

CARDINIA ROAD EMPLOYMENT PRECINCT STRUCTURE PLAN

(INCLUDING THE CARDINIA ROAD EMPLOYMENT PRECINCT NATIVE VEGETATION PRECINCT PLAN)





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FOREWORD

The Cardinia Road Employment Precinct (the Precinct) represents a new model for employment delivery in growth areas. The Precinct is planned as an integrated commercial and industrial business park in a high amenity setting that is characterised by landscape wetland corridors, a diverse activity centre and quality residential area. It offers a business and operational environment superior to other locations in south-east Melbourne. To attract investment and encourage business establishment, extensive major transport infrastructure will be provided at the outset of development, numerous high-profile sites have been created and a range of goods and services will be delivered in the Precinct that is rarely available in industrial or business parks.

The Precinct is located in Cardinia Shire, in the Casey-Cardinia Growth Area south-east of Melbourne. Only 9 percent of the Shire's 1,280 square kilometres is designated for urban development, known as the Cardinia Urban Growth Area. An extensive hinterland accesses goods and services from the Shire, expanding across Gippsland and the Dandenongs and encompassing the Shires of Bass Coast, Baw Baw, South Gippsland and Yarra Ranges.

Within the Cardinia Urban Growth Area is the Cardinia Employment Corridor and at its heart is the Precinct. Located south of the Princes Freeway, the accessibility of the Cardinia Employment Corridor to the east offers the opportunity for businesses to establish regional trade catchments, generating significant economic growth. Located adjacent to the City of Casey and with established transport links to Dandenong and the EastLink corridor, the location also offers the opportunity for businesses to serve areas to the west. These locational characteristics ensure Cardinia's

Employment Corridor is well positioned to play a significant role in meeting both metropolitan and regional needs.

Of the five growth areas identified by the State Government in *A plan for Melbourne's growth areas (DSE 2006)*, Casey-Cardinia is the only area designated for urban expansion east of Melbourne. With the rate of development exceeding past growth forecasts and residential land supply becoming increasingly scarce, *A plan for Melbourne's growth areas (DSE 2006)* released additional land for development: accommodating 135,000 to 170,000 new residents. As a result, the population of the Growth Area will increase by 220,000 persons from 2006 to 2031, with the total future resident population reaching ½ million.

A plan for Melbourne's growth areas (DSE 2006) recognised the need for significant numbers of jobs to be delivered within the growth area, enabling a greater proportion of residents to access employment closer to where they live. A target to deliver between 100,000 and 140,000 jobs was set. A significant expansion to the Urban Growth Boundary (UGB) occurred in Cardinia Shire, creating the 2,500 hectare Cardinia Employment Corridor.

The release of additional land in Casey under *Melbourne @ 5 Million (DPCD 2008)* will further increase demand for employment, with the population anticipated to grow to over 600,000 residents. To ensure the delivery of an adequate number of jobs for the growth area, there is a need to deliver 'more than just sheds' of traditional industrial development, by facilitating the development of a mix of uses that are jobs-intensive and require a range of skills.

The Precinct is the catalyst for the development of the Cardinia Employment Corridor, planned to accommodate a diverse range of industry types in a business park setting. Its success in attracting investment will have a significant impact on the timing and density of development and job yields across the corridor. The Precinct's land use mix is targeted to achieve this particular strategic outcome. The residential component underpins delivery of high-density, higher-skilled employment, providing the necessary support for goods, services and facilities that are a major 'point of difference' for this business park. It is within this context that the provision of residential uses within a designated employment precinct is supported.

New opportunities for major investment, economic growth and job creation will be provided in the growth area as a result of the implementation of the Cardinia Road Employment Precinct Structure Plan. The development of the Precinct will significantly enhance the quality of life of residents throughout the region, by providing an alternative choice of work destination closer to home.

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01 INTRODUCTION

1.1 Composition of Documents

This document comprises two incorporated documents. The Cardinia Road Employment Precinct Structure Plan (PSP) and the Cardinia Road Employment Precinct Native Vegetation Precinct Plan. (NVPP) The documents and their inter-relationship are explained below.

1.2 Role of the Precinct Structure Plan

The PSP has been prepared by Cardinia Shire Council in conjunction with the Growth Areas Authority (GAA), government agencies, service authorities and major stakeholders.

The PSP is a long-term plan for urban development. It describes how the land is expected to be developed, the infrastructure and services planned to support the new community and how they will be delivered as well as protecting and enhancing valuable natural and historic features.

The PSP:

- enables the transition of non-urban land to urban land;
- sets the vision for how land should be developed and the desired outcomes to be achieved;
- determines the overall layout of future land use and development;
- enables the assessment, protection and enhancement of biodiversity values in the context of surrounding future urban development;

- outlines projects required to ensure that future workers, residents and visitors within the Precinct can be provided with timely access to services and transport necessary to attract investment and support a quality lifestyle;
- details the design requirements for built form and conditions that must be met by future land use and development;
- informs the use and development controls that apply in the schedule to the Urban Growth Zone and what permits may be granted under the Schedule to the Zone; and
- provides developers, investors and local communities with certainty about future development.

The PSP is informed by:

- The State Planning Policy Framework set out in the Cardinia Planning Scheme, including the Growth Area Framework Plans and the Precinct Structure Planning Guidelines (GAA 2009); and
- The Local Planning Policy Framework of the Cardinia Planning Scheme and other local policies and strategies (under Clause 21 and 22).













1.3 Land to which the Precinct Structure Plan applies

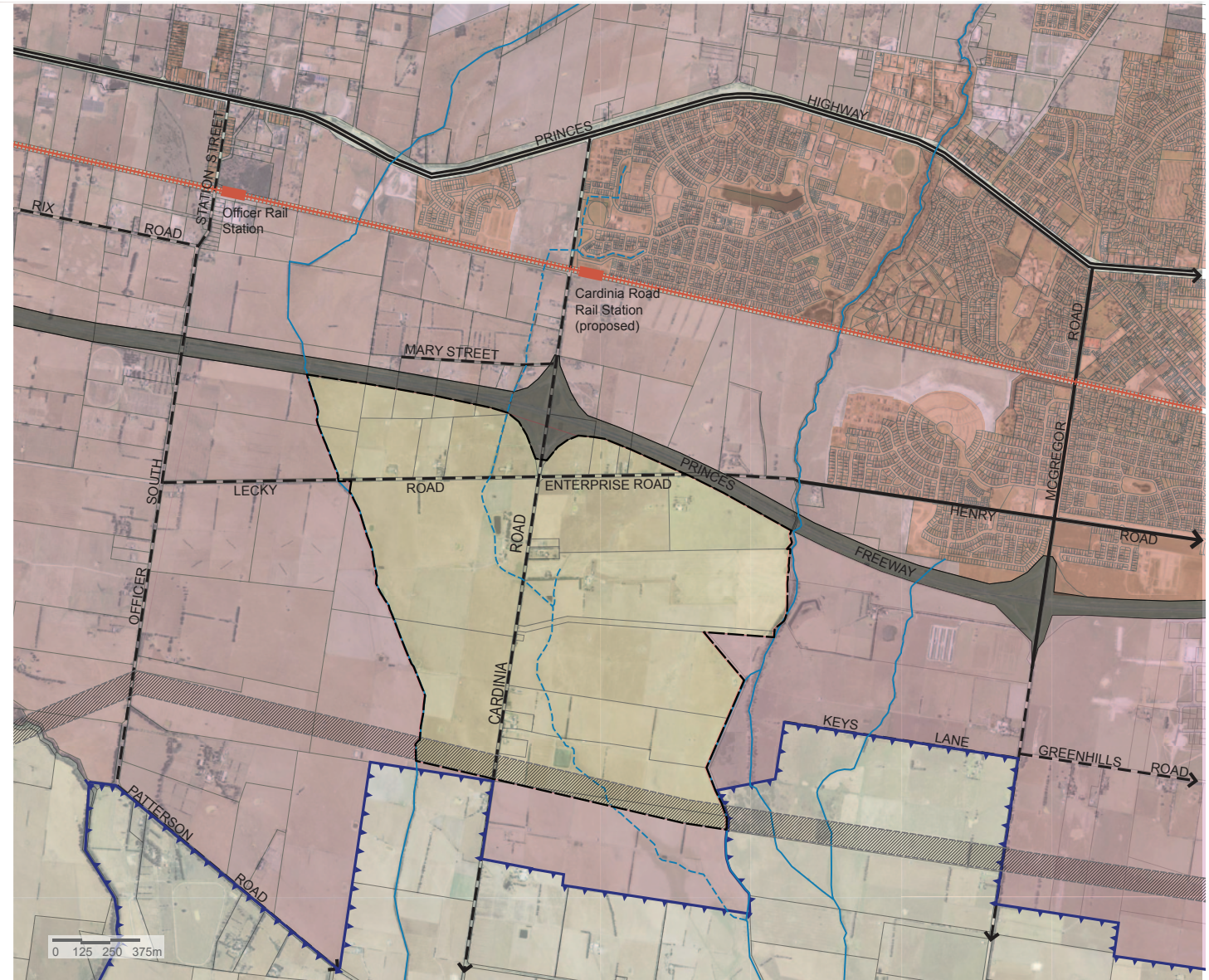
The PSP applies to the land shown in Plan 1 and shown on the Cardinia Planning Scheme maps as Schedule 2 to the Urban Growth Zone (UGZ2). The PSP applies to approximately 590 hectares of land, which is generally defined by:

- Princes Freeway (including Pakenham Bypass) to the north;
- Toomuc Creek to the east;
- the regional electricity transmission line easement to the south; and
- Gum Scrub Creek to the west.

Plan 1: PSP Area

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
-  Existing Waterways
-  Drainage Lines
-  State Freeway
-  State Highway
-  Existing Road (urban standard)
-  Existing Road (rural standard)
-  Rail Station and Line
-  Transmission Easement
-  Future Urban Area
-  Existing Urban Area



1.4 Role of the Native Vegetation Precinct Plan

The NVPP has been prepared for the purposes of clause 52.16 of the Cardinia Planning Scheme. It identifies:

- native vegetation which may be removed without a planning permit
- the offsets that must be provided to remove the native vegetation which can be removed; and
- native vegetation to be protected which cannot be removed without a permit.

The NVPP has been included within the PSP document because clause 52.16 anticipates that it can be and because the NVPP is one of the planning tools that is used to facilitate development in accordance with the PSP. However, the NVPP is a separate incorporated document notwithstanding it is found within the PSP.

The statutory basis for the NVPP is clause 52.16 of the Cardinia Planning Scheme and not Schedule 2 to the Urban Growth Zone. Users of this document should note that the NVPP has a different statutory basis to the PSP.

1.5 Land to which the Native Vegetation Precinct Plan applies

The NVPP applies to the land identified in NVPP Map 1 (which in the case of the Cardinia Road Employment Precinct covers the same land as the PSP and UGZ 2).

1.6 Implementation

The Cardinia Road Employment Precinct Structure Plan will be implemented by:

- development proponents who develop land generally in accordance with this PSP;
 - the Victorian Government and Cardinia Shire Council by funding, delivering and managing a range of infrastructure and services to support the development of the Precinct;
 - development proponents, the Victorian Government and Cardinia Shire Council in attracting investment and encouraging major businesses to establish in the Precinct; and
 - non-government service providers and individuals such as volunteers who manage and deliver services.
- Amendment C130 to the Cardinia Planning Scheme will implement the PSP through:
- Schedule 2 to the Urban Growth Zone at Clause 37.07;
 - the proposed Cardinia Road Employment Precinct Infrastructure Funding Agreement made under Section 173 Agreement of the Planning and Environment Act 1987;
 - a Developer Contributions Plan Overlay, potentially requiring a Developer Contributions Plan to be incorporated into the Scheme at Clause 45.06 in the future;
 - the Cardinia Road Employment Precinct Native Vegetation Precinct Plan incorporated in the Scheme at Clause 52.16 (Note: This document is included within and forms part of this Precinct Structure Plan); and
 - other requirements of the Planning Scheme, as appropriate.

1.7 Further Reference Material

A glossary and other information including details of technical studies supporting the preparation of this PSP are listed in Section 7.3 Supporting Documents.

1.8 Monitoring and Review

Cardinia Shire Council and the Growth Areas Authority will jointly monitor the implementation of the PSP. Its effectiveness will be evaluated regularly, at least every five years. The PSP may be revised and updated following review, which may trigger a review of the Infrastructure Funding Agreement or Development Contributions Plan (if one is prepared in the future).

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02 LOCAL CONTEXT AND SITE DESCRIPTION

2.1 Metropolitan and Regional Context

Located in Cardinia Shire, the Cardinia Road Employment Precinct (the Precinct) is approximately 50 kilometres south-east of Melbourne CBD and 20 kilometres east of the Dandenong Central Activities District (CAD).

The Casey-Cardinia Growth Area has experienced high levels of population growth over the past fifteen years, with the highest proportion of new urban development in Melbourne occurring in the corridor. Areas such as Dandenong, Rowville, Scoresby, Clayton and Cheltenham have historically provided jobs for residents of the growth area, with the majority of people commuting to established employment nodes north and west of Dandenong. At the time of the 2006 Census, Cardinia Shire had a total population of 56,000 residents and Casey had a total population of 214,000 residents. The population is forecast to double over the next 15 to 20 years, generating the need to provide substantial new local employment.

Historically, the rate of job creation has not kept pace with population growth. Increasing scarcity of zoned and serviced industrial land has placed pressure on industry and the broader community. To meet future job requirements and optimise community resilience and prosperity, a significant number and diversity of jobs must be delivered within the growth area.

To deliver sufficient jobs, additional land for employment has been provided in the Cardinia Employment Corridor. Located south of the Princes Freeway, this corridor extends from Cardinia Creek to the edge of the urban growth boundary, east of Koo Wee Rup Road. Covering an area of approximately 2,500 hectares it forms the largest contiguous greenfields employment zone east of Dandenong.

The Cardinia Road Employment Precinct is the catalyst for development, planned to stimulate investment in jobs-intensive industries.

Located centrally to the Cardinia Employment Corridor, the intensity of development in the Precinct will impact upon investment attraction and job densities across the balance of the corridor. The strategic planning carried out for this Precinct provides for the detailed implementation of the Casey-Cardinia Growth Area Framework Plan (DSE 2006) and outlines how the development of the Precinct will achieve the objectives of the Plan for Melbourne's Growth Areas.

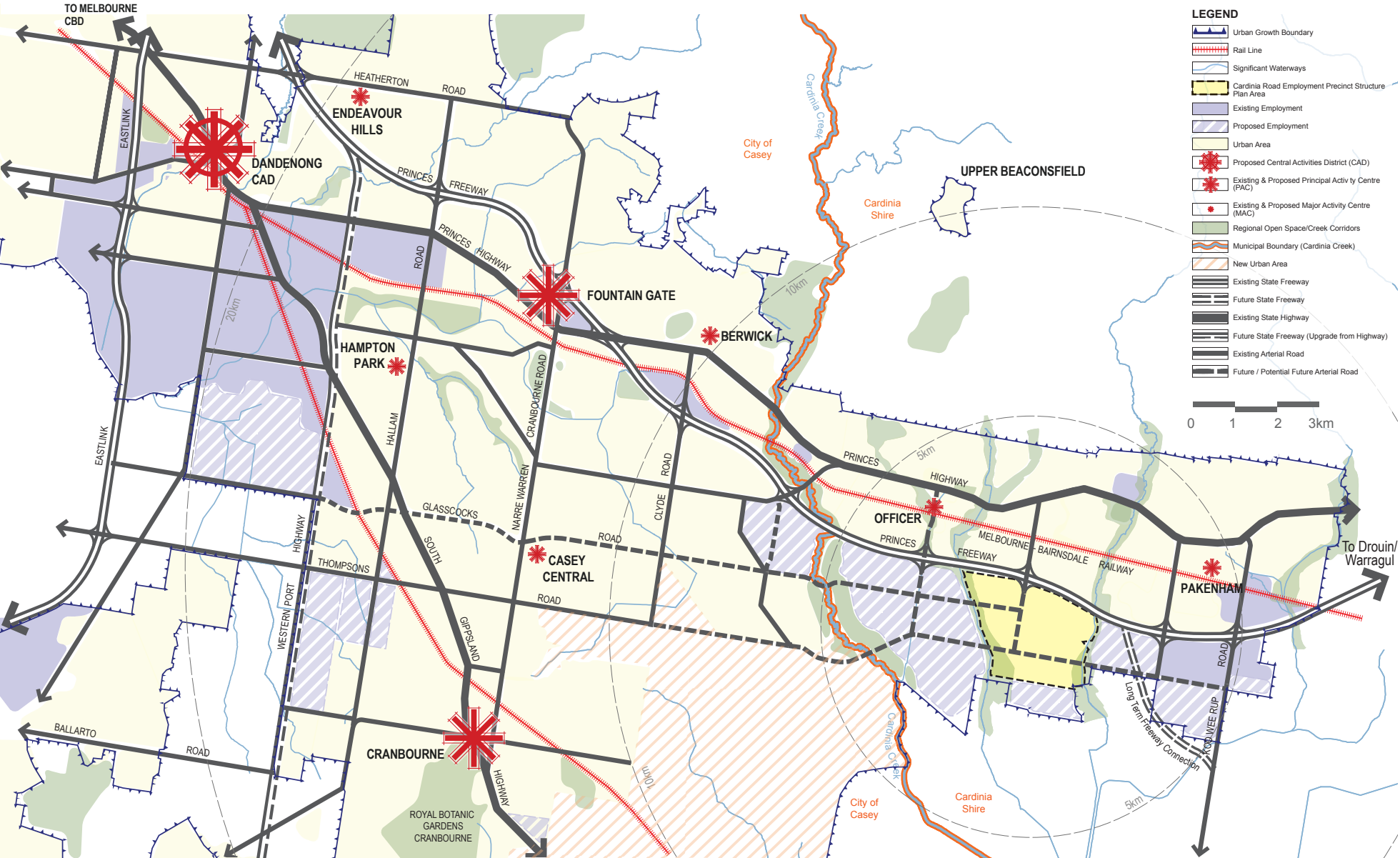
In the broader metropolitan and regional context (refer Plan 2), the development of the Precinct will be influenced by:

- **established and planned employment areas** such as:

- Dandenong South, an existing employment area where major corporations control greenfield sites;
- Hallam, an existing employment area located just east of Dandenong, which is fully developed;
- Cranbourne West, a new employment node located on Western Port Highway, where a 340 hectare industrial and commercial park is being developed;
- Narre Warren-Fountain Gate Business Park, located at the intersection of the Princes Highway and Princes Freeway. Designated for office development, the area is part of the Narre Warren-Fountain Gate Principal Activity Centre (PAC);
- Casey Technology Park at Berwick, where Monash University Berwick and Casey Hospital are located. The area is planned to be developed for technology-related business and research and development activities;

- C21 Business Park, a new employment node located just south of the Princes Freeway, adjacent to Cardinia Creek; and
 - potential additional employment land in the City of Casey, which will be investigated as part of the Melbourne @ 5 Million Framework Plan process.
- **an extensive network of State freeways, highways and major roads**, such as:
 - Princes Freeway (including the Pakenham Bypass) that links to metropolitan Melbourne and EastLink (via the Monash Freeway) and Gippsland to the east;
 - Princes Highway that is a secondary link to metropolitan Melbourne, EastLink and Gippsland;
 - an upgraded Healesville-Koo Wee Rup Road connecting the Princes Freeway to South Gippsland Highway, including a bypass of Koo Wee Rup and a longer-term freeway connection to the Princes Freeway just east of the Precinct;
 - South Gippsland Highway, which connects from Dandenong South to South Gippsland, including providing links to Phillip Island and Wilsons Promontory;
 - Western Port Highway (proposed to be upgraded to a freeway) that connects to the Port of Hastings and Mornington Peninsula;
 - EastLink, which provides access (via the Monash Freeway) to the corridor of established employment areas from Frankston to Ringwood;
 - Thompsons Road, a major arterial road that will be extended to provide east-west access from the eastern edge of the Cardinia Employment Corridor to EastLink at Carrum Downs, connecting the several major employment areas including the C21 Business Park and Cranbourne West along its alignment; and

Plan 2: Metropolitan and Regional Context



- Glasscocks/Grices Road, a second arterial that runs parallel with Thompsons Road, providing east west access from the Precinct to Carrum Downs.
- **an expanding activity centre network** that includes:
 - Dandenong Central Activities District, intended to provide a 'regional CBD' to serve Melbourne's south-east;
 - Principal Activity Centres at Narre Warren-Fountain Gate and Cranbourne; and
 - Major Activity Centres at Pakenham, Officer, Berwick, Casey-Central, Hampton Park and Endeavour Hills.
- **an established rail network**, encompassing:
 - a metropolitan railway line, which branches into the Pakenham and Cranbourne lines at Dandenong. The railway line runs parallel to the Princes Freeway, centrally to Cardinia Shire's future residential area; and
 - a V-Line regional railway service, connecting to Gippsland from Pakenham Station.
- **an extensive open space network**, that includes:
 - Toomuc Recreation Reserve, a significant Regional Open Space area;
 - waterways such as Gum Scrub Creek, Toomuc Creek, Deep Creek and Cardinia Road Drain which form part of the Toomuc/Deep Creek Outfall Catchment and the Koo Wee Rup Flood Protection District; and
- Cardinia Creek, which defines the boundary of City of Casey and Cardinia Shire and provides a significant urban break between suburbs. It also provides a series of linked parks, known as the Cardinia Creek Parklands, which stretch over 400 hectares along 10 kilometres of Cardinia Creek.

2.2 Local Context

2.2.1 History

The Bunurong People had custodianship of a significant proportion of Cardinia Shire prior to European settlement. The Bunurong had spiritual obligations to maintain the country of Lohan, the dreamtime ancestor who created much of the country between the mouth of the Yarra River and Wilsons Promontory. Indigenous campsites remains are likely to be located across the entire Koo Wee Rup floodplain.

The district was settled by Europeans in the early 1900s. Within the Precinct, the European history of the area is represented by 'Kaduna Park' homestead, located just west of Cardinia Road. 'Kaduna Park' is a circa 1912 Edwardian-era weatherboard dwelling, representative of dwellings associated with early farming endeavours in the area.

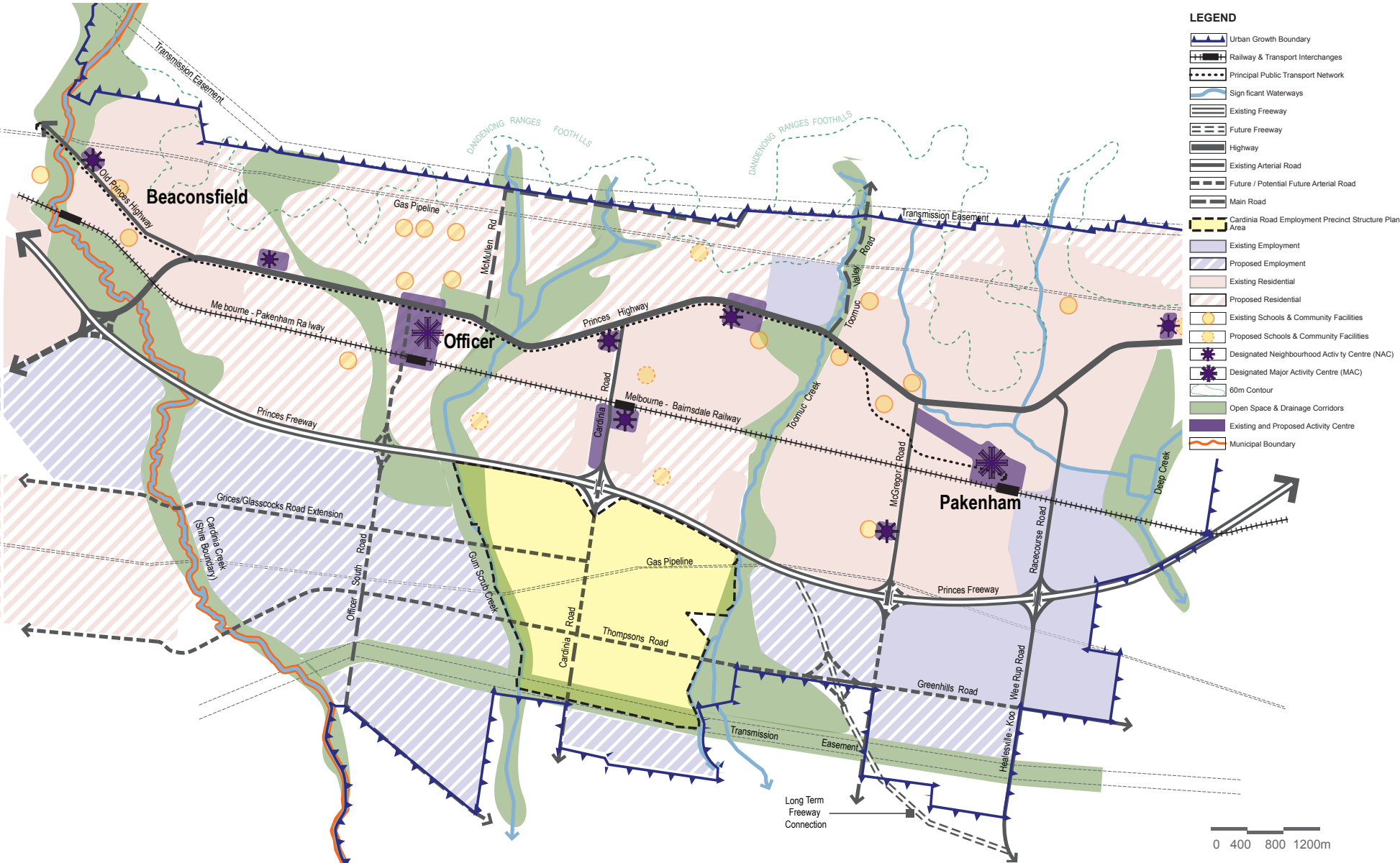
2.2.2 Surrounding Neighbourhoods

The future urban area in Cardinia Shire surrounds the Princes Freeway, with residential precincts north of the Freeway and employment precincts to the south (as shown in Plan 3 and 3a).

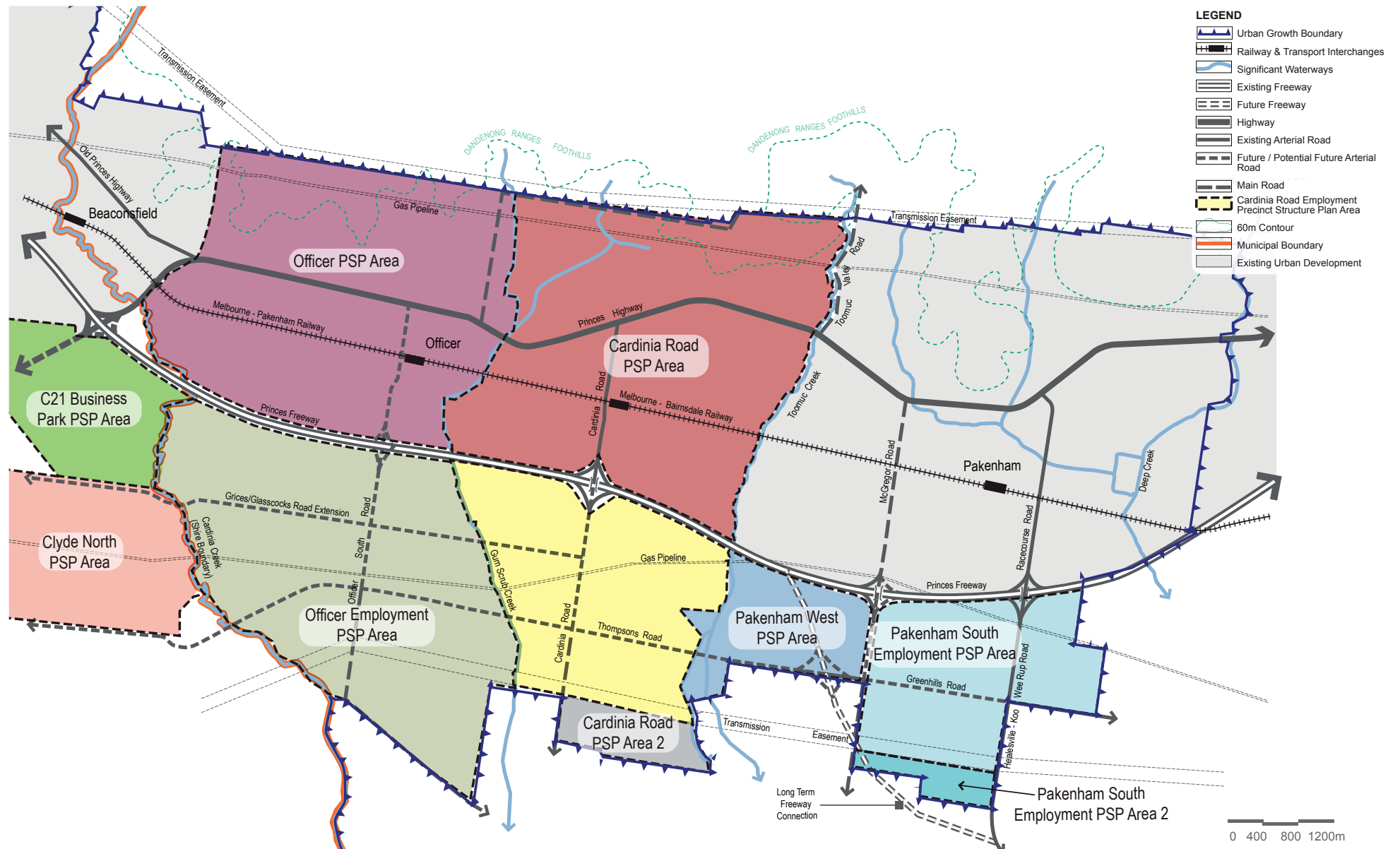
The residential precincts

The Cardinia Road Precinct Structure Plan area is located immediately north of the Precinct. Principally a residential community, development of the area is currently underway. The Cardinia Road Precinct Structure Plan covers the Lakeside Estate, a largely established high-quality residential area. It has attracted a more diverse demographic to Pakenham due to its quality design and facilities such as the Cardinia Cultural Centre.

Plan 3: Local Context



Plan 3a: PSP Areas



A wide range of infrastructure and facilities will be delivered in the Cardinia Road Precinct that support the Cardinia Road Employment Precinct, including schools, active open space reserves, arterial road connections and access to public transport services via Cardinia Road Station.

Residential development has continued in the Pakenham area in recent years, with the land east of Toomuc Creek already significantly developed. Located centrally to the area is the Pakenham Major Activity Centre, which provides the widest range of goods and services in Cardinia Shire.

The preparation of Officer Precinct Structure Plan is underway, including planning of the Officer Major Activity Centre located in a new residential community of approximately 30,000 people. It will also deliver a wide range of infrastructure and facilities that will support the employment precincts.

The employment precincts

The Cardinia Employment Corridor has a total area of approximately of 2500 hectares, which has been divided into four precincts:

- Cardinia Road Employment Precinct (the Precinct);
- Pakenham South Employment Precinct, located east of McGregor Road to the eastern edge of the Urban Growth Boundary. Encompassing South East Business Park, the area is already partially zoned for industrial use. It is planned to accommodate local and regional industrial businesses in addition to a bulky goods area;
- Pakenham West Employment Precinct, located between Toomuc Creek and McGregor Road, with the future Koo Wee Rup Bypass alignment connecting to the Princes Freeway centrally to the area; and

- Officer Employment Precinct, a future major employment precinct of 1050 hectares, located west of Gum Scrub Creek and extending across to Cardinia Creek.

A precinct-based approach has been adopted to enable growth and development of the Cardinia Employment Corridor to be effectively managed, based on the following principles:

- stage the release of land to match demand;
- maximise the diversity of investment and employment through land supply;
- stimulate demand by creating a critical mass of activity and development in consolidated nodes to attract additional investment;
- ensure future planning accommodates the changing needs of industry and community, as demand for different employment land types evolves; and
- concentrate infrastructure investment in consolidated nodes to create a superior business and operational environment.

A number of employment land development opportunities exist, including:

- large format campus style office park development;
- land efficient transit orientated development;
- core activity centre development;
- major road access;
- proliferation of high-profile sites along State Freeways and arterial roads; and
- local business establishment and expansion.

However, the local context also presents clear challenges for the delivery of the vision for the Precinct. The scale of the Cardinia Employment Corridor requires the release of employment land to be carefully managed, balancing supply with demand.

To establish a successful and concentrated 'core' of activity, demand must be directed into the Precinct, maximising its attractiveness to additional investment.

To achieve a critical mass of development in the Precinct, the release of additional land in the Cardinia Employment Corridor should be discouraged until the commercial area within the Precinct has significantly established. The dispersal of investment will otherwise impact upon land uptake rates within the Precinct, adversely affecting the timing and density of jobs.

2.2.3 Transport and Movement

The Princes Freeway runs along the northern edge of the Precinct, providing the major metropolitan and regional road connection for the area. This is supported by the Princes Highway, a designated Principal Public Transport Network (PPTN) route. These two major east-west routes are accessed via Cardinia Road, which runs centrally through the Precinct.

There is no existing arterial road network within the Cardinia Road Employment Precinct. There are three existing rural roads: Cardinia Road (rural seal), Lecky and Enterprise Road (graded surfaces), which will be upgraded as the Precinct develops. Future connections to arterial roads in Casey and planned upgrades of existing north-south roads within Cardinia Shire will deliver a clear grid system within the Growth Area.

North of the Freeway, the upgrade of Cardinia Road to an urban arterial standard is underway. The planned future duplication of Cardinia Road and delivery of a second bridge over the Princes Freeway and grade separation of the railway line will significantly improve accessibility between the Cardinia Road and Cardinia Road Employment Precincts. Duplication of Cardinia Road south of the Freeway will also occur as traffic volumes increase over time.

Two new east-west arterial roads are planned to be constructed in the Precinct. Thompsons and Glasscocks / Grices Road will connect the arterial road networks of the City of Casey and Cardinia Shire. These will enhance access between the Pakenham and Officer Employment Precincts and the Major Activity Centres, providing alternative access to Officer South Road, McGregor Road and Koo Wee Rup/Racecourse Road.

The delivery of a freeway interchange at Officer South Road will also improve access to the Precinct from the west.

The Melbourne to Bairnsdale (Pakenham metropolitan line) railway line is located approximately 1 kilometre north of the Princes Freeway, with Cardinia Road Station being constructed east of Cardinia Road. The existing Principal Public Transport Network (PPTN) bus route serving the area connects Narre Warren-Fountain Gate to Pakenham, along the Princes Highway.

The development of the Precinct and the broader Cardinia Employment Corridor requires a substantial expansion of the public transport network to meet the needs of the community, particularly to provide a viable alternative mode of transport for journey to work trips.

Melbourne 2030 identifies the need to protect the long-term options for a new general aviation airport in the south-east of Metropolitan Melbourne, by ensuring that urban development does not impinge on possible sites, possible buffer zones or flight paths. While the location and delivery of this airport has not been established, the future development of this Precinct under this PSP will not prejudice the ability of planning to achieve this policy position.

2.2.4 Employment and Activity Centres

The network of activity centres in Cardinia Shire comprises:

- two Major Activity Centres (MACs): the existing Pakenham Town Centre and a future Officer Town Centre. MACs will provide a wide range of goods and services including discretionary activities and items;
- seven existing and future Neighbourhood Activity Centres (NACs), in addition to the NAC planned for the Precinct. NACs will provide for the day-to-day and weekly needs of communities and create a focus for social interaction; and
- Neighbourhood Convenience Centres (NCCs) that are generally co-located with schools, community centres and open space in the residential areas. NCCs supplement the higher order centres in providing for day-to-day needs offering basic goods and services.

Pakenham Town Centre has historically been the focus for a range of retailing, medical, personal and professional services that support residents in Cardinia Shire and parts of Gippsland. Together with significant industrial development in close proximity to the Town Centre, Pakenham is an existing major source of employment in the Shire. Pakenham's role as an employment hub will continue to evolve as the Cardinia Urban Growth Area develops. The proposed relocation of Pakenham Racecourse and development of a new Woolworths supermarket and Big W discount department store in the core retail area will strengthen the centre. Further investment and regeneration in the centre is expected.

Officer Town Centre is a new MAC, where planning is underway. The centre will provide a main street environment integrated with Officer Railway Station and is expected to accommodate a wide range of activities including retailing, cafes and restaurants, personal, professional and community services and other uses. The development of Officer Town Centre will deliver a significant number of jobs to the growth area and enhance the quality of life and range of lifestyle choices available in Cardinia Shire.

Two existing NACs are located in close proximity to the Precinct, at Lakeside Pakenham on the Princes Highway and at Heritage Springs on McGregor Road. Two other NACs are proposed north of the Precinct at Cardinia Road Station and the corner of Princes Highway and Cardinia Road.

Existing employment areas within Cardinia Shire include:

- South East Business Park, located east of the precinct in the Pakenham South Employment Precinct. A new area zoned for industrial development, the majority of land is to be developed;
- industrial areas east of Pakenham Town Centre, located east of Racecourse Road, where investment has occurred in speculative showroom/warehouse development; and
- industrial areas on Princes Highway, west of Toomuc Creek, where light industrial uses have established with some showrooms along the Highway.

While these areas have a role in delivering employment to the region, the Cardinia Road Employment Precinct will have a distinctly different role and provides for a different mix of industry types.

2.2.5 Open Space

The Precinct is well integrated with the established and future open space networks of surrounding precincts. Rehabilitation of existing creeks and waterways such as Gum Scrub Creek, Toomuc Creek and Deep Creek will provide north-south links throughout Cardinia Urban Growth Area. New trail networks will be delivered as part of the development of the Precinct, integrating the passive open space network with active reserves north of the Princes Freeway.

The Precinct will have access to:

- a new district level active recreation reserve located on Gum Scrub Creek immediately north of the Precinct, via the Gum Scrub Creek trail and a pedestrian underpass that provides access under the Freeway;
- Toomuc Major Recreation Reserve, a Regional Open Space area via the Toomuc Creek trail and a pedestrian underpass that provides access under the Freeway;
- a second new district level active recreation reserve located just north of Princes Freeway between Toomuc Creek and Cardinia Road. This reserve would be accessed by the Toomuc Creek trail and the Freeway pedestrian underpass or from the bridge over the Freeway at Cardinia Road; and
- a new passive parkland with extensive wetland and drainage areas, north of Princes Highway just west of Cardinia Road.

2.2.6 Community Facilities

Extensive community infrastructure has already been delivered north of the Princes Freeway in the Lakeside Pakenham Estate including:

- Lakeside Community Centre, with a kindergarten and maternal child health centre;
- Cardinia Cultural Centre, a major regional function and entertainment facility;
- Primary and Secondary schools, including Lakeside Lutheran College and Lakeside Pakenham Primary School; and
- a regional indoor sports facility on Princes Highway.

Three additional primary schools and a secondary college are planned north of the Precinct in the Cardinia Road Precinct Structure Plan area, in addition to six new community centres. Of these, two of the primary schools, the secondary school and four of the new community centres are located immediately north of the Freeway. The planned network of trails, shared paths and pedestrian bridges and underpasses support the integration of the precincts and enable the facilities to be easily accessed by residents, workers and visitors.

2.3 Precinct Features

2.3.1 Heritage

Aboriginal Cultural Heritage

The Precinct is located in the former Koo Wee Rup swamp wetlands, an area known to contain sites and artefacts of Aboriginal cultural heritage value will be identified. Toomuc Creek is the eastern boundary of the Precinct, which is recognised as an area of Aboriginal cultural heritage sensitivity under the Division 3 of Part 2 of the Aboriginal Heritage Regulations 2007.

Ten registered Aboriginal sites have been identified just east of Toomuc Creek, outside the PSP area. Of the ten sites, nine are artefact scatters and one is a scarred tree.

Preparation of a voluntary Cultural Heritage Management Plan is underway, which includes all properties in the Precinct. Preliminary assessments identified areas of sensitivity along Toomuc and Gum Scrub Creeks and in southern parts of the Precinct. Sub-surface testing has not identified any significant sites within the Precinct, with two artefacts being recovered. The only artefacts found are within the transmission line easement (refer Victorian Aboriginal Heritage Register sites shown on Plan 4), which is shown as encumbered open space in the future urban structure plan (Plan 5).

Post-Contact Heritage

There is limited evidence of post-contact heritage in terms of existing buildings. A scattering of dwellings marks the landscape, however many are the result of recent development and have no heritage value, with the exception of Kaduna Park (refer Plan 4).

Kaduna Park is a locally significant heritage homestead (Heritage Overlay reference - HO90). Located west of Cardinia Road it is representative of Edwardian architecture within a landscaped setting, typical of farm dwellings from the early 1900s.

In addition to Kaduna Park homestead, the trees lining the driveway and other trees surrounding the dwelling are of significance on the property.

Currently the Heritage Overlay applies to the entire farm, most of which has no heritage value.

A "Heritage Overlay Focus Area Plan" has been prepared by Graeme Butler & Associates (2007), reflecting the elements of significance on the property. As part of the Amendment implementing this PSP, the extent of the Heritage Overlay will be reduced.

2.3.2 Biodiversity

For much of its recent history, the Precinct has been used for farming activities including grazing and cropping. As a result, the majority of original vegetation on the land has been cleared and the land disturbed through cultivation. The Precinct is largely a modified landscape, however it does provide appropriate habitat features for a number of common species and the threatened Growling Grass Frog.

As part of the former Koo Wee Rup swamp, the Precinct has low lying land. Several creeks and drainage lines that feed into the Westernport, which is listed as an internationally-significant Ramsar wetland. The development of the Precinct creates the opportunity to enhance creeks, waterways and drainage lines, establishing habitats for fauna species and protecting and enhancing vegetation.

The Growling Grass Frog range includes the Cardinia Urban Growth Area and sightings have been recorded at several natural and man-made water bodies in the Precinct.

The greater Pakenham area is home to a 'meta-population' that represents a remnant of the former Koo Wee Rup Swamp population. The species is of national significance, listed as 'vulnerable' under the Environmental Protection and Biodiversity Conservation Act 1999 and 'threatened' under the Victorian Flora and Fauna Guarantee Act 1988.

The significance of the Growling Grass Frog and the population in the Pakenham area requires that particular measures need to be implemented to protect and enhance habitat in the Precinct.

In a limited number of places, small patches of remnant understorey vegetation have been found in the Precinct. Two Ecological Vegetation Classes (EVCs) have been identified in the Precinct: Swampy Woodland and Swamp Scrub. Swamp Scrub is found in linear localised patterns along Lecky Road, Enterprise Road and Cardinia Road. Swampy Woodland is also clustered in similar patterns along Cardinia Road.

2.3.3 Topography and Landform

The Precinct has a highly modified landscape with a slight fall from north to south. There are views to the north towards the Dandenong Foothills, which provide a landscape backdrop to the Cardinia Urban Growth Area. The bridge over Princes Freeway provides views across the Precinct, looking south along Cardinia Road (refer Plan 4).

The Precinct is currently used for agricultural purposes and is dominated by pastoral species. Across the Precinct, there are numerous farm dams, including two large turkeys-nest dams, which are located adjacent to the Cardinia Road Drain at the rear of Kaduna Park homestead and just north of the transmission line easement, east of Cardinia Road.

2.3.4 Catchments and Drainage

The boundaries of the Precinct are defined by major creeks: Gum Scrub Creek to the west and Toomuc Creek to the east (refer Plan 4). The Cardinia Road Drain runs north-south through the Precinct, crossing Cardinia Road at a central point. An existing overland flow path generally extends along Cardinia Road Drain, which is covered by a Land Subject to Inundation Overlay. The Floodway Overlay covers land adjacent to Gum Scrub Creek.

The Cardinia Road Employment Precinct affects the adjacent catchments associated with the Deep Creek and Cardinia Creek waterways, with all three outfall channels running parallel south of the Urban Growth Boundary (UGB) into the Koo Wee Rup Flood Protection District and ultimately Westernport.

Development Services Schemes (DSS) (commonly known as 'drainage schemes') have been prepared for Cardinia Road Precinct, Officer Precinct and Pakenham South Employment Precinct.

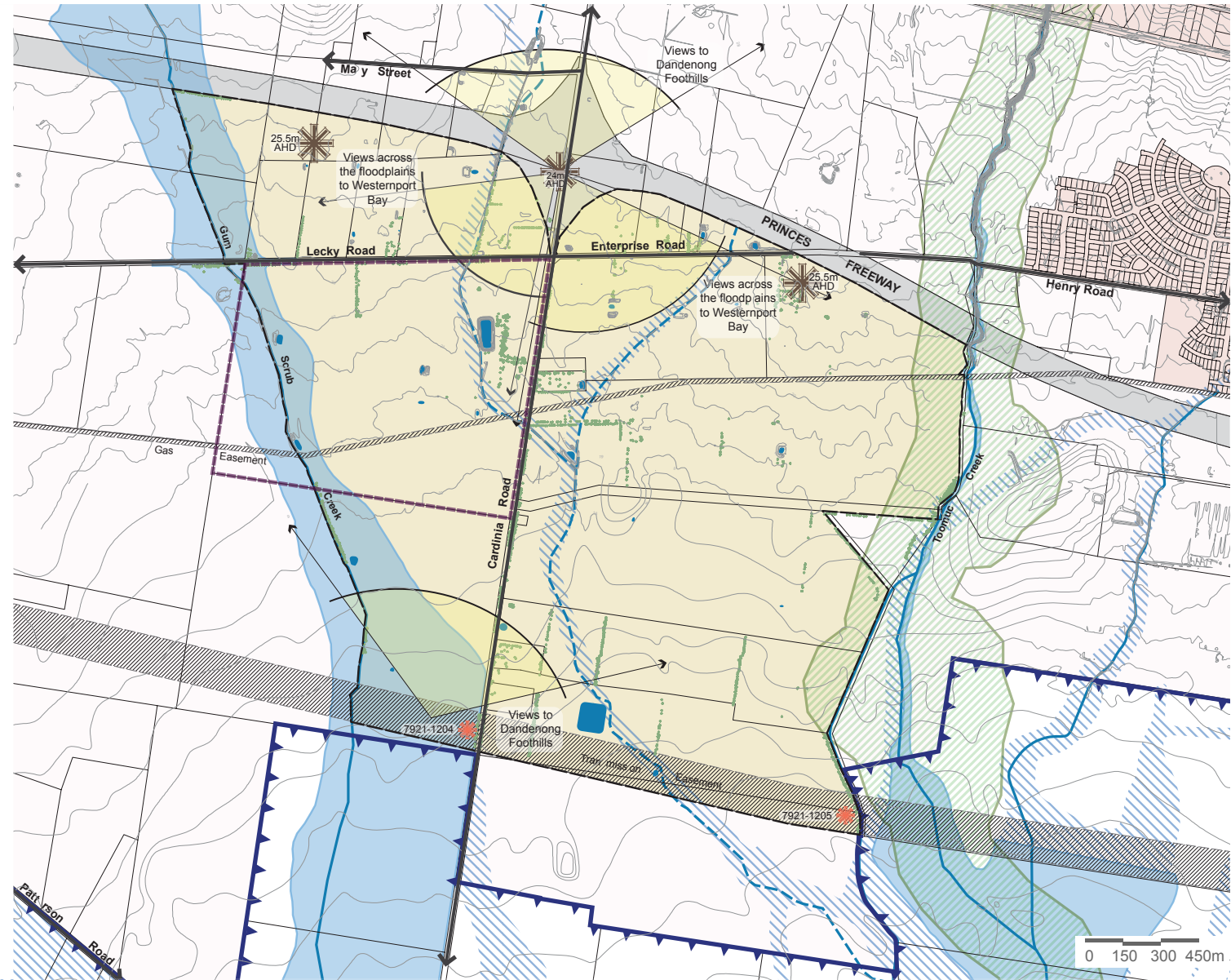
Preliminary work on the preparation of a DSS for Officer Employment Precinct is currently underway, which will clarify the requirements for Gum Scrub Creek. At present, a wetland area is planned under the draft Officer Precinct DSS just south of the Freeway, west of Gum Scrub Creek.

In the preparation of the Officer Employment Precinct DSS, consideration should be given to the potential for accommodating the wetland outside the UGB, due to the limitations it places on the future integration of Officer with the Precinct.

Plan 4: Precinct Features

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- Existing Roads
- Existing State Freeway
- Existing Creeks
- Existing Drainage Lines
- Existing Waterbodies/Dams
- Contours (1m intervals)
- Existing Views
- High Points
- Land Subject to Inundation Overlay (LSIO)
- Floodway Overlay (FO)
- Existing Vegetation (Approx. location)
- Heritage Overlay - Kaduna Park
- Existing Major Easements
- Area of Aboriginal Cultural Heritage Sensitivity.
Source: AAV (Aboriginal Heritage Regulations 2007)
- Existing Urban Area
- Future Urban area
- Victorian Aboriginal Heritage Register (VAHR) Site and Number



2.3.5 Service Infrastructure

Two major easements traverse the Precinct, which have limited development potential and specific requirements about how they may be utilised.

- An electricity transmission line easement extends along the southern boundary of the Precinct. It contains three existing overhead transmission lines (one 66kV and two 500kV cables) within a 154 metre wide easement.
- A gas pipeline extends across the middle of the Precinct. Connecting the Longford gas plant in Gippsland to Dandenong, it generally has an east-west alignment. Within the 20 metre wide easement is a 450mm diameter pipe.

The land encumbered by the gas and electricity easements will either be utilised as open space or form part of future road easements within the Precinct.

A new fibre optic broadband cable has been installed along Enterprise and Lecky Road. The location of the cable is planned to fit within the nature strips of future road cross-sections, ensuring the services are appropriately located in the road reserve in the long-term.

2.3.6 Existing Subdivision Pattern

There are relatively few parcels of land in the Precinct, with approximately 590 hectares split into 30 titles owned by 16 landowners.

Numerous large regularised parcels of land are accessed via Cardinia Road, creating the opportunity to establish a competitive land supply market. Subject to the upgrade of Cardinia Road to urban standard (which may be delivered as works-in-lieu of developer contributions, if approved by Cardinia Shire Council), lots could be subdivided at any time.

Limited consolidation is required to facilitate development and achieve an integrated suburb design. The three existing road reserves will form part of the future suburb layout, as follows:

- Cardinia Road will be widened and upgraded to an urban arterial standard.
- Lecky and Enterprise Roads are both Government Roads, where service infrastructure may be delivered prior to development of the Precinct. Although mechanisms exist for the incorporation of the land into development parcels or diverted, it is unlikely that the timing of infrastructure delivery will enable these outcomes and the roads will need to be sealed as part of adjacent subdivisions.

A Crown Land parcel (Property 21) is located centrally to the Precinct, extending east from Cardinia Road to Toomuc Creek. At 30 metres wide, it is potentially a barrier to the integration of future subdivisions, however investigations have confirmed it is surplus to the requirements of the Public Land Manager and can be acquired for development.

03 VISION & FUTURE URBAN STRUCTURE

3.1 Vision

The vision is a high level statement of what is envisaged for the Cardinia Road Employment Precinct (the Precinct) and its new resident, working and business communities. The vision will be realised through the implementation of the PSP, is illustrated in Figure 1 and reflected in the Elements set out in Chapter 5.

The Cardinia Road Employment Precinct will be:

A multi-functional regional employment node that delivers a diverse mix of jobs to Casey-Cardinia, interconnected with regional transport routes and rapidly growing communities. An intensively developed commercial core and residential precinct is set amid extensive wetlands and biodiversity corridors, establishing a high amenity business park setting to attract investment.

A new hub for specialised business in south-east Melbourne, including research and development, manufacturing and production, engineering and trades-related services. The attraction of businesses across these sectors will generate a range of professional and higher-skilled employment opportunities, diversifying and expanding the employment base of Casey-Cardinia.

A higher level of self-containment within Casey-Cardinia, providing a catalyst for investment in jobs- and land-intensive uses. By facilitating the establishment of a significant critical mass of investment, the Precinct will stimulate demand for employment land and encourage higher job-densities, particularly in office development.

Greater employment self-containment within Casey-Cardinia and job diversity are delivered by the urban structure of the Precinct. Reflecting principles of environmental sustainability, high amenity, housing diversity and a strong sense of place, the Precinct will establish an amenity and service provision standard designed to attract the desired employment mix.

A high density residential area that demands neighbourhood-level retail facilities, which support the delivery of a wider range of goods and services to support residents, workers, visitors and businesses. Major creeks and landscaped wetland corridors integrate the Precinct with establishing residential areas located to the north, providing a borrowed landscape and extensive passive recreation spaces throughout the Precinct. The high standards of building design, massing and mix of uses will create a high-profile edge to the Precinct and deliver a strong 'gateway' to the precinct from the Cardinia Road freeway overpass.

Enhance the quality of life of residents throughout Casey-Cardinia, by enabling people to work closer to home and reducing commuting time. The success of the Precinct will generate flow-on-effects for investment in other jobs- and land-intensive uses across the Cardinia Employment Corridor, fundamentally changing the structure of the economy in Melbourne's south-east.

Figure 1: Gateway to the Precinct: A High Amenity Commercial Core



The development of an integrated business and residential precinct will deliver the vision for the Precinct through its future urban structure. The key elements of the urban structure are described in Section 3.2, with land use budget and future demographic characteristics of the Cardinia Road Employment Precinct outlined in Sections 3.3 and 3.4 respectively.

3.2 Integrated Precinct Design

The Future Urban Structure (refer Plan 5) shows how the Precinct will be developed over time to achieve the sustainable growth objectives of the Victorian Government and Cardinia Shire Council.

The ways in which the PSP delivers the vision for the Precinct through an integrated neighbourhood design are described in the following Sections: 3.2.1 to 3.2.7.

3.2.1 Establish a regional economic hub

The Precinct is located at the heart of the Cardinia Employment Corridor, a new major regional employment area. As the 'hub' of the Corridor, the Precinct is planned to provide a catalyst for its development by attracting a critical mass of investment in a wide range of specialist and jobs-intensive industries.

Integration with key major transport routes enable new investment and businesses establishing in the Precinct to serve south-east Melbourne, the broader Gippsland region as well as export interstate and internationally via established road freight routes that connect to the Ports of Hastings and Melbourne.

The Precinct facilitates the diversification of industry and employment in the Corridor, by providing for a wide range of industrial and commercial development types, including:

- offices in a campus-style business park setting for uses requiring larger land areas;
- combined showroom and warehouse or workshop type uses to accommodate light industrial uses in high-visibility locations required by businesses with front-of-house customer service and display areas; and

- industrial areas with well-designed road networks that offer direct connections to arterial roads and deliver greater operational efficiency for businesses.

To encourage the development of high density commercial and office uses, the Precinct specifically provides for a range of supporting land uses that establish the pre-conditions for investment in offices.

An Activity Centre with a significant retail component is planned for the heart of the Precinct, with activities clustered around it including residential and supporting commercial uses such as cafes and restaurants, hotels and conference facilities.




























The development of substantial office floorspace within the Precinct is critical to achieving regional jobs self-containment and providing 'new economy' employment opportunities. Delivery of high capacity fibre-optic broadband cable to provide high speed global connections will be a major requirement for business establishment and create the opportunity for technology and communications related business.

The range of employment opportunities and industry types accommodated in the Precinct will also promote community strengthening in the south-east by decreasing dependence on a handful of industry types, increasing resilience to macro-economic changes.

Estimates have been prepared for different employment categories, reflecting the land use distribution in the Precinct, the density of development (building height ratio), extent of land developed (footprint ratio) and number of jobs generated per hectare (jobs ratio) (refer Table 1). At full development, the Precinct may generate up to 18,700 jobs for the region, with over 70 percent being located in the Commercial area.

Plan 5: Future Urban Structure

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
- Road Network**
 -  State Freeway
 -  Arterial Road
 -  Connector Street
 -  Residential Connector Street (Boulevard)
 -  Access Street - level 2
 -  Access Street - level 1
 -  Controlled Intersections
- Residential Land**
 -  High Density Residential 2
 -  High Density Residential 1
 -  Medium Density Residential
 -  Conventional Residential
- Employment Land**
 -  Commercial
 -  Activity Centre
 -  Service Business
 -  Industrial
- Heritage and Community**
 -  Post Contact Heritage Site
 -  Community Facility
- Open Space and Environment**
 -  Unencumbered Open Space
 -  Encumbered Open Space
 -  Existing Creeks
 -  Drainage Lines
 -  Ecological Vegetation Classes (EVCs) to be Retained
- Other land**
 -  Existing Major Easements
 -  Future Urban Land
 -  Existing Urban Land

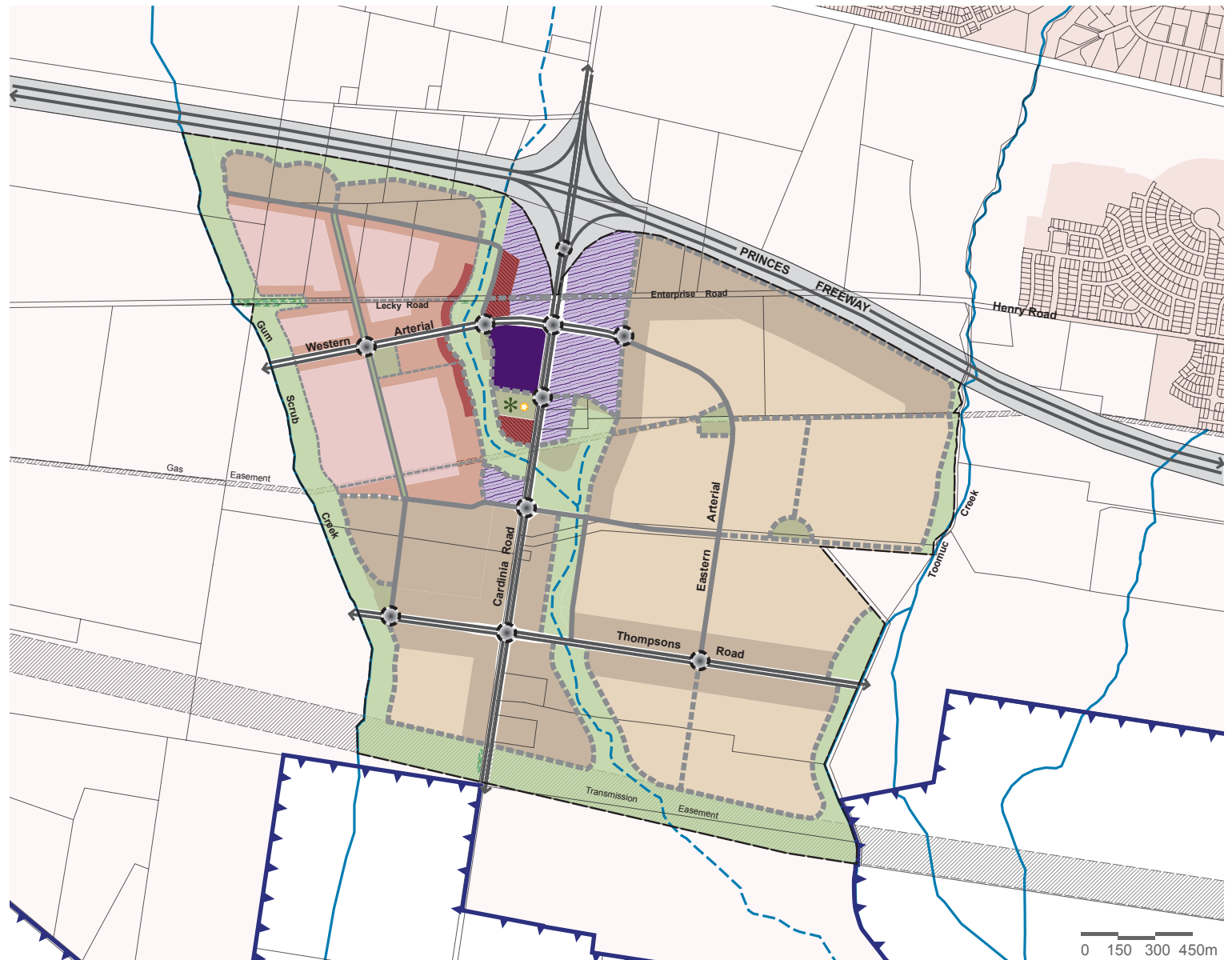


Table 1: Estimated Employment Generation

Employment Land Type	Net Employment Area (Hectares)	Building Height Ratio (Storeys)	Footprint Ratio	Gross Floor Area (Hectares)	Jobs Ratio (Jobs per Hectare)	Total Jobs*
Activity Centre	5.52	2	0.3	3.31	50	166
Commercial	27.08	4	0.5	54.16	250	13,540
Service Business	134.08	1	0.5	67.04	50	3,352
Industrial	186.39	1	0.5	93.20	18	1,678
Total for Precinct	353.07	n/a	n/a	217.71	n/a	18,735

* Full Time Equivalent

Source: Cardinia Shire Council, based on estimates by MacroPlan Australia 2008

3.2.2 Stimulate local employment and business activity

The Precinct provides for a diverse range of employment opportunities to meet the needs of the growing Casey-Cardinia community. It has been designed to ensure that all industry types can be accommodated within the Precinct without compromising the amenity of future residential areas, the range of industrial types that can establish in the Precinct, or the flexibility of industrial operations. The range of uses that are planned allows for co-location of a wide variety of business types and scales, stimulating growth and delivering greater efficiency with the opportunity to establish localised supply-chains and multi-business production lines.

The future urban structure of the Precinct integrates employment and residential land uses in a framework that addresses interfaces between sensitive uses, while maximising the value of the Precinct's biodiversity and natural landscape characteristics.

An intensively developed core Commercial area is located at the gateway to the Precinct, centred upon Cardinia Road immediately south of the Freeway.

The area is proposed for high-density office development, with greater massing, high built form standards and minimum street setbacks creating an attractive and prominent entry to the Precinct. The location of the commercial area maximises the benefits of the amenity provided by the Cardinia Road Open Space Corridor, a landscaped wetland channel that frames the area.

Service Business uses front onto the Princes Freeway, Cardinia Road south of the Commercial area and Thompsons Road, to encourage high built form standards and create a high-profile showroom edge to the Precinct. These uses benefit from the exposure offered by the road network and encourage activity along key roads. In addition, Service Business uses will provide for a transition between Residential or Commercial areas to the Industrial areas within the Precinct. Generally these uses will comprise integrated factory/warehouse clusters, small lot industrial parks and industry clusters (e.g. automotive services/repairs), combining display areas and 'back of house' facilities in the one location.

East of Cardinia Road is the core industrial area, with Eastern Arterial providing the major transport route through this part of the Precinct. While accommodating a wide range of industrial uses, attractive commercial frontages will create a higher amenity environment than traditional industrial precincts and generate a level of activity across the Precinct.

The specific location of employment uses in the Precinct will protect sensitive interfaces between open spaces, towards the Princes Freeway and between commercial and residential uses. Land uses with a potential for significant off-site amenity impacts are to be located in the eastern and south-eastern portion of the Precinct to ensure that significant buffers to residential, retail and commercial uses can be achieved and protected.

3.2.3 Provide a new employment destination, that offers better transport options and shorter journey to work trips

The Precinct has been specifically designed to create a more sustainable urban structure for Casey-Cardinia that reduces travel distances, improves travel time efficiency and reduces carbon emissions generated by journey to work trips.

A greater proportion of jobs need be provided within the growth area to better meet the employment needs of the future population and address the historic dependency on Dandenong and areas further west for employment.

The development of the Precinct will deliver a new work destination in Casey-Cardinia, facilitating an increase in eastward journey-to-work travel and enabling more employment to be delivered locally, generating a greater proportion of shorter trips.

Travel to Work Statement

The PSP aims to reduce travel distances to work by providing:

- **significant employment to reduce travel times and out-commuting**

The Precinct will create new employment opportunities for the local and regional workforce whilst offering an attractive environment for national and international business. Currently, more than 60% of the workforce participants in Casey-Cardinia travel out of the Growth Area to get to work. By providing a greater range of job opportunities that reflect the needs and skills of local residents, a greater level of self containment will be fostered within Cardinia Shire, reducing travel distances, travel to work times and pressure on peak hour

capacities of east-west transport routes, particularly Princes Freeway.

- **an efficient road and public transport network**

Serviced by the Princes Freeway, a major state freeway and freight route, the development of the arterial road network within the Precinct will deliver strong regional east-west links including Western Arterial (the Glasscocks/Grices Road extension) and Thompsons Road. Connected by the centrally-located Cardinia Road, the road network will be well integrated with developing residential neighbourhoods north of Princes Freeway, which will be enhanced by the delivery of a second bridge over the Freeway.

In adjacent precincts, a number of other future north-south arterial roads intersect with the future east-west arterials, creating a broader arterial road 'grid' within the Cardinia Urban Growth Area (refer Plan 3). These connections will ensure the Precinct and the broader Cardinia Employment Corridor are well located to facilitate a shift in journey to work patterns across the growth area.

Development of the arterial road network will enable a wider range of transport options to be provided, including bus services along Grices/Glasscocks and/or Thompsons Roads. New local services will also need to be provided, linking employees and residents to the existing rail PPTN, the PPTN along Princes Highway, the new Major Activity Centre proposed adjacent to Officer Station and the new station currently under construction at Cardinia Road (north of the Bypass).

The residential area is centred upon Western Arterial, a potential future arterial road which could potentially be a regional bus route in the future. The connector street network through the residential

area will potentially provide local bus services. The arterial and collector road network and the planned dwelling density distribution will ensure that 95% of dwellings are located within 400 metres street walking distance of a potential public transport service. Higher density residential development is planned around this network to maximise the number of dwellings located along and within walking distance of a potential public transport service.

- **a walkable street structure orientated to promote energy efficient lot design**

Co-location of residential and employment uses within the Precinct provides the opportunity to increase the proportion of residents walking and cycling to work. The urban structure provides a local street network with high levels of permeability, walkability and passive solar orientation throughout the Precinct.

An east-west community spine connects from the Activity Centre to the residential park on Western Arterial, providing a focus for medium density residential development, which provides clear viewlines to the Activity Centre and will encourage non-motorised forms of travel. The finely grained road network within the commercial area also supports walking and cycling by creating a highly permeable 'core' that maximises ease and convenience of access by foot or bike.

- **an extensive walking and cycling network linking to adjacent areas**

The Precinct provides dedicated bicycle and pedestrian paths (refer Plan 16), including on-road cycle lanes on all arterial roads and connector streets to provide for commuters.

Shared paths are provided in addition to on-road cycle lanes as well as several other street types, recognising the different needs of different users. The delivery of a second bridge over the Freeway at Cardinia Road will also improve access to the Precinct by walking and cycling.

The grid of streets links with the off-road trails network within key open space corridors, providing an integrated network of shared paths, cycle lanes and footpaths (on and off road). The north-south trails network along Gum Scrub and Toomuc Creeks provide connectivity to residential precincts to the north of the Princes Freeway, via underpasses. Bridges over these creeks provide access east and west of the Precinct along the Transmission Line Easement via the off road network.

- **attractors located to promote walking to frequently used services**

An extensive network of pedestrian paths, shared paths and dedicated on-road cycling lanes services the centrally located Activity Centre, which is a key destination for bicycle and pedestrian movement in the Precinct. These paths also provide connections to facilities in adjacent Precincts, particularly the area north of Princes Freeway.

Western Arterial provides a potential future bus route connecting the Activity Centre to the future Cardinia Road Train Station and Officer Town Centre, making public transport a convenient option.

- **support for the Neighbourhood Activity Centre**

Higher density residential development located along Western Arterial and clustered along the Cardinia Road Open Space Corridor will support the delivery of public transport services and provide sufficient catchment for the new Activity Centre.

3.2.4 Create a vibrant, mixed use activity centre at the heart of the Precinct

The future urban structure provides for a Neighbourhood Activity Centre to be located at the heart of the Precinct. Its retail role and function is defined by its anchor store: a full-size supermarket, ensuring it provides for the weekly shopping needs of the residential area and encouraging a wide range of specialty retail goods and services to co-locate.

Importantly, the level of core retail planned for the activity centre and the frequency of visitation this attracts, will encourage a wide range of other uses to establish, including hospitality (cafes, restaurants and bars or a tavern), personal services (hairdressers, beauticians and drycleaners) and commercial services (banks, insurance and travel agencies). The employment catchment of the Activity Centre is likely to also generate demand for niche retail goods and services, such as stationery retailers and printing and photocopying services.

As a street-based centre, the diversity of uses in the activity centre will ensure it provides a focus for community interaction across a wider-range of hours.

High density residential development is provided within walking distance of the Activity Centre. The value of the Cardinia Road Open Space Corridor is maximised by lining its edges with higher density development throughout the residential area.

The Activity Centre is located immediately north of Kaduna Park, a heritage homestead that will become the focus of community life in the Precinct. Providing meeting rooms, a formal garden area and with potential for conference facilities and hospitality uses, it will become a feature of the Precinct, serving residents, employees, businesses and visitors.

Higher density residential uses are also planned south of Kaduna Park, benefiting from the character and amenity created by the existing historic dwelling and its landscaped surrounds. With key connections through the activity centre and sightlines to and from Kaduna Park, the land use configuration enables high levels of integration between the Activity Centre and the community facility, co-locating the main attractors to ensure higher levels of activity in the heart of the Precinct.

3.2.5 Establish a distinctive character, unique sense of place and community

The setting and built form of the Precinct is critical to the achievement of a strong sense of place, with opportunities for community interaction provided in an environment with high levels of amenity, services and activity that underpin a strong sense of character.

A gateway into the Precinct from the north is created by multi-storey office development, which lines the Cardinia Road boulevard. The entry sets the tone of development within the Precinct, delivering a high amenity urban environment within an Australian landscape setting.

The Commercial area is clustered around a dense mixed use environment, known as the 'commercial core'. Located west of Cardinia Road, east of the Cardinia Road Open Space Corridor, the area provides for residential, community, office and retail activities focused around the Activity Centre.

Office development fronts onto Cardinia Road, Western Arterial and part of Eastern Arterial. Offering a range of activities, goods and services that are supported by a network of public spaces, the commercial core provides a series of meeting places and services that workers, residents and other visitors to the Precinct will readily identify with.

A highly permeable street network and built form environment will encourage pedestrian activity, with a series of key connections linking Kaduna Park, the town square, the Cardinia Road Open Space Corridor and other parks to create an attractive, interesting and active public realm environment.

Connecting the residential and employment areas by the thread of the Cardinia Road Open Space Corridor, the Activity Centre, the open space network and Kaduna Park are integral to delivering the high amenity and access outcomes necessary for investment and attracting a diversity of businesses and employment opportunities.

The Precinct has two other major open space corridors: Gum Scrub and Toomuc Creeks. These provide important ecological, drainage and buffer functions, and concurrently provide a high level of visual and recreational amenity. The multi-purpose design of these corridors maximises the efficient use of land while achieving environmental conservation, drainage, recreation and character objectives.

An Australian Landscape theme embraces the existing character of creek lines and maximises the use of indigenous native vegetation. It is reflected in boulevard plantings along Arterial Roads, as well as landscaped verges of roads throughout the Precinct. Drainage lines and surrounds will be also naturally enhanced using heath vegetation, native grasses, vegetated swales and swamp paperbark trees, establishing a clear landscape character.

3.2.6 Provide a different, higher-density housing choice

Residential development has been planned for the Precinct, principally to facilitate the establishment of a high amenity commercial core area. To create sufficient catchment for the Neighbourhood Activity Centre, including a full-sized supermarket, the Precinct provides for 2,000 dwellings.

To minimise the impact of residential development of the amount of employment land provided within the Precinct, the residential area provides significantly increased densities with reduced formal open space areas. The Open Space Corridors along drainage and creek lines provide many opportunities for passive and informal active recreation, while providing connections to formal and active recreation reserves north of the Princes Freeway via the shared path and trails network.

A range of housing options are provided within a relatively small area of the Precinct, delivering densities substantially greater than conventional residential subdivision. With a focus on providing higher-density living options, a high proportion of dwellings will be delivered as two-storey townhouses and three and four storey strata-titled apartments or flats. Multi-level residential development is encouraged on both sides of the Cardinia Road Open Space Corridor, providing an attractive built form edge and increasing residential densities around the activity centre.

Residential development plays a key role in achieving a 'new employment community', by supporting day and night activity. Located in the north-western portion of the Precinct, the residential area is well integrated with a network of open spaces and is surrounded by low impact light-industrial uses. Where residential abuts employment uses, higher density residential

is proposed to create a more intensively developed built form 'edge' to provide a buffer that protects the amenity of lower-density residential areas. The use of wider road reserves, landscaping, open space networks, and managing road access will ensure the interfaces between sensitive uses are carefully addressed, maintaining the amenity of the Precinct.

3.2.7 Achieve best-practice environmentally sustainable development

Energy and Water Efficient Design

The Future Urban Structure reflects energy efficient design by creating a new regional employment hub to provide a greater proportion of jobs locally and reduce journey-to-work travel distances.

It provides for a greater range of travel modes through street design, accommodating buses, cyclists and pedestrians, with strong connections to areas north of the Princes Freeway and to future adjacent precincts to the east and west.

The Future Urban Structure provides a framework for subdivision design that promotes solar access, to minimise energy use of dwellings and buildings in employment areas, with a clear framework for the development of a 'grid-based' street network.

Third pipe recycled water is mandated in the residential area, with requirements for development in the employment area to demonstrate water and energy efficient design elements, such as rainwater harvesting or solar energy systems.

Incorporate Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) aims to reduce the quantity of stormwater and improve the quality of water that is either discharged or re-used on site. WSUD techniques are able to be incorporated into the Precinct as a result of the existing drainage lines and creeks. Utilising the existing drainage systems on the site reduces the requirement for piping and channelling of water and maintenance costs.

WSUD techniques may also be incorporated into the public open space network, with the network of wetlands in the Cardinia Road Open Space Corridor and along Toomuc Creek providing for stormwater filtration.

WSUD techniques that could be utilised include:

- integrating stormwater drainage systems with other uses such as road verges, parklands and walking paths which improves the aesthetic appeal;
- reducing front setbacks to reduce the amount of low functional areas that often require irrigation;
- reducing the length of driveways (and the amount of impervious services) to reduce stormwater run-off;
- the use of drought proof and salt resistant vegetation to reduce water consumption;
- reducing road widths where practical to minimise water run-off; and
- implementing a system of filtration and retention of stormwater such as the use of swales and infiltration systems to improve the quality of water before it exits the site.

Protect and Enhance Native Vegetation

The proposed Australian Landscape Theme embraces the existing character of the creek lines and maximises the use of indigenous native vegetation.

Heath vegetation, native grasses and vegetated swales will be provided along the drainage lines.

In addition to the retention of patches of remnant vegetation along Lecky Road at Gum Scrub Creek, the implementation of the Australian Landscape Theme will enhance the existing biodiversity characteristics of the area.

Revegetation along Cardinia Road Open Space Corridor, Gum Scrub and Toomuc Creeks will establish major north-south bio-links through the growth corridor, substantially improving current habitat links.

Protect Significant Species: The Growling Grass Frog

The nationally-significant Growling Grass Frog will be protected and its habitat enhanced through the development of the Precinct.

The delivery of the DSS will establish biodiversity corridors through the Precinct to supplement existing frog ponds to be retained, including:

- the Cardinia Road Open Space Corridor, a drainage corridor providing a series of new frog ponds and wetlands;
- revegetation and rehabilitation of Gum Scrub Creek, including new ponds;
- revegetation and rehabilitation Toomuc Creek, including new ponds and wetlands;
- establishment of an east-west habitat link and associated ponds along the Princes Freeway, west of Cardinia Road; and

- the establishment of vegetation and new ponds along the length of the transmission line easement in the south of the Precinct.

These new corridors build upon existing frog ponds and expand the Growling Grass Frog Habitat in the Precinct to over 35 ponds with connecting wetlands and vegetated channels, enabling movement within the Precinct and to and from areas north of the Freeway.

3.3 Land Use Budget

The Cardinia Road Employment Precinct covers an area of approximately 590 hectares, with a total net developable area of approximately 440 hectares.

The Summary Land Use Budget including employment land composition and residential lot yield is outlined in Table 2. Table 3 provides a more detailed, property-specific land use budget, which shows how the net developable area (NDA) has been calculated.

Property-specific employment land composition and dwelling yields are set in Table 4.

Both Tables correspond with Plan 6: Land Use Budget, which illustrates the areas included in the columns of the tables.

Table 2: Summary Land Use Budget

a) Net Developable Area Calculation

Description	Hectares (Ha)	% of Total Precinct	% Of NDA
Total Precinct Area	588.40	100%	n/a
Transport			
6 Lane Arterial Road / Widening	0.75	0.13%	0.17%
4 Lane Arterial Road / Widening ^	23.76	4.04%	5.41%
Commercial Access Street (included in DCP)	0.47	0.08%	0.11%
Sub-Total	24.98	4.25%	5.68%
Community Facilities			
Kaduna Park	1.79	0.30%	0.41%
Sub-Total	1.79	0.30%	0.41%
Open Space			
Unencumbered Land for Recreation			
Parks	7.11	1.21%	1.62%
Sub-Total	7.11	1.21%	1.62%
Encumbered Land for Conservation and Recreation			
Waterways - Drainage Corridor	75.15	12.77%	17.10%
Conservation Reserve *	2.44	0.41%	0.56%
Habitat Corridors:			
East-West Habitat Link	6.62	1.13%	1.51%
Major Easements **	27.06	4.60%	6.16%
Sub-Total	111.27	18.91%	25.32%
Total - Open Space	118.38	20.12%	26.93%
Encumbered Land for Infrastructure			
For Infrastructure ^ ^	3.71	0.63%	0.84%
Sub-Total	3.71	0.63%	0.84%
Net Developable Area	439.54	74.70%	100%

* Existing EVCs, GGF Habitat and Buffers

** Transmission Line and Gas Pipeline Easements where used for open space

^ Indicates VicRoads declared roads, potential future declared roads and undeclared roads.

^ ^ Gas Pipeline Easement where development is limited

Continued overleaf...

Table 2: Summary Land Use Budget

b) Land Areas by Employment Type




Description	Hectares (Ha)	% Of Total Precinct	% Of Nda
Activity Centre & Employment Land Type			
Commercial	27.08	4.60%	6.16%
Activity Centre	5.52	0.94%	1.26%
Service Business	134.08	22.79%	30.50%
Industrial	186.39	31.68%	42.41%
Total - Employment Area	353.07	60.01%	80.33%

c) Residential Yield Estimates





Description	Net Residential Hectares (Ha)	Dwellings Per Hectare	Dwellings
Residential Area Type			
Activity Centre	n/a	n/a	100
Conventional Residential	48.17	15	723
Medium Density Residential	31.95	20	639
High Density Residential 1	2.70	70	189
High Density Residential 2	3.65	105	383
SUB-TOTAL	86.47	n/a	2,034
Average dwellings per Net Residential Hectare		23.5	n/a

Plan 6: Land Use Budget





LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
-  Property Reference Number





Road Network

-  State Freeway
-  Arterial Road - 6 lane
-  Arterial Road - 4 lane
-  Commercial Access Street (included in DCP)

Residential Land

-  High Density Residential 2
-  High Density Residential 1
-  Medium Density Residential
-  Conventional Residential

Employment Land

-  Commercial
-  Activity Centre
-  Service Business
-  Industrial

Heritage and Community





-  Community Facilities - Kaduna Park

Open Space and Environment

Unencumbered Open Space



-  Parks

Encumbered Open Space



-  Waterways - drainage corridor
-  Conservation Reserve
-  East - West Habitat Link
-  Major Easements

Other land

Encumbered Land

-  For Infrastructure
-  Major Easements

Adjacent Areas

-  Future Urban Area
-  Existing Urban Area

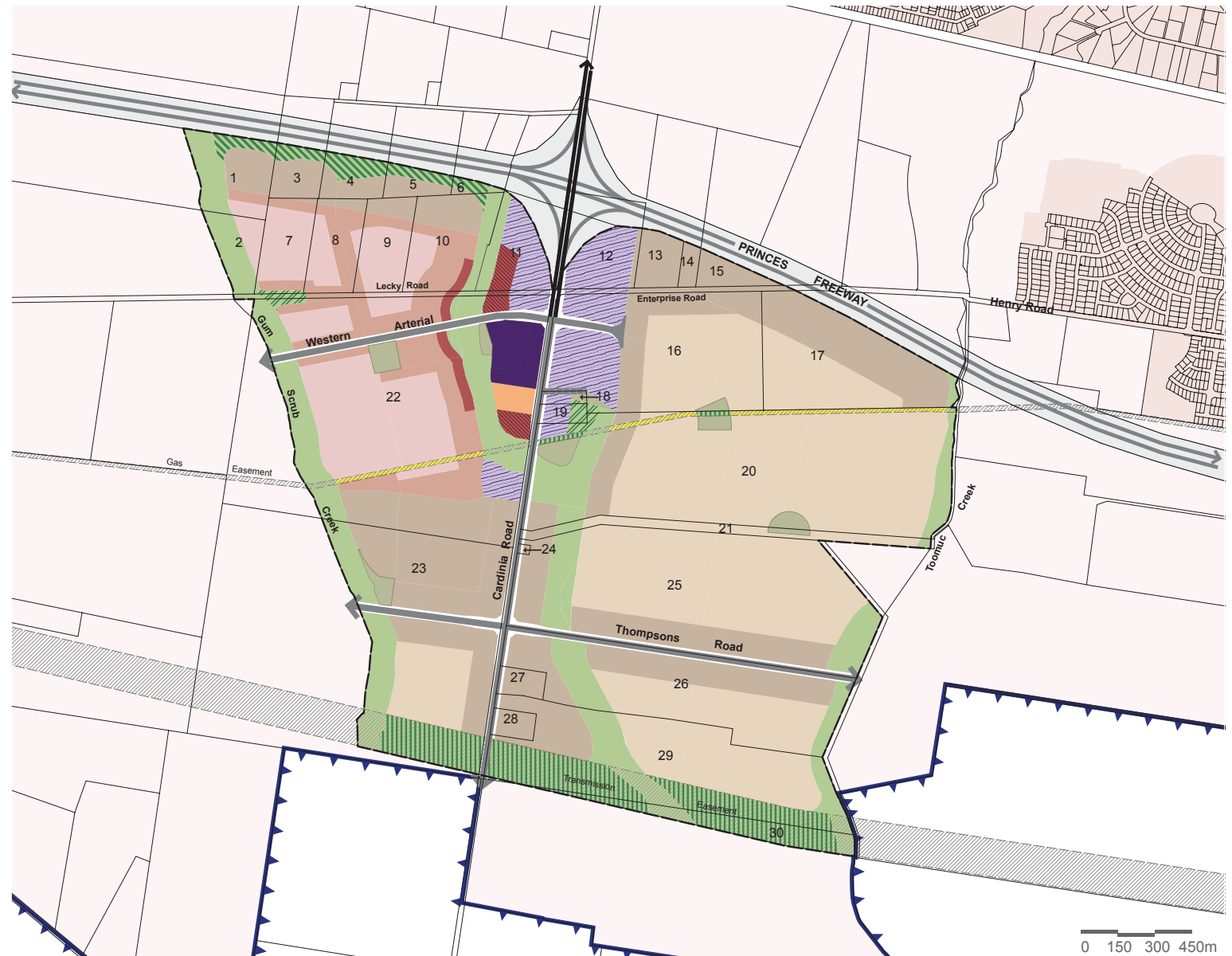


Table 3: Property Specific Land Use Budget – Net Developable Area

Property Number	Total Area (Ha)	Transport			Community	Unencumbered Land for Recreation	Encumbered Land For Conservation and Recreation				Encumbered Land (Other)	Net Developable Area (Ha)	Key Percentages		Open Space Delivery Target (% NDA)	Difference (%)	Equivalent Land Area (ha)
		6 Lane Arterial Road / Widening	4 Lane Arterial Road / Widening	Commercial Access Street (Included in DCP)			Waterways - Drainage Corridor	Conservation Reserve *	East-West Habitat Link	Major Easements **			% Precinct NDA	Open Space % Parcel NDA			
Property 1	10.46	-	-	-	-	-	3.91	-	1.43	-	-	5.12	1.16%	-%	1.62%	-1.62%	-0.08
Property 2	5.55	-	-	-	-	-	3.90	-	-	-	-	1.65	0.38%	-%	1.62%	-1.62%	-0.03
Property 3	4.41	-	-	-	-	-	-	-	1.08	-	-	3.33	0.76%	-%	1.62%	-1.62%	-0.05
Property 4	4.60	-	-	-	-	-	-	-	2.05	-	-	2.55	0.58%	-%	1.62%	-1.62%	-0.04
Property 5	3.19	-	-	-	-	-	-	-	1.21	-	-	1.98	0.45%	-%	1.62%	-1.62%	-0.03
Property 6	1.03	-	-	-	-	-	0.16	-	0.67	-	-	0.20	0.05%	-%	1.62%	-1.62%	--
Property 7	8.09	-	-	-	-	-	0.08	0.30	-	-	-	7.71	1.75%	-%	1.62%	-1.62%	-0.12
Property 8	8.05	-	-	-	-	-	-	0.01	-	-	-	8.04	1.83%	-%	1.62%	-1.62%	-0.13
Property 9	8.02	-	-	-	-	-	-	-	-	-	-	8.02	1.82%	-%	1.62%	-1.62%	-0.13
Property 10	13.35	-	-	-	-	-	2.17	-	0.18	-	-	11.00	2.50%	-%	1.62%	-1.62%	-0.18
Property 11	8.09	0.02	-	-	-	-	1.89	-	-	-	-	6.18	1.41%	-%	1.62%	-1.62%	-0.10
Property 12	6.58	0.22	-	-	-	-	-	-	-	-	-	6.36	1.45%	-%	1.62%	-1.62%	-0.10
Property 13	4.05	-	-	-	-	-	-	-	-	-	-	4.05	0.92%	-%	1.62%	-1.62%	-0.07
Property 14	1.31	-	-	-	-	-	-	-	-	-	-	1.31	0.30%	-%	1.62%	-1.62%	-0.02
Property 15	2.95	-	-	-	-	-	-	-	-	-	-	2.95	0.67%	-%	1.62%	-1.62%	-0.05
Property 16	42.34	0.19	2.22	0.23	-	0.72	0.13	0.20	-	-	-	38.65	8.79%	1.86%	1.62%	0.25%	0.09
Property 17	27.74	-	-	-	-	-	0.48	-	-	-	-	27.26	6.20%	-%	1.62%	-1.62%	-0.44
Property 18	1.00	-	0.11	0.24	-	0.14	-	0.09	-	-	-	0.42	0.10%	33.33%	1.62%	31.72%	0.13
Property 19	1.61	-	0.17	-	-	-	-	0.58	-	-	-	0.86	0.20%	-%	1.62%	-1.62%	-0.01
Property 20	83.48	-	0.91	-	-	2.99	10.34	0.52	-	0.64	2.46	65.62	14.93%	4.56%	1.62%	2.94%	1.93
Property 21	6.77	-	0.08	-	-	0.34	0.71	-	-	-	-	5.64	1.28%	6.03%	1.62%	4.41%	0.25
Property 22	100.44	0.05	5.51	-	1.79	1.87	17.79	0.36	-	-	1.25	71.82	16.34%	2.60%	1.62%	0.99%	0.71
Property 23	55.24	-	2.81	-	-	1.05	9.38	-	-	6.55	-	35.45	8.07%	2.96%	1.62%	1.34%	0.48
Property 24	0.19	-	0.07	-	-	-	-	-	-	-	-	0.12	0.03%	-%	1.62%	-1.62%	--
Property 25	70.60	-	3.65	-	-	-	8.30	-	-	-	-	58.65	13.34%	-%	1.62%	-1.62%	-0.95
Property 26	41.12	-	3.32	-	-	-	6.25	-	-	-	-	31.55	7.18%	-%	1.62%	-1.62%	-0.51
Property 27	2.19	-	0.22	-	-	-	-	-	-	-	-	1.97	0.45%	-%	1.62%	-1.62%	-0.03
Property 28	2.00	-	0.21	-	-	-	-	-	-	-	-	1.79	0.41%	-%	1.62%	-1.62%	-0.03
Property 29	47.58	-	0.43	-	-	-	7.64	-	-	14.03	-	25.48	5.80%	-%	1.62%	-1.62%	-0.41
Property 30	7.36	-	-	-	-	-	1.52	-	-	5.84	-	-	-%	-%	1.62%	-1.62%	-
SUB-TOTAL	579.39	0.48	19.71	0.47	1.79	7.11	74.65	2.06	6.62	27.06	3.71	435.73	99.13%	1.63%	1.62%	0.01%	0.06
Cardinia Road	4.21	0.16	4.05	-	-	-	-	-	-	-	-	-	-%	-%	1.62%	-1.62%	-
Enterprise Road	2.10	0.09	-	-	-	-	-	-	-	-	-	2.01	0.46%	-%	1.62%	-1.62%	-0.03
Lecky Road	2.70	0.02	-	-	-	-	0.50	0.38	-	-	-	1.80	0.41%	-%	1.62%	-1.62%	-0.03
SUB-TOTAL	9.01	0.27	4.05	-	-	-	0.50	0.38	-	-	-	3.81	0.87%	-%	1.62%	-1.62%	-0.06
TOTAL	588.40	0.75	23.76	0.47	1.79	7.11	75.15	2.44	6.62	27.06	3.71	439.54	100%	1.62%	1.62%	-%	-

* Existing EVCs, GGF Habitat and Buffers

** Transmission Line and Gas Pipeline Easements where used for open space

^ Indicates VicRoads declared roads, Potential Future declared roads and undeclared roads

^ Gas Pipeline Easement where development is limited

Table 4: Property Specific Land Use Budget – Employment Areas and Dwellings

Property Number	Total Area (Ha)	Net Developable Area (Ha)	EMPLOYMENT				Net Employment Hectares (ha)	CONVENTIONAL RESIDENTIAL: 15 Dwellings per NRHa		MEDIUM DENSITY RESIDENTIAL: 20 Dwellings per NRHa		HIGH DENSITY RESIDENTIAL 1: 70 Dwellings per NRHa		HIGH DENSITY RESIDENTIAL 2: 105 Dwellings per NRHa		TOTAL - Designated Residential Areas		
			Commercial	Activity Centre	Service Business	Industrial		NRHa	Dwellings	NRHa	Dwellings	NRHa	Dwellings	NRHa	Dwellings	NRHa	Dwellings/ NRHa	Dwellings
Property 1	10.46	5.12	-	-	3.40	-	3.40	0.97	15	0.75	15	-	0	-	0	1.72	17.18	29.55
Property 2	5.55	1.65	-	-	-	-	-	1.65	25	-	0	-	0	-	0	1.65	15.00	25
Property 3	4.41	3.33	-	-	3.28	-	3.28	-	0	0.05	1	-	0	-	0	0.05	20.00	1
Property 4	4.60	2.55	-	-	2.55	-	2.55	-	0	-	0	-	0	-	0	-	-	0
Property 5	3.19	1.98	-	-	1.98	-	1.98	-	0	-	0	-	0	-	0	-	-	0
Property 6	1.03	0.20	-	-	0.20	-	0.20	-	0	-	0	-	0	-	0	-	-	0
Property 7	8.09	7.71	-	-	0.12	-	0.12	5.95	89	1.64	33	-	0	-	0	7.59	16.08	122
Property 8	8.05	8.04	-	-	0.71	-	0.71	3.33	50	4.00	80	-	0	-	0	7.33	17.73	130
Property 9	8.02	8.02	-	-	1.57	-	1.57	5.24	79	1.21	24	-	0	-	0	6.45	15.94	103
Property 10	13.35	11.00	-	-	3.77	-	3.77	2.14	32	4.45	89	0.64	45	-	0	7.23	22.95	166
Property 11	8.09	6.18	4.70	-	-	-	4.70	-	0	-	0	-	0	1.48	155	1.48	105.00	155
Property 12	6.58	6.36	6.11	-	0.25	-	6.36	-	0	-	0	-	0	-	0	-	-	0
Property 13	4.05	4.05	-	-	4.05	-	4.05	-	0	-	0	-	0	-	0	-	-	0
Property 14	1.31	1.31	-	-	1.31	-	1.31	-	0	-	0	-	0	-	0	-	-	0
Property 15	2.95	2.95	-	-	2.95	-	2.95	-	0	-	0	-	0	-	0	-	-	0
Property 16	42.34	38.65	10.25	-	9.16	19.24	38.65	-	0	-	0	-	0	-	0	-	-	0
Property 17	27.74	27.26	-	-	15.46	11.80	27.26	-	0	-	0	-	0	-	0	-	-	0
Property 18	1.00	0.42	0.42	-	-	-	0.42	-	0	-	0	-	0	-	0	-	-	0
Property 19	1.61	0.86	0.86	-	-	-	0.86	-	0	-	0	-	0	-	0	-	-	0
Property 20	83.48	65.62	0.66	-	5.29	59.67	65.62	-	0	-	0	-	0	-	0	-	-	0
Property 21	6.77	5.64	-	-	0.50	5.14	5.64	-	0	-	0	-	0	-	0	-	-	0
Property 22	100.44	71.82	3.19	5.52	11.60	-	20.31	28.50	428	19.06	381	1.96	137	1.99	209	51.51	22.42	1,155
Property 23	55.24	35.45	-	-	25.25	10.20	35.45	-	0	-	0	-	0	-	0	-	-	0
Property 24	0.19	0.12	-	-	0.12	-	0.12	-	0	-	0	-	0	-	0	-	-	0
Property 25	70.60	58.65	-	-	14.87	43.78	58.65	-	0	-	0	-	0	-	0	-	-	0
Property 26	41.12	31.55	-	-	14.27	17.28	31.55	-	0	-	0	-	0	-	0	-	-	0
Property 27	2.19	1.97	-	-	1.97	-	1.97	-	0	-	0	-	0	-	0	-	-	0
Property 28	2.00	1.79	-	-	1.79	-	1.79	-	0	-	0	-	0	-	0	-	-	0
Property 29	47.58	25.48	-	-	6.20	19.28	25.48	-	0	-	0	-	0	-	0	-	-	0
Property 30	7.36	-	-	-	-	-	-	-	0	-	0	-	0	-	0	-	-	0
SUB-TOTAL	579.39	435.73	26.19	5.52	132.62	186.39	350.72	47.78	717	31.16	623	2.60	182	3.47	364	85.01	22.19	1,886
Cardinia Road	4.21	-	-	-	-	-	-	-	0	-	0	-	0	-	0	-	-	0
Enterprise Road	2.10	2.01	0.55	-	1.46	-	2.01	-	0	-	0	-	0	-	0	-	-	0
Lecky Road	2.70	1.80	0.34	-	-	-	0.34	0.39	6	0.79	16	0.10	7	0.18	19	1.46	32.57	48
SUB-TOTAL	9.01	3.81	0.89	-	1.46	-	2.35	0.39	6	0.79	16	0.10	7	0.18	19	1.46	32.57	48
TOTAL	588.40	439.54	27.08	5.52	134.08	186.39	353.07	48.17	723	31.95	639	2.70	189	3.65	383	86.47	22.36	1,934

Dwelling target for Activity Centre + 100
Total Dwelling Yield 2,034

3.4 Future Demographic Profile

3.4.1 Resident Population of the Precinct

The implementation of the Cardinia Road Employment PSP will create an alternative residential offer in Cardinia Shire, with higher density living options including two and three storey townhouses on small lots, multi-storey apartment buildings and shop-top dwellings.

The delivery of these dwelling types will create a different character to the residential area and establish a major point of difference to the traditional residential neighbourhoods north of the Princes Freeway.

Reflecting the different housing mix, it is expected that a different demographic will be attracted to the Precinct than in other parts of Cardinia Shire.

In particular, this specialised residential offer will attract a range of smaller households including:

- executives who would prefer to be closer to their place of employment;
- older working people looking for a lifestyle change;
- couples without children (including empty-nesters and people down-sizing); and
- singles and young professionals employed in white collar industries, given the range of employment opportunities available in the Precinct.

The likely future household type will result in a relatively low average household size (assumed to be two persons per dwelling). Given that the Precinct design allows for 2,000 dwellings, it is estimated that the future resident population of the Precinct will be approximately 4,000 to 4,500 persons as shown in Table 5.

Table 5: Population Estimates by Dwelling Type

Residential Area Type	Net Residential Hectares (NRHa)	Dwellings per hectare *	Dwellings	Average Household Size	Estimated Population
Activity Centre	5.52	n/a	100	1.30	130
High Density Residential 2	3.65	105	383	1.30	498
High Density Residential 1	2.70	70	189	1.50	284
Medium Density Residential	31.95	20	639	2.00	1,278
Conventional Residential	48.17	15	723	2.90	2,095
TOTALS	91.99	22.11	2,034	2.11	4,285

* Average Total Dwellings per Hectare is for dedicated NRHa and excludes Activity Centre dwellings

Source: Cardinia Shire Council 2009

A high percentage of households are anticipated to be childless, for example couple families without children and single person households. As a result, a very low percentage of potential future residents would be under 14 years old which would not trigger the need to provide schools and higher order community facilities within the Precinct. The location of proposed schools and other community facilities in the Cardinia Road Precinct, north of the Princes Freeway will enable these to be conveniently accessed from the Gum Scrub Creek trail network and direct connections via the road network.

3.4.2 Working Population of Cardinia Shire

Residents in the Growth Area currently have access to a limited range of employment opportunities within the region, with a high proportion of residents employed in blue-collar industries.

At the time of the 2006 Census:

- a greater proportion of Cardinia Shire residents were employed in manufacturing than the average across the Melbourne Statistical Division (MSD) with 15.5% of Cardinia workers in manufacturing compared to 12.9% across Melbourne;
- Cardinia residents were nearly twice as dependent upon the Construction industry as the Melbourne average (12.3% compared to 7.3%); and
- in comparison to the Melbourne average, less than half the number of Cardinia Shire residents had jobs in Information Media and Telecommunications, Financial and Insurance Services, Professional, Scientific and technical Services.

Notably, the proportion of residents currently employed in retail is on par with the metropolitan average.

Retail is likely to be a major expansion industry, as Cardinia Shire reaches a level of development where higher-order goods and services will begin to establish. The development of retail floorspace can provide a catalyst for the development of office and other commercial floorspace, accommodating a range of services that will grow in line with population, requiring higher-skilled workers to meet the needs of a growing and diversifying economy.

Recent key indicators of positive change to the demographics of communities in Cardinia Shire include:

- a 1.3% increase in the proportion of residents with Bachelor (or higher) degrees from 2001 to 2006;
- a 1.2% increase in the proportion of residents with Advanced Diplomas or Diplomas from 2001 to 2006;
- significant increases in the number of residents employed as Managers and Administrators, Professionals and Associate Professionals; and
- increasing affluence of the community, with higher proportions of households earning incomes that fall in the two metropolitan upper income quartiles.

As Cardinia Shire develops, the demographics of its resident population will continue to change, creating a readily accessible and increasingly diverse workforce to support business expansion and new investment, with residents of the region attracted to a better work-life balance provided by the opportunity to work closer to home.

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04 ELEMENTS

The objectives and planning and design guidelines to implement the Vision and Future Urban Structure in terms of the following elements:

1. Image and Character;
2. Employment and Activity Centres;
3. Housing;
4. Community Facilities;
5. Open Space and Natural Systems;
6. Transport and Movement; and
7. Utilities, Energy and Sustainability.

Each element includes:

- **Objectives:** an objective describes the desired outcome to be achieved by development.
- **Plans:** the plans are the spatial expression of objectives.
- **Planning and Design Guidelines:** planning and design guidelines including figures and tables that:
 - must be met; or
 - should be met.

Any planning and design guideline that:

- 'must be met' is a requirement that must be reflected in planning permit applications, where the responsible authority considers that the guideline is relevant to a proposal.
- 'should be met' is a preferred outcome for developments that should be reflected in planning permit applications. To meet the objective, an alternative may be proposed. If the responsible authority is satisfied that the alternative meets the objective, then the alternative may be considered to the satisfaction of the responsible authority.

4.1 Image and Character

4.1.1 Objectives

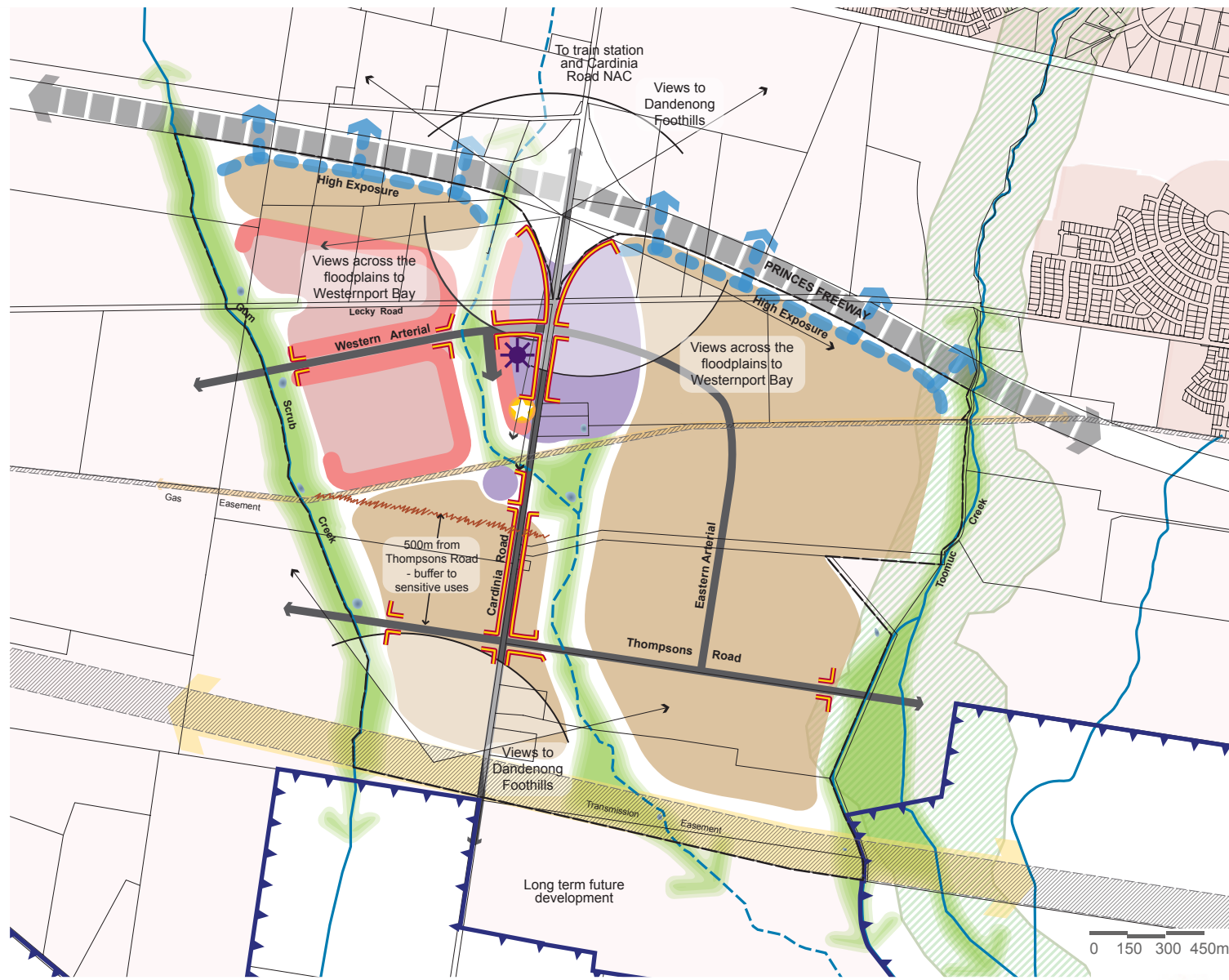
The objectives for image and character are to:

- establish a strong gateway entry to the precinct through landmark architecture and intensively developed built form in key locations including:
 - along the Princes Freeway;
 - at arterial road entries into the Precinct and arterial intersections; and
 - throughout the commercial area and activity centre.
- create a functional, safe and attractive built environment that promotes a strong sense of place for businesses, employees, residents and visitors;
- establish a strong sense of place through a built form that responds to the Precinct's natural landscape attributes and its heritage sites;
- ensure interfaces between uses in the Precinct minimise adverse amenity impacts;
- preserve and enhance areas of landscape and cultural heritage significance including:
 - Aboriginal and Post-Contact sites;
 - view corridors to and from significant landscape features and heritage sites;
 - creek lines, water bodies, native vegetation and fauna communities; and
- create a strong Australian Landscape character throughout parks, waterway corridors and streets in the Precinct.

Plan 7: Image and Character Plan

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- Princes Freeway
- Major Road Network
- Key Built Form Interface Treatment
- Activity Centre Location
- Major Easements
- Various Industry
- Commercial
- Residential
- Higher Densities of Residential than Conventional/Standard
- Heritage Homestead - Kaduna Park
- Open Space/Drainage Corridor
- Interface with high exposure to the Pakenham Bypass
- Existing Views
- Existing Creeks
- Drainage Lines
- Existing Waterbodies to be Retained
- Areas of Aboriginal Cultural Heritage Sensitivity (Aboriginal Heritage Register 2007)
- Future Urban Land
- Existing Urban Land



4.1.2 Implementation

The objectives for image and character are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 7: Image and Character Plan;
- Planning and design guidelines set out under 4.1.3 including:
 - Figure 2 and Figure 3: Sensitive Land Use Interfaces; and
 - Table 11: Open Space.

4.1.3 Planning and Design Guidelines

Urban Design

The following planning and design guidelines must be met:

- built form in areas adjacent to the Princes Freeway is to create a prominent, continuous and unified built form edge to the Precinct.
- built form design on sites abutting Freeway entry and exit ramps is to reflect the geometry of the freeway interchange.
- built form on Cardinia Road is to establish an attractive and prominent entry feature to the Precinct.
- subdivision is to create landmark or gateway sites at arterial road entry points to the Precinct and at intersections along arterial roads, capable of accommodating larger buildings that provide visual markers and signature buildings at key locations.
- subdivision design is to respond to the Activity Centre location and design to create a well-integrated permeable environment through delivery of a finer-grained road network.

- subdivision and road network design is to:
 - create a business park environment that is highly accessible to all modes of transport and is easy to move around in; and
 - maximise the amenity of residential areas abutting employment land, discouraging use of residential streets by commercial traffic.
- a variety of land uses, public spaces and environments is to allow for a range of different experiences for people in the Precinct.
- signage must not visually dominate streetscapes or individual buildings.
- provide screens or false facades to 'screen' rooftop plants, air conditioning systems or other utilities from the view of the public realm.

The following planning and design guidelines should be met:

- incorporate signage, landmark features and buildings into the design of streets and spaces to increase legibility and to ensure ease of movement.

Interfaces with Sensitive Uses

The following planning and design guidelines must be met:

- where residential is located adjacent to Service Business areas, medium density housing must be provided, with a double-storey edge that acts as a buffer for the balance of the residential area.
- car park and service areas are to be provided at the side and rear of buildings across all employment land categories.

- wider road reserves are to create separation between different land uses, particularly where sensitive land uses are directly adjacent to one another. Where residential forms one edge of the street extensive landscaping is to be provided, including advanced trees to create a 'boulevard'.
- integrate open space areas with walking and cycling path networks.
- landscape treatments within the road reserve and open space areas located to provide visual separation between uses must incorporate the Australian landscape theme.

The following planning and design guidelines should be met:

- where residential uses abut employment land, an intensively developed residential edge is to be provided (refer Sections illustrated in Figure 2 and Figure 3) with a zero lot line and attached housing typology.
- where employment land abuts residential uses, the set back is to be minimised and active frontages provided to the abutting street.
- south of the gas easement, double-fronted residential dwellings are encouraged where they abut Service Business uses, with opportunities for home based businesses to establish along the Service Business frontage.

Post-Contact Heritage

The following planning and design guidelines must be met:

- new structures within the Heritage Overlay Focus Area are to be designed so as to support the integrity of the heritage homestead. This does not mean style mimicry.
- interfaces with Kaduna Park are to enhance the integration of the site with the surrounding land uses, support pedestrian permeability, minimise overshadowing and 'grade down' the intensity of adjacent uses towards the site.

The following planning and design guidelines should be met:

- development can occur on the balance of the Kaduna Park site, subject to the protection of elements described under the Heritage Overlay (HO90) that reflect the "Heritage Overlay Focus Area Plan" (Graeme Butler & Associates 2007).
- the following is to be protected:
 - the farm house exterior;
 - the land within the Heritage Overlay Focus Area, particularly north and east of the homestead is not to be developed; and
 - mature exotic trees (oak, Monterey pines and cypress) and pines and mature gums on the drive, within the Heritage Overlay Focus Area.
- a new building, the 'Business and Community Hub' is to be located adjacent to the Kaduna Park Homestead.
- significant trees covered by the Heritage Overlay are to be protected during the design and construction of Cardinia Road and roads accessing the Activity Centre.

- any perimeter fencing is not to be constructed to create an open, landscaped environment.
- additional landscaping is encouraged to provide an attractive setting complementing the existing features and creating a significant formal garden area, including use of exotic species.

Landscape Character

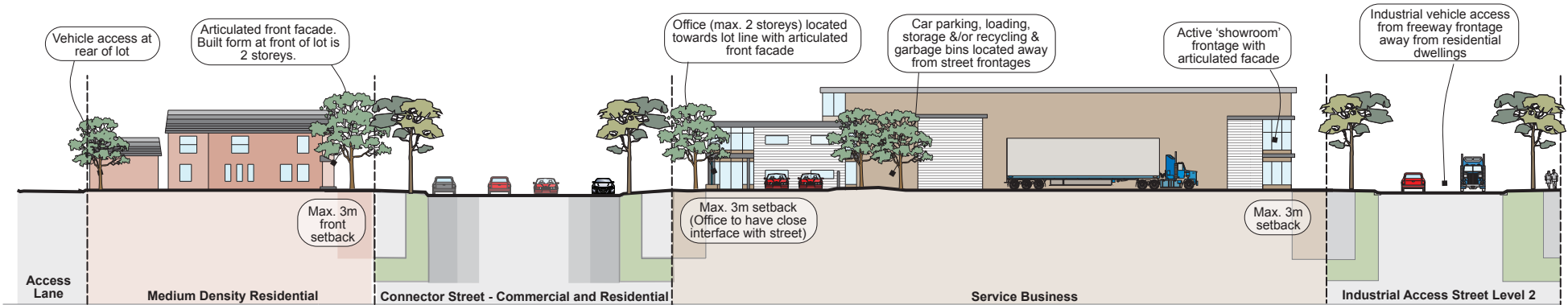
The following planning and design guidelines must be met:

- wide road reserves are to be provided, incorporating wide nature strips that allow tree lined boulevards to be provided throughout the Precinct, particularly on Cardinia Road and Western Arterial.
- road reserves with widened nature strips must be provided between residential and industrial areas to create a landscaped buffer.
- the Australian Landscape theme is to be a focus throughout the Precinct. All development is to front onto and address its natural and vegetated landscape, vegetation and waterway features, maximising access to vistas along open space corridors from the built form.
- where front fencing is provided (for any land use) it is to be visually transparent.

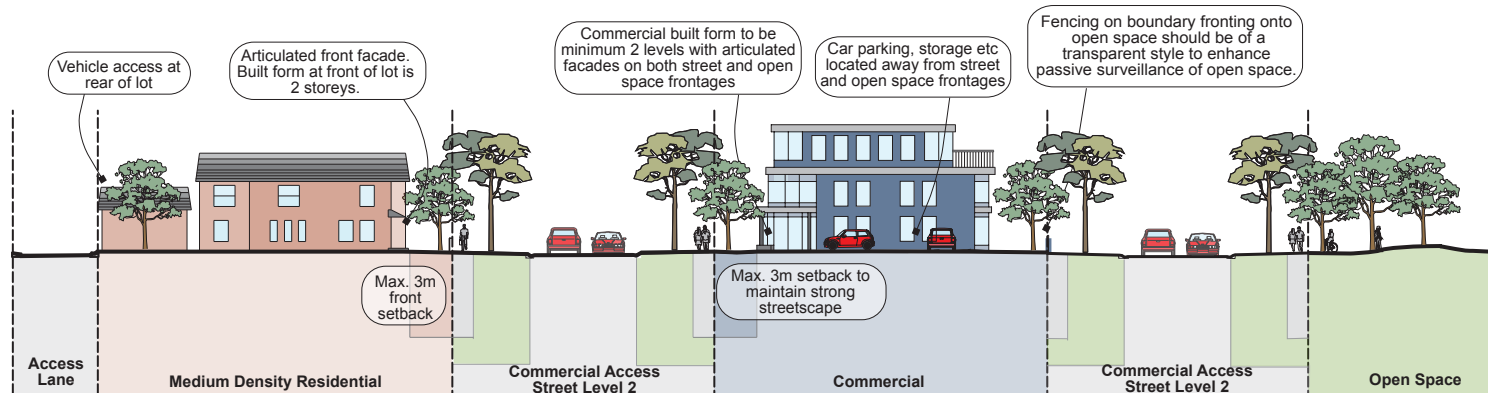
The following planning and design guidelines should be met:

- planting and vegetation is to be Australian native species with a preference to local indigenous species.
- non-Indigenous vegetation is permitted as feature plantings (i.e garden beds) throughout the Precinct.
- front fencing is discouraged (for any land use) to maintain an open landscape theme.

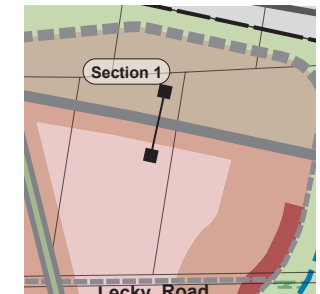
Figure 2: Sensitive Land Use Interfaces (Section 1 and 2)



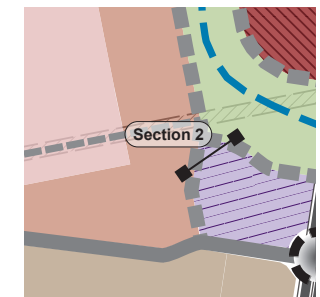
Section 1: Residential - Service Business Interface Section



Section 2: Residential - Commercial Interface Section

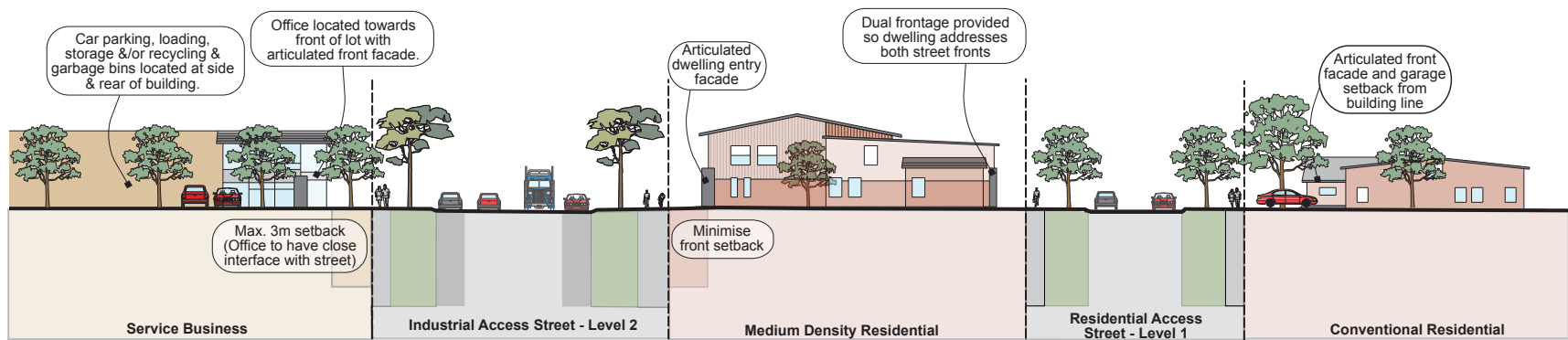


Indicative Section 1 Location

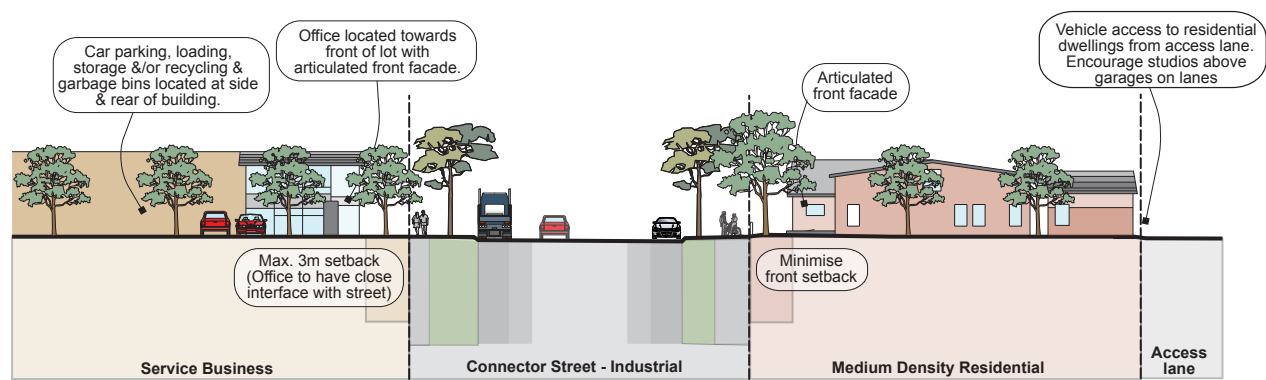


Indicative Section 2 Location

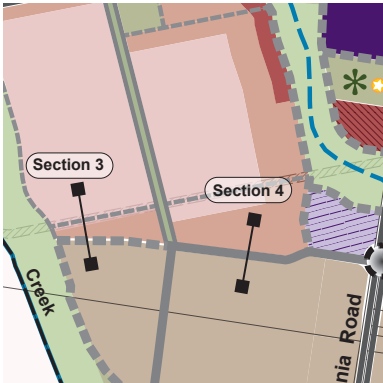
Figure 3: Sensitive Land Use Interfaces (Section 3 and 4)



Section 3: Service Business - Medium Density Residential - Conventional Residential Interface



Section 4: Service Business - Medium Density Residential Interface



Indicative Section 3 & 4 Locations

4.2 Employment and Activity Centres

4.2.1 Objectives

Employment Areas

The objectives for employment are to:

- increase the supply of serviceable employment land in Melbourne's south-east;
- strengthen the local and regional economy by creating opportunities for new business to locate in the corridor;
- support a reduction in the level of out-commuting;
- improve the ratio of jobs per household in the Casey-Cardinia Growth Area;
- deliver an environment that is attractive for investment from national and international firms, including establishment of corporate headquarters and diversified industrial activities with supporting offices; and
- facilitate the expansion of the Principal Freight Network.

The objectives for Employment Areas are to:

- diversify the range of local employment opportunities and increase the proportion of business, professional and high-skilled jobs;
- optimise the distribution of uses by:
 - provide the highest density of employment at the gateway to the Precinct and along arterial roads in designated Commercial areas;
 - locating high profile showroom based uses along the Princes Freeway;

- ensuring low impact commercial and light industrial uses establish adjacent to residential areas; and
- ensure uses with potential for amenity impacts are located away from sensitive uses in the eastern and southern parts of the Precinct.
- promote opportunities for establishment and growth of a range of small business types and home based business;
- facilitate the development of a range of services that support the operation of businesses and establish a high profile for the Precinct, including hotels, function venues and conference centres; and
- provide a high amenity street based activity centre as the focus for Commercial and Residential development.

Activity Centre

Objectives for the Activity Centre are to:

- provide neighbourhood-level core retail facilities to create a high-amenity, well-serviced environment, encouraging the establishment of office and service employment;
- deliver a range of goods and services that provides for the diverse needs of businesses, residents, workers and visitors;
- cluster high density residential and commercial uses around the Activity Centre;
- integrate pedestrian and cycling networks with adjacent Residential and Commercial areas, providing a permeable environment with direct and effective links;
- provide strong visual connections between the Activity Centre, Commercial areas, Residential areas and adjoining open space corridors, maximising access to view sheds and vistas;



- develop an attractive street-based activity centre with a strong urban built form and an active Main Street and public realm; and
- provide a focal point for community activity and pedestrian movement.

4.2.2 Implementation




- The objectives for employment and activity centres are met by implementation of all of the following:
- Plan 5: Future Urban Structure;
- Plan 8: Employment and Activity Centres;
- Planning and design guidelines set out under 4.2.3 including:
 - Table 6: Employment Land Planning and Design Guidelines;
 - Table 7: Hierarchy of Activity Centres;
 - Table 8: Activity Centre Urban Design Guidelines;
 - Figure 4: Building Typology – Commercial;
 - Figure 5: Building Typology – Industry; and
 - Figure 6: Indicative Urban Design Framework - Activity Centre.
- Section 4.2.4 Urban Design Framework Requirements; and
- Section 4.2.5 Site Context Response Requirements.

Plan 8: Employment and Activity Centres

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary

Road Network

-  State Freeway
-  Arterial Road
-  Connector Street
-  Access Street
-  Controlled Intersections





Employment Land

-  Commercial
-  Neighbourhood Activity Centre
-  Service Business
-  Industrial
-  Residential
-  Commercial Core/Walkable Catchment




Heritage and Community

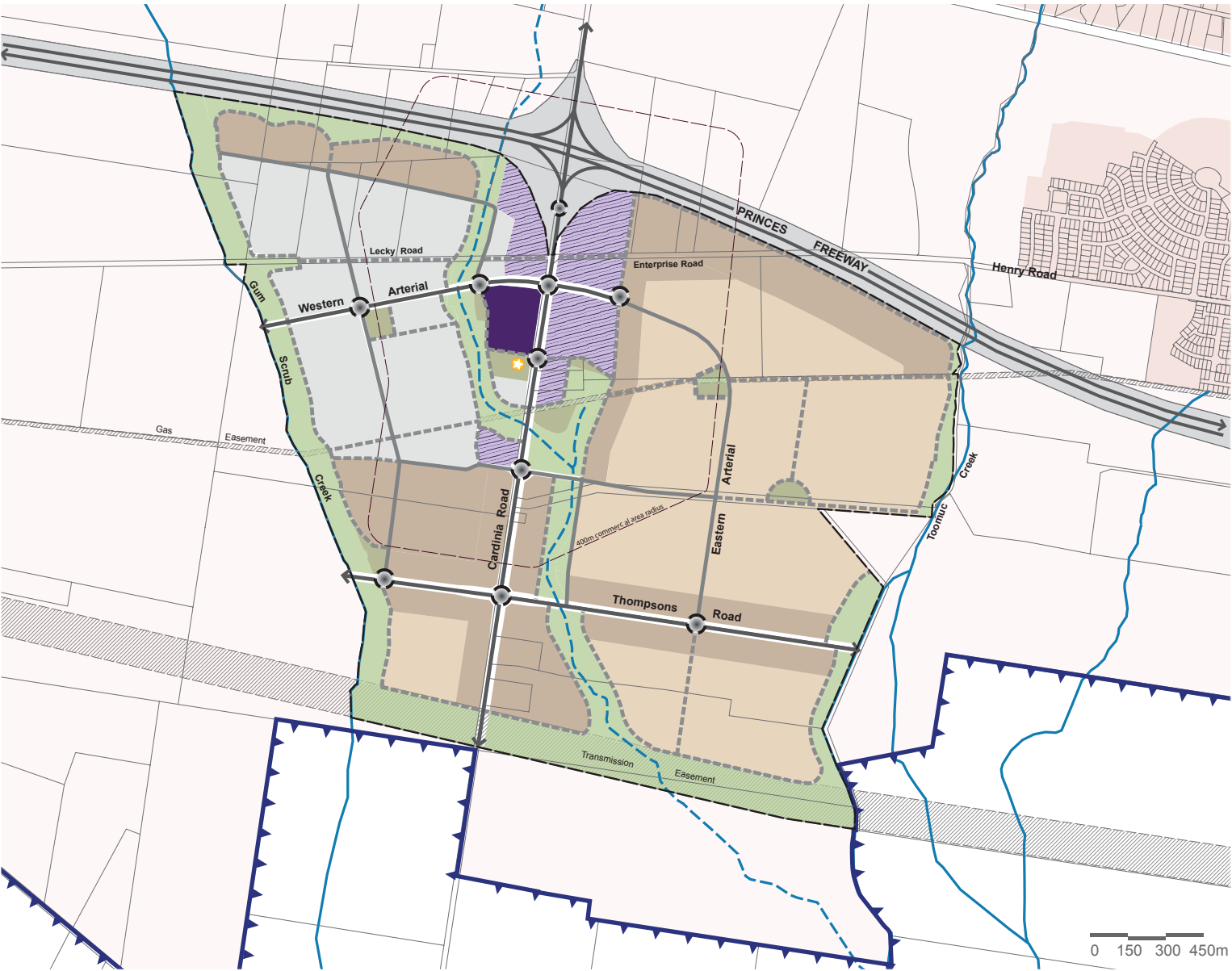
-  Community Facility

Open Space and Environment

-  Unencumbered Open Space
-  Encumbered Open Space
-  Existing Creeks
-  Drainage Lines

Other land

-  Existing Major Easements
-  Future Urban Land
-  Existing Urban Land



4.2.3 Planning and Design Guidelines

Employment Areas

The following planning and design guidelines relating to the location of uses must be met:

- Commercial development is to form the gateway to the Precinct, extending along Cardinia Road from the Princes Freeway to surround the intersection of Cardinia Road and Eastern and Western Arterial, creating a high density commercial core, principally comprised of offices.
- Service Business uses are to be located along the Princes Freeway, along Cardinia Road and key sections of Thompsons Road, to provide a high-quality built form edge to the Precinct.
- Industrial Uses are to be located where potential amenity impacts are minimised and high levels of access to arterial roads can be achieved through subdivision design.
- Commercial and Industrial development is to be well integrated through:
 - road network design that creates a permeable environment between adjoining developable parcels and provides direct connections to arterial roads; and
 - building design that positively contributes to the public realm with a strong visual address and active frontages to primary street frontages, delivering a high amenity outcome (for design suggestions refer to Figure 4 and Figure 5).
- Home-based businesses are encouraged in the Activity Centre and in residential areas to maximise the use of high-visibility locations and protect the amenity and integrity of core residential areas. They are encouraged in residential areas where the sites:
 - front onto arterial roads;
 - overlook open space corridors; or
 - abut Service Business areas.

The framework for the development of employment in the Precinct is illustrated in Plan 8. Planning and design guidelines for the development of specific types of employment land are set out in Table 6.

Table 6: Employment Land Planning and Design Guidelines

	Planning and design guidelines that must be met	Planning and design guidelines that should be met
General	<ul style="list-style-type: none"> • Secondary street frontages are to provide opportunities to activate building edges, including extensive glazed frontages that enable passive surveillance over the public realm. • Adjacent to residential areas (refer Figure 2 and Figure 3): <ul style="list-style-type: none"> – uses cannot operate for extensive hours (as per Environmental Protection Authority (EPA) requirements); – uses that generate high traffic volumes and utilise large vehicles are discouraged; – frontages must be provided to all public roads; – buildings must present their front, rather than side or rear to residential areas; and – large car parks must not be provided at the front of buildings. • Adjacent to open space areas (refer Figure 2 and Figure 3): <ul style="list-style-type: none"> – buildings must present their front, rather than side or rear to open space areas; – frontages must be provided to all public roads; – passive surveillance of open spaces must be achieved through orientating windows and doors towards the open space; and – the amount of on-street car parking must be maximised. • Formal garden entries provided within front setbacks of lots are not to compromise the Precinct's Australian Landscape Theme. • Rooftop plants, telecommunications towers etc are to be obscured from view by the built form, screens or false facades. • Building design is to provide attractive entrances that resolve the level differences between the ground level and finished floor level requirements (refer Section 4.7.3 regarding drainage). • High quality building design is to be achieved to enhance the public realm. High quality building materials are to be utilised, blank walls to be minimised and extensive active frontages provided. • Large at-grade car parks are to: <ul style="list-style-type: none"> – be landscaped throughout with clean-trunked canopy trees; and – have adequate pedestrian paths to provide direct, dedicated access-ways from parking to building entrances. • Creation of common property through subdivision is to be avoided, enabling intensification of development and site redevelopment in the longer term. 	<ul style="list-style-type: none"> • Car parking is to be provided on site and screened from the street and public realm by the built form. • Integrated and centralised signage is encouraged for multiple businesses and tenancies. • Where colourbond steel is utilised, it not to exceed 30 percent of the building mass (excluding the roof) visible from any public street. • Locations of sensitive uses are not to compromise Industrial land use buffers.

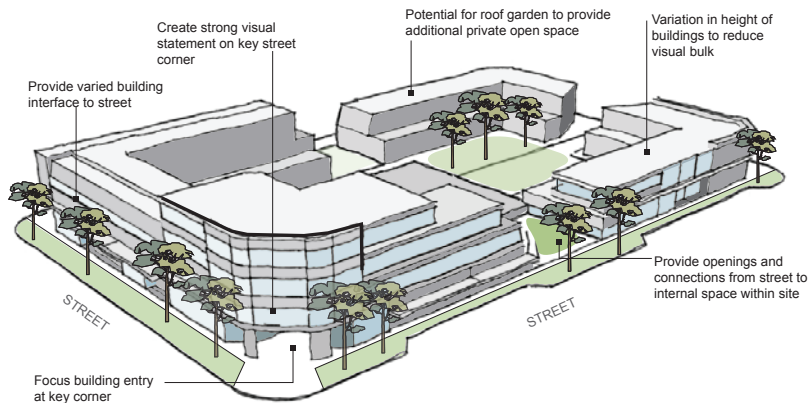
Planning and design guidelines that must be met	Planning and design guidelines that should be met
<p>Commercial</p> <ul style="list-style-type: none"> • The dominant use is to be office, alongside supporting high employment generating activities such as conference facilities, hotels, hospitals and tertiary education facilities, which encourage investment in offices.. • Building set backs from the street are to be minimised to create a highly urbanised Commercial environment, with: <ul style="list-style-type: none"> – a maximum setback of 3 metres from the lot line, where lots directly abut Cardinia Road; and – no setback and a zero lot line where a service road or 'loop road' is provided parallel to Cardinia Road. • Direct connections to open space areas and the Activity Centre are to create a highly permeable, walkable street network and urban environment. • An ultimate built form of at least 3 to 4 storeys in height is to be provided to achieve the required job densities (refer Figure 4). Development may be staged to allow for less height if it can be demonstrated that the building height can be increased in the future. • Greater massing and building heights are to be achieved on all corner sites with a frontage to Cardinia Road, creating an attractive entry feature with landmark statement buildings. • Buildings fronting Cardinia Road and open space areas are to be articulated to create visual interest and diversity. • Buildings on sites that abut the Freeway interchange are to be: <ul style="list-style-type: none"> – primarily accessed (by pedestrians and vehicles) from an internal road that is parallel to the Freeway interchange; or – built with zero setback from the Freeway interchange, with a well articulated façade that has extensive active frontages overlooking the Freeway and the interchange. • Ground level pedestrian entrances and foyers are to be clearly visible from the street, with the primary pedestrian entrance to buildings from the highest-order road frontage. • Buildings are to provide frontages to (existing and future) buildings of adjacent land uses to create a positive relationship between different parts of the Precinct. • The amenity offered by view lines towards and across open space areas is to be optimised, with the windows and upper storey outdoor spaces of buildings located to maximise the use of the 'borrowed landscape'. • Loading bays and service areas are to be located in areas screened from public view, protecting the amenity of the public realm. • Car parking is to be provided off-street with: <ul style="list-style-type: none"> – on-street car parking principally providing for short-stays; – centralised car parking encouraged, including multi-deck car parks; and – minimal parking visible from the street. • Signage is to be contained within the built form and be proportional to facades (with a building frontage to signage ratio of not more than 4:1). • Where restricted retail uses are provided: <ul style="list-style-type: none"> – offices must be provided at upper storeys, and – an office to restricted retail floorspace ratio of no less than 2:1 is to be provided (for example 1000m² showroom must be built in conjunction with 2000m² of office floorspace). 	<ul style="list-style-type: none"> • Large floor plates are encouraged for office buildings to maximise job densities and land utilisation. • To activate street frontages, particularly along arterial roads and overlooking public open space, cafes, restaurants and convenience shops are encouraged, provided that they are a supporting use. The maximum combined leasable floor area is 500m² for these uses on any individual lot. • Integrated office developments to provide communal open space areas for employees, supplementing the public open space network. Open space to maximise solar access, and provide pedestrian connectivity to areas external to the development (refer Figure 4). • A single vehicle access to be provided for integrated office developments, with shared car parking. Car parking areas can be at-grade, basement or multi-deck, and should be generally screened from the street and public spaces by the built form (refer Figure 4).

	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Service Business	<ul style="list-style-type: none"> Buildings are to orientate towards the highest-order road frontage of their site, with: <ul style="list-style-type: none"> areas adjacent to the Princes Freeway fronting onto the Freeway, rather than orienting their side or rear to the Freeway; areas along Cardinia and Thompsons Road fronting onto the arterial road; and areas along Eastern Arterial fronting onto Eastern Arterial. Adjacent to the Princes Freeway: <ul style="list-style-type: none"> showroom, customer service areas and office components of developments are to face the Freeway; opportunities for exposure are to be optimised, with a higher built form and greater massing that creates the sense of a continuous high-profile glazed edge to the Precinct; and landscaping is to be low lying to ensure maximum visibility and exposure. Where the primary frontage of buildings in the Service Business areas are oriented towards arterial roads or the Freeway, and a second frontage to adjacent land uses exists, the following is to be provided: <ul style="list-style-type: none"> active frontages of buildings to overlook open space areas and streets where they are shared with residential uses; windows and secondary pedestrian entrances of buildings overlooking streets in the Commercial area; or secondary buildings and/or glazed frontages to provide a strong visual connection where the use is adjacent to Industrial areas. Car park and service areas are to be screened from public view, with integrated on-site car parking areas 'tucked behind' buildings. Direct pedestrian paths connecting off-street car parks to the primary entrances of buildings must be provided. On-street car parking is to be provided in addition to the off-street parking requirements, except where a use has an interface with residential areas. Uses with adverse amenity potential (noise, hours of operation, fumes) are not to establish in the area. Lighting design is to minimise light 'spill' into adjoining land, particularly residential areas. Signage is to be provided within the built form, with a maximum building frontage to signage ratio of no more than 3:1. Where warehousing is provided, it must be in conjunction with an office and a floorspace ratio of now more than 4:1 is to be achieved (for example, a 400m² warehouse must provide at least 100m² of office) Where cafes, restaurants, convenience shops and convenience restaurants are provided, they are to be located: <ul style="list-style-type: none"> adjacent to open space; and with frontage to an arterial road or connector street; except where the site adjoins or forms part of a petrol station or a use listed above. 	<ul style="list-style-type: none"> Allotments ranging between 500m² and 2000m² are to be provided. A single vehicle access point to be provided for sites with a single road frontage. Two vehicle access points to be provided for sites with two road frontages, enabling single directional 'loop' for servicing and delivery.

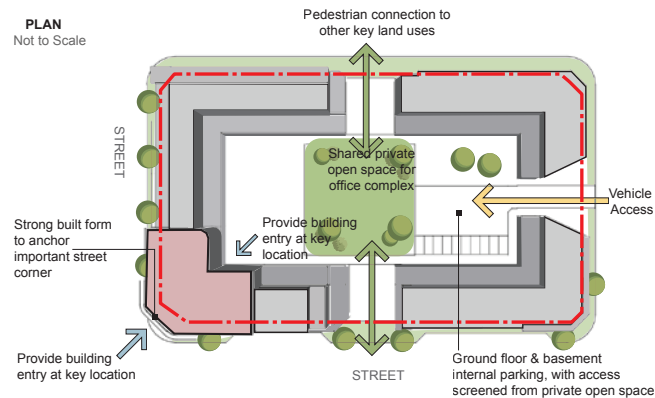
	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Industrial	<ul style="list-style-type: none"> Allotments up to 5 hectares are to be provided, to cater for a wide range of industry types. Larger lots can be provided where a specified use is identified. Uses with adverse amenity potential may be considered if it is demonstrated that the Residential, Activity Centre and Commercial land (noise, light spillage, hours of operation) is not adversely affected (subject to buffer requirements and distances illustrated in Appendix A). Heavier industrial uses are to locate in the southern and eastern parts of the Industrial Area. A grid street network is to be developed, creating a variety of lot sizes that enable flexibility in land use and development intensity over time, as demonstrated in Figure 5. Office components of industrial developments are to be provided along the street frontage. Office facades are to be articulated, providing an attractive streetscape. Landscaping should also be provided along the street frontage (refer Figure 5). Buildings are to provide frontages to (existing and future) buildings in adjacent land use areas to create a positive relationship between different parts of the Precinct. A maximum street setback of 3 metres is to be achieved, except opposite residential areas where a setback of 6 metres is required. At-grade parking, including loading and storage areas are to be provided at either the side or rear of the building (refer Figure 5), with direct pedestrian paths connecting off-street car parks to the primary entrances of buildings. Lighting design is to minimise light 'spill' onto adjoining land. Where cafes, restaurants, convenience shops and convenience restaurants are provided, they are to be located: <ul style="list-style-type: none"> – adjacent to open space; and – with frontage to an arterial road or connector street; except – where the site adjoins or forms part of a petrol station or a use listed above. 	<ul style="list-style-type: none"> Warehouse, display and storage areas should be provided in conjunction with other uses eg. industry or office. The visual bulk of industrial buildings is to be minimised through the integration of offices and showroom/customer service areas (refer Figure 5). Visitor parking may be provided close to the office entry of the development, separated from the street by landscaping. Signage is to be provided within the built form with a maximum building to signage ratio of no more than 3:1. Pole signs may be provided.

Figure 4: Building Typology – Commercial

OFFICE BUILDINGS INDICATIVE BUILDING MASSING



PLAN
Not to Scale



SECTION

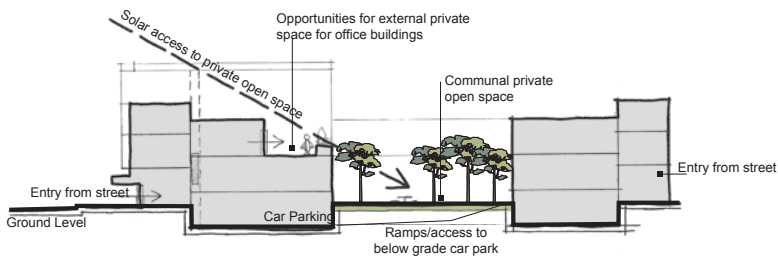
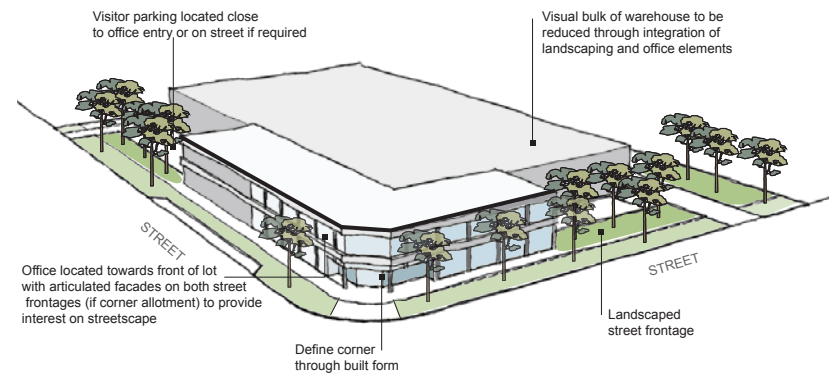


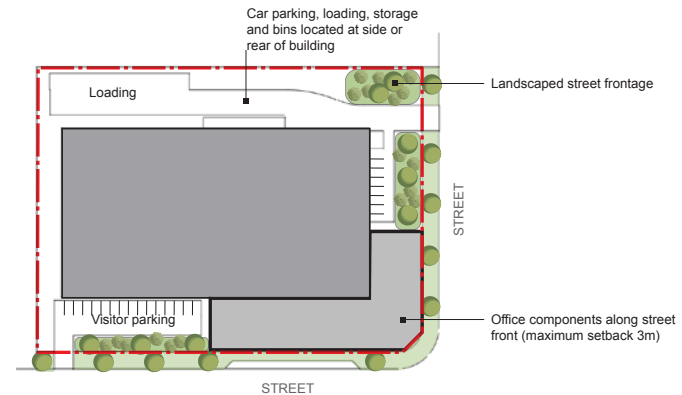
Figure 5: Building Typology – Industry

INDUSTRIAL BUILDINGS INDICATIVE BUILDING MASSING



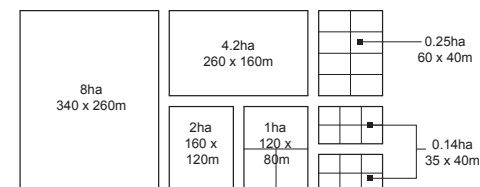
LEGEND
Lot Boundaries

PLAN
Not to Scale



FLEXIBILITY OF THE GRID

Grid street network can be flexible to allow for varied industry sizes



Activity Centre

The following planning and design guidelines must be met:

- The Activity Centre is to be located on the south-west corner of the intersection of Cardinia Road and Eastern and Western Arterial in accordance with Plan 5.
- The Activity Centre is to provide a neighbourhood-level role and function in accordance with Table 7.

The Planning and Design Guidelines outlined in Table 8 apply to the Activity Centre.

Table 7: Hierarchy of Activity Centres

Location	Activity Centre	Role and Function
Within the Precinct	Employment Precinct Neighbourhood Activity Centre	<ul style="list-style-type: none"> • Retail floorspace of approximately 6,000m². • Office floorspace of 4,000m² (minimum). • Peripheral commercial areas to provide for activity diversity and provide floorspace for flexible use. • A 'main street' centre anchored by a full-size supermarket (maximum 3,500m²), specialty shops and providing a wide range of personal and professional services, niche (business-related) retail and hospitality, such as cafes, restaurants and taverns/bars. • Provision for the development of non-retail commercial uses such as office and small office/home office (SOHO) development. • Approximately 100 dwellings, including shop-top housing and apartments. • Located adjacent to the Cardinia Road Open Space Corridor and Kaduna Park, the Activity Centre offers the opportunity to create strong links to between these three key community spaces.
Outside the Precinct Note: These activity centres are outside the PSP area, however their role and function has been described as they are located in close proximity to the Precinct and they play a supporting role, particularly in terms of their range of goods, services and facilities and transport links. For more detail on the following activity centres refer to the Cardinia Road PSP, September 2008.	Lakeside / Toomuc Neighbourhood Activity Centre	<ul style="list-style-type: none"> • Retail floorspace of approximately 10,000m². • Peripheral commercial floorspace of approximately 25,000m². • Neighbourhood-level core retail function with associated peripheral commercial uses, comprising a supermarket, associated shops and services. • Possible future upgrade from NAC to MAC (Smart Growth Committee 2005). • Regional peripheral commercial facilities and bulky goods retailing role associated with the Pakenham Homemaker Precinct. • Regional recreation and community services function, underpinned by the Cardinia Cultural Centre, the 'Cardinia Life' indoor sports and aquatic centre and Police and Emergency Complex.
	Cardinia Road North Neighbourhood Activity Centre	<ul style="list-style-type: none"> • Retail floorspace of approximately 5,000m². • Neighbourhood-level core retail function and associated peripheral commercial uses, comprising a supermarket, associated shops and services.
	Cardinia Road South Neighbourhood Activity Centre	<ul style="list-style-type: none"> • Retail floorspace of approximately 10,000m². • Neighbourhood-level core retail function with associated peripheral commercial uses, comprising a supermarket, associated shops and services. • Restricted retail services along Cardinia Road. • Neighbourhood community services including primary school and community centre. • Integrated with Cardinia Road Railway Station (under development).

Table 8: Activity Centre Urban Design Guidelines

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Layout and Structure	<ul style="list-style-type: none"> The ground level within the activity centre is to match the floor level of buildings, providing an environment that promotes seamless movement and attractive public realm. The road and pedestrian network of the Activity Centre is to be well integrated with (existing and planned) surrounding areas, enabling safe and accessible movement to, from and within the centre, particularly for pedestrians. The Activity Centre will be 'street-based' with an active, public Main Street lined with specialty shops. A finer-grained street network supporting the Main Street is to be created with internal roads or access ways. All internal roads are to be public roads. Key views and sight lines into and out of the Activity Centre and to Kaduna Park and open space corridors are to be considered and reflected in the layout and overall design. Buildings are to be developed: <ul style="list-style-type: none"> on the edge of Main Street, with frontages aligned with the lot line of the road reserve; and in all corners of the site, with frontages aligned to the lot line of adjacent road reserve/s and to abut internal roads or access ways. Subdivision of the Activity Centre site is to be minimised to ensure more intensive development can occur over time. Creation of common property is to be avoided. 	<ul style="list-style-type: none"> Limited development may occur in the unencumbered open space west of the Activity Centre, subject to no adverse impacts occurring on the waterway or Growling Grass Frog habitat. Create lots with roads or carriageways on all sides. The frontages of tenancies along Main Street will be a maximum of 10 metres in width, creating a fine-grained shopfront environment.
Built Form and Massing	<ul style="list-style-type: none"> Prominent locations (including in all corner of the site) must be developed to: <ul style="list-style-type: none"> provide multi-storey buildings with articulated frontages; or create the illusion of building height through landmark architecture. Upper storeys are to be provided on the majority of specialty shops in Main Street. Where SoHos are provided, they are to: <ul style="list-style-type: none"> be designed to enable the ground floor to be split from the upper floor to create two separate tenancies; and ensure entrances can be provided from the street frontage to both ground floor and upper storey tenancies. 	<ul style="list-style-type: none"> Buildings are to be at least two storeys high. Mixed use, 'townhouse-style' development with ground floor facades providing 'shopfront' or home office (SoHo) environments are encouraged adjacent to the Cardinia Road Open Space Corridor, providing opportunities for flexible use.

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Uses – Distribution and Form	<ul style="list-style-type: none"> • Retail shops will dominate in the Main Street, providing for: <ul style="list-style-type: none"> – a finely grained shopfront environment along its length; – a mix of retail uses; – small-scale offices or dwellings at upper storeys; and – access only from Main Street except for corner shops. • The highest-order retail anchor store in the centre will be a supermarket of no more than 3,500m². • Stand-alone offices will be: <ul style="list-style-type: none"> – multi-storey; or – provide upper storey residential dwellings. • Medical centres and gyms are to be located at edge locations where they are a stand-alone use or can be located at upper storeys of Main Street. • Where childcare and other community uses are provided they are to be located adjacent to open space and/or Kaduna Park. • Entertainment and dining premises are encouraged in Main Street and overlooking the Cardinia Road Open Space Corridor, broadening the operating hours of the centre. • Showrooms, niche business-related retail and services are encouraged and may be located on the periphery of the centre or along secondary streets in the Activity Centre. • A range of uses are encouraged including uses which operate across broader hours (especially at night) such as cafés, restaurants and bars. • High density residential uses are encouraged: <ul style="list-style-type: none"> – overlooking the Cardinia Road Open Space Corridor; or – fronting onto Kaduna Park; or – above retail and commercial uses. 	<ul style="list-style-type: none"> • In the unencumbered open space west of the Activity Centre, restaurant or café uses are encouraged, with outdoor dining areas overlooking the Cardinia Road Open Space Corridor.
Supermarkets and other 'large box uses'	<ul style="list-style-type: none"> • Supermarkets and other core retail uses of more than 1,000m² must: <ul style="list-style-type: none"> – be directly accessed only from Main Street; – sit behind the fine-grained shopfront environment of Main Street; and – not present long façades to the public realm with all edges 'wrapped' or 'hidden from' the public realm with other tenancies or buildings. 	<ul style="list-style-type: none"> • Niche, business-related retailing requiring larger floor areas (eg. office supplies) may be located on secondary streets or accessways with direct access from car parks. • The shortest edge of the building is to be oriented to higher order roads.

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Public Domain	<ul style="list-style-type: none"> • A central town square is to be: <ul style="list-style-type: none"> – provided in scale with the Activity Centre; – edged with the active frontages of specialty shops and be directly accessed by shop frontages to encourage outdoor dining; – well located in an area with high levels of pedestrian activity; and – have good solar orientation. • Continuous active frontages are required along Main Street, with minimal breaks in the built form, except to provide: <ul style="list-style-type: none"> – a well-located town square that is integrated with and addressed by retail uses; – access to the supermarket via a small plaza space the equivalent of no more than two specialty shops in width; or – access to central car parking areas (pedestrian or vehicular). • A dense concentration of shop entries and extensive clear glazed windows are to characterise Main Street, enabling a high level of pedestrian amenity and engagement. • Façades are to be articulated to contribute to the character of the street and provide visual interest. • Continuous awnings or verandahs are to be provided over the footpath on all streets. • Wider footpaths are to be provided to: <ul style="list-style-type: none"> – enable outdoor dining and shopfront trading; – accommodate informal social interaction; and – provide clear paths of movement. • Street furniture and public art are to be provided to create a sense of place and provide informal spaces for social interaction. • Where specialty shops have facades to both Main Street and internal car parking areas: <ul style="list-style-type: none"> – separate tenancies are to be provided fronting onto Main Street and internal car parking areas; or – where single tenancies exist, active frontages are to be provided on both sides; except – where rear tenancies would overlook site servicing facilities of other uses. • The visibility of blank walls is to be minimised. • The Activity Centre (including car park areas) is to be landscaped with clean-trunked canopy trees and low-lying vegetation to maximise shade and safety. • A materials and colour palette must be utilised to create a strong urban character that complements and is sensitive to the surrounds. 	<ul style="list-style-type: none"> • The town square is to be at least 500m². • Blank walls are to be no more than 10 metres in length or account for no more than 50 percent of any one side of a building (whichever is smaller). • Non-indigenous planting may be permitted as feature plantings (e.g. garden planting and shade trees) within the Activity Centre.

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Interfaces and edges to the road network	<ul style="list-style-type: none"> The design of buildings in the Activity Centre is to respond to the scale and character of adjoining development. Corner sites, where the Main Street meets an arterial road: <ul style="list-style-type: none"> are to anchor the 'Main Street' to the arterial road, by providing greater building mass and height; are critical development sites and not suitable for single-storey fast food outlets or petrol stations; and are not required to include a retail component. Landscaping of the interface is to be of a high standard and is considered to be an important element to complement built form design. Rooftop plants, telecommunications towers etc are to be obscured from view by the built form, screens or false facades. Pedestrian and bicycle links are to: <ul style="list-style-type: none"> be provided in Activity Centre; and be integrated with the network provided on arterial roads and open space corridors. 	<ul style="list-style-type: none"> Buildings located adjacent to Kaduna Park are to 'step down' in height towards the site, with upper storey outdoor areas encouraged to overlook Kaduna Park.
Main Street Traffic	<ul style="list-style-type: none"> Access to the Main Street from arterial roads will be subject to the approval of VicRoads. Pedestrian crossings, slow zones, pedestrian priority areas and clearly indicated shared spaces should be used to deliver a pedestrian friendly environment. The use of roundabouts to manage traffic is to be avoided wherever possible. A 'shared space' is required to create an attractive Main Street environment in the core retail area, with: <ul style="list-style-type: none"> continuous paving treatment from shopfront to shopfront; and pedestrian priority over traffic and other forms of movement. 	<ul style="list-style-type: none"> Access to internal streets (including Main Street) from arterial roads is to be set back of at least 100 metres from designated intersections. The use of slip lanes to access the Activity Centre should be avoided to promote pedestrian safety.
Parking	<ul style="list-style-type: none"> On-street parking is to be provided on Main Street. Car parking within the Activity Centre must be centralised to allow for shared usage. The design of off-street car parking must ensure that: <ul style="list-style-type: none"> it is accessible for Main Street traffic; it is screened from the Main Street; footpaths are provided to, from and within the car park; and, appropriate detail has been considered such as landscaping and provision of canopy trees. Bicycle parking is to be provided in a number of locations and must be clearly visible and well lit, preferably under cover. 	<ul style="list-style-type: none"> Parking should be minimised to encourage use of other modes of travel. Multi decked or basement car parking is preferred. Car parking may extend from the supermarket to Cardinia Road in the short term, maximising visibility for passing traffic on Cardinia Road. Short-term car park areas fronting Cardinia Road should be 'built out' in the longer term: replaced by commercial buildings and multi-storey or basement car parks.

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Public Transport	<ul style="list-style-type: none"> The Activity Centre design is to incorporate/respond to the proposed public transport network in consultation with the Department of Transport. Public transport infrastructure and facilities are to be located in commuter friendly and convenient locations. 	
Signage	<ul style="list-style-type: none"> Signage is to be integrated within the built form. The transparency and visual permeability of windows at ground level is not to be obscured by any form of tinting, films, paint or similar. The placement of advertising collateral eg. posters and banners in ground floor tenancies is to maintain a clear visual connection from buildings onto the street and not obscure sightlines at eye-level. 	
Site Servicing	<ul style="list-style-type: none"> Service areas are to be internalised wherever possible. Where internalised service areas cannot be provided, they are to be secured and screened at the rear of buildings. Where service areas are accessible from car parks, a well designed and secure façade must be presented to public areas. 	<ul style="list-style-type: none"> Loading areas should be accessed off a north-south internal street, with left-in, left-out access from Western Arterial. Site servicing from Main Street, the east-west road adjacent to Kaduna Park and the Activity Centre Ring Road (adjacent to the Cardinia Road Open Space Corridor) is discouraged.

4.2.4 Urban Design Framework Requirements

An Urban Design Framework (UDF) is required for the following areas:

- The area shown as 'Service Business' in Plan 5 that abuts Princes Freeway, comprising two discrete sub-areas:
 - west of Cardinia Road, north of the residential area; and
 - east of Cardinia Road, for the area generally north of Enterprise Road, extending to Toomuc Creek in a band that is approximately 200 metres wide.
- The area defined as the 'commercial core' including the Activity Centre, which encompasses:
 - all land between Cardinia Road and the Cardinia Road Open Space Corridor; and
 - all land east of Cardinia Road shown as Commercial in Plan 5.

Urban Design Framework: Princes Freeway Service Business Area

The Urban Design Framework must:

- demonstrate consistency with the 'General' and 'Service Business' guidelines in Table 6.
- set out building design guidelines including addressing the interface with streets and open space, heights, massing and articulation.
- set out guidelines for circulation and access through the Precinct, particularly for larger vehicles and trucks.
- set out guidelines for vehicle access to lots including front (Freeway-side) and rear access.
- outline guidelines for the provision of car parking, including location, design and access.
- provide guidelines for site-servicing including areas for deliveries and waste disposal, site-specific access for larger vehicles and measures to minimise the impact on the amenity of adjoining sensitive land uses.
- include an overall landscape concept.
- outline guidelines to improve environmental sustainability including integrated water management and energy conservation consistent with the minimum requirements set out in Table 20.
- set out design guidelines for the provision of advertising signs.
- set out requirements for concealment of rooftop plants etc.

Urban Design Framework: Commercial Core (including the Activity Centre)

The purpose of the 'commercial core' UDF is facilitate the delivery of a well integrated urban form with building and subdivision design that responds to adjacent developments and features of the Precinct, ensuring a high-quality and high-amenity outcome.

The UDF must be prepared in detail for the Activity Centre site, with a broader framework being created to guide development of surrounding Commercial and High Density Residential Areas. For the commercial core area not shown as activity centre in Plan 5, the UDF should include:

- integration of access and movement paths;
- visual continuity including creation and maintenance of sightlines;
- building siting and massing; and
- amenity and character of the Precinct's commercial core.

The Urban Design Framework must:

- reflect consistency with the role and function for the Activity Centre set out in Table 7.
- address the guidelines for the Activity Centre set out in Table 8.
- demonstrate consistency with the 'General' and 'Commercial' guidelines in Table 6.
- address the Activity Centre Design Guidelines (DSE 2005), Safer Design Guidelines for Victoria (DSE 2005) and Guidelines for Higher Density Residential Development (DSE 2004).
- set out guidelines for building design in the Activity Centre including interface with streets and other public spaces, heights and articulation to create a strong urban character.

- set out a framework for the siting of buildings and principles for heights and massing in the commercial core area not shown as activity centre.
- demonstrate how opportunities for future expansion can be incorporated into the development of the Activity Centre, enabling more intensive development of sites (particularly at-grade carparks) over time.
- set out the building and paving materials to be used in the Activity Centre and identify key elements to be reflected in the commercial core area not shown as activity centre.
- set out guidelines for the integrated design of 'internal' streets in the Activity Centre, including design and width of accessways, pedestrian access and areas, car parking and where appropriate, street furniture. A framework must also be provided demonstrating how these connections should be integrated with sightlines and movement paths in the commercial core area not shown as activity centre.
- outline access arrangements from adjoining arterial roads for the Activity Centre, including intersections with streets and property access/egress points.
- provide a Transport Impact Assessment Report for the Activity Centre, prepared to the satisfaction of VicRoads and the responsible authority.
- outline guidelines for car parking in the Activity Centre including the location and design of car parking areas, as well as setting out car parking rates for proposed uses.
- demonstrate how public transport will be integrated with the commercial core and particularly the Activity Centre (to be developed in consultation with the Department of Transport).
- identify locations of public spaces within the commercial core including a town square in the Activity Centre and connections to other public spaces including open space.
- include a landscape concept for the Activity Centre and set out an overall landscaping scheme for the commercial core area not shown as activity centre.
- outline guidelines to improve environmental sustainability including integrated water management and energy conservation consistent with the minimum requirements set out in Table 15.
- provide guidelines for the provision of advertising signs in the Activity Centre.
- set out guidelines for the design of site-servicing areas in the Activity Centre, including areas for deliveries and waste disposal including access for larger vehicles and measures to minimise the impact on the amenity of the Activity Centre and other adjacent uses.
- set out requirements for concealment of rooftop plants etc throughout the commercial core.
- include a plan for the Activity Centre showing proposed ownership patterns.




























Indicative Urban Design Framework - Activity Centre

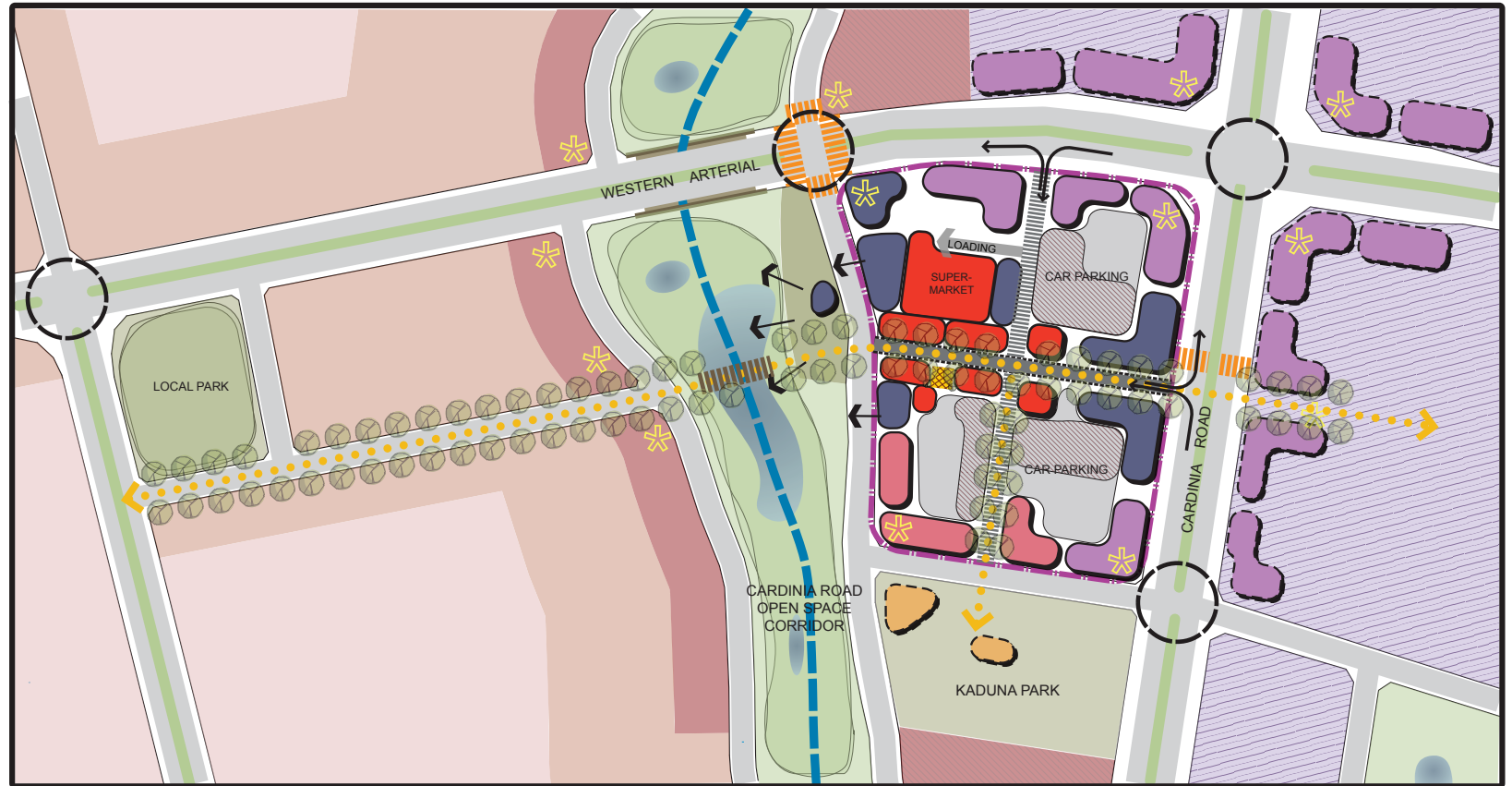
The Indicative Urban Design Framework provides a design solution for the Activity Centre (refer Figure 6). Alternative approaches may be considered.

In addition to the activity centre, the UDF must provide direction to the development of adjacent commercial and higher density residential areas.

Figure 6: Indicative Urban Design Framework - Activity Centre

LEGEND

-  Activity Centre Site Boundary
-  Core Retail
-  Peripheral Commercial
-  Office
-  High Density Residential
-  Potential Community Facilities
-  Car Parking
-  Future Development Area
-  Potential Locations for Significant Buildings
-  Controlled Intersection
-  Town Square
-  Primary Pedestrian Link
-  Pedestrian Bridge
-  Signalised Pedestrian Crossing
-  Principal Road Network
-  Main Street
-  Key Internal Circulation
-  Boulevard Plantings
-  Conventional Residential
-  Medium Density Residential
-  High Density Residential 1
-  High Density Residential 2
-  Commercial
-  Unencumbered Open Space
-  Encumbered Open Space
-  Drainage Line
-  Wetlands & Other Waterbodies



4.2.5 Site Context Report Requirements

A Site Context Report is required for landmark sites and prominent gateways to the Precinct, where an Urban Design Framework does not apply. It is a site-specific assessment of the merits of a proposal in terms of the urban design standards set by the development and will be required at planning permit stage.

A Site Context Report is required for the following sites:

- Cardinia Road between the Cardinia Road Open Space Corridor and Thompsons Road;
- the corners of Cardinia and Thompsons Roads, extending along Thompsons Road to the first connecting street;
- Thompsons Road adjoining Gum Scrub Creek; and
- Thompsons Road adjoining Toomuc Creek.

Site Context Report

The Site Context Report must:

- demonstrate consistency with the relevant guidelines in Table 6.
- illustrate building design principles including how interfaces with streets and open space have been addressed, how heights, massing and articulation will create a prominent 'landmark' on the site.
- demonstrate how the proposed building relates to existing and future adjacent buildings, illustrating how facades and active frontages:
 - respond to existing adjacent buildings; and/or
 - provide opportunities for achieving visual continuity and integration with future adjacent developments.
- demonstrate how circulation and access will be provided, particularly for larger vehicles and trucks.
- show how car parking will be provided and its visual dominance from the street is minimised.
- demonstrate how site-servicing facilities will be provided, minimising the impact on the amenity of any adjoining sensitive land uses.
- include an assessment of how landscaping will contribute towards an attractive public realm, while not detracting from sense of scale of the built form.
- demonstrate how rooftop plants etc will be concealed.

The Site Context Report would usually include a short report, a site plan showing key features and relationships with surrounds and where adjacent buildings exist: photographs and elevations of the streetscape/s.

4.3 Housing

4.3.1 Objectives

The objectives for housing are to:

- facilitate the development of a residential area that accommodates sufficient population to support a full size supermarket in the Neighbourhood Activity Centre;
- provide at least 2,000 dwellings in the Precinct.
- establish a high amenity setting for the residential area, creating a distinctive neighbourhood character that embraces the natural features of Precinct;
- create a niche residential offer that provides a different housing choice in Cardinia Shire, by:
 - achieving significantly higher residential densities, including smaller lot development; and
 - delivering a compact multi-storey residential form.
- provide a range of residential densities and housing types;
- develop higher residential densities in locations to encourage walking to the Activity Centre and public transport; and
- optimise the amenity provided by the waterways and open space corridors.

4.3.2 Implementation

The objectives for housing are met by implementation of all of the following:

- Plan 5: Future Urban Structure Plan;
- Plan 9: Housing;
- Planning and design guidelines set out under 4.3.3 including:
 - Table 9: Distribution of Densities;
 - Figure 2 and Figure 3: Sensitive Land Use Interfaces;
 - Figure 7: Indicative Subdivision Design along Western Arterial;
 - Figure 7a: Indicative Conventional & Medium Density Residential Typologies; and
 - Figure 7b: Indicative High Density Residential Typologies.
- Plan 11: Open Space Network.

4.3.3 Planning and Design Guidelines

General

The following planning and design guidelines must be met:

- A greater number of dwellings will be considered if they are contained within the area shown for residential development in Plan 9 and consistent with the objectives for housing.
- The dwelling yield for any individual parcel (or parcels in contiguous ownership) is to be achieved (refer Table 4).
- 95% of dwellings are to be within 400 metres street walking distance of potential public transport routes to support the provision of future bus services.
- Medium density housing is to be provided where

residential adjoins Service Business uses, with:

- subdivision and road design that incorporates an appropriate interface treatment (including tree planting and use of tree outstands for carparking).
- dwellings designed to front onto the Service Business use.
- Shop-top housing and apartments are to be provided in the Activity Centre.
- Subdivision layout is to:
 - provide a permeable street network with a grid layout avoiding cul-de-sacs;
 - maximise solar access through lot design and orientation. Where north-south lot orientation cannot be achieved, lot width must enable solar access to north facing windows of habitable rooms; and
 - maximise the number of narrow lots to increase the number of dwellings within the walkable catchment of the Activity Centre, open space and public transport routes.
- Streetscapes:
 - must be landscaped with vegetation reflecting the Australian Landscape theme; and
 - are not to be dominated by garages and carports.
- Dwellings are to:
 - have front fences of no more than 1.2 metres in height, where they are provided;
 - face and provide pedestrian access from the primary street frontage; and
 - maximise passive surveillance over public open space, with appropriately located windows, doors, verandas and balconies.

- Rear access lanes are to:
 - be provided where access to the front of the lot is limited by the road classification or lot width;
 - provide addresses for above garage dwellings and home based businesses, enabling buildings to provide passive surveillance over laneways;
 - be no more than 150 metres long, with no t-intersections or bends;
 - be a maximum width of 6.0 metres;
 - be designed with no alcoves or obscured places, ensuring garages and rear fences are constructed to the edge of the road reserve of the laneway (with zero setback); and
 - not be heavily landscaped. Low-lying vegetation and climbing plants that do not obscure viewlines is encouraged.
- Home-based business is encouraged, particularly:
 - along the western edge of Cardinia Road Open Space Corridor;
 - in streets where Service Business is the adjacent use;
 - on Western Arterial; and
 - in studios and 'garage-top' buildings in rear access lanes.

The following planning and design guidelines should be met:

- The overall dwelling yield and distribution to be achieved in the Precinct is shown in Plan 9 and Table 9, generally reflecting the gradation in densities and diversity of lot sizes.
- The dwelling diversity of any individual parcel (or parcels in contiguous ownership) is to be generally consistent with Table 4.

- Housing at greater than conventional density is to be provided consistent with Plan 9:
 - High Density Residential 2 is to be provided south of Kaduna Park and north of Western Arterial along the eastern edge of the Cardinia Road Open Space Corridor.
 - High Density Residential 1 is to be provided along the western edge of the Cardinia Road Open Space Corridor, within walking distance of the Activity Centre.
 - Medium density housing is to be provided:
 - along Western Arterial, east of Cardinia Road Open Space Corridor (refer Figure 7);
 - along the central north-south access street that provides a connection to the Service Business area;
 - between the Activity Centre and the residential local park; and
 - around the Lecky Road conservation reserve.
- Conventional residential development is to be 'tucked behind' medium and high density residential areas and overlook Gum Scrub Creek.
- All dwellings are to be located within 400 metres street walking distance of a potential future public transport route.
- Mixed-use townhouse-style housing may be provided in the Activity Centre, with a shopfront or office-style ground floor.
- Residential buildings are to be a minimum of two storeys.
- The Australian Landscape theme is to be provided throughout the residential area.

- Non-indigenous planting may be permitted as feature plantings (e.g. garden planting) within residential developments.
- Rear access lanes are to:
 - provide 'rumble strips' across entrances to laneways from residential local streets;
 - provide landscaped entrances to laneways with canopy trees and low-lying plantings provided (in the road reserve of the residential local street);
 - be approximately 100 metres in length; and
 - be a maximum width of 5 metres.

Plan 9: Housing

LEGEND


























-  Precinct Structure Plan Area
-  Urban Growth Boundary
- Road Network**
 -  State Freeway
 -  Arterial Road
 -  Connector Street
 -  Access Street
 -  Controlled Intersections
 -  Signalised Intersection/Crossing
 -  Pedestrian Bridge
 -  Indicative Walkable Catchment
- Residential Land**
 -  High Density Residential 2
 -  High Density Residential 1
 -  Medium Density Residential
 -  Conventional Residential
- Employment Land**
 -  Commercial
 -  Neighbourhood Activity Centre
 -  Employment
- Heritage and Community**
 -  Community Facility
- Open Space and Environment**
 -  Unencumbered Open Space
 -  Encumbered Open Space
 -  Existing Creeks
 -  Drainage Lines
- Other land**
 -  Existing Major Easements
 -  Future Urban Land
 -  Existing Urban Land



Figure 7: Indicative Subdivision Design along Western Arterial



Table 9: Distribution of Densities

Residential Area Type	Net Residential Hectares (NRHa)	% Total NRHa	Dwellings	Average Lot Size (m ²)	% of Dwellings
Activity Centre			100	0	4.99%
High Density Residential 2	3.73	4.45%	392	0	19.55%
High Density Residential 1	2.70	3.22%	189	110	9.43%
Medium Density Residential	32.28	38.49%	646	350	32.22%
Conventional Residential	45.16	53.85%	677	500	33.81%
Totals	83.87	100%	2,004		100%

Source: Cardinia Shire Council, based on estimates by MacroPlan Australia 2008

Note: High Density Residential 1 & 2 assume 35 dwellings per hectare per level within the development.

High Density Residential 1 and 2

The following planning and design guidelines must be met:

- Articulated facades must be provided to contribute to streetscape character.
- Dwellings in High Density Residential 1 areas must be a minimum of two storeys.
- Buildings in High Density Residential 2 areas must be a minimum of three storeys.
- Dwellings must be provided as integrated housing sites, multi-storey apartments or terrace housing.
- Where housing is provided as terraces, rear access lanes are required unless a central parking solution is provided.
- Dwellings are to be set back by no more than 1.0 metre from adjacent street frontages (excluding rear access lanes).
- Siting and design of corner lots and locations of buildings on them is to ensure the extent of side fences on street frontages is minimised.

The following planning and design guidelines should be met:

- High Density Residential 2 areas are to achieve 105 dwellings per net developable hectare (refer Figure 7b for design suggestions).
- High Density Residential 1 areas are to achieve 70 dwellings per net developable hectare (refer Figure 7b for design suggestions).
- Consolidated vehicle access points are to be provided, with central rear-accessed driveways to internalised or underground car parking areas.

Medium Density Residential

The following planning and design guidelines must be met:

- Subdivision is to provide widened road reserves with landscape buffers where Medium Density Residential is located adjacent to employment land (refer Figure 2 and Figure 3 for design suggestions).
- Siting and design of corner lots and locations of buildings on them is to ensure the extent of side fences on street frontages is minimised (refer Figure 7a).

The following planning and design guidelines should be met:

- A density of at least 20 dwellings per net developable hectare is to be achieved.
- Terraced housing is encouraged.
- Dwellings are to generally be two storeys in height.
- Dwellings are to be set back by no more than 3.0 metres from the front boundary.
- Rear access lanes are encouraged (refer Figure 7a).

Conventional Residential

The following planning and design guideline must be met:

- A rectilinear area of open space (minimum 36m²) is to be provided to accommodate a canopy tree in the backyard of each lot.

The following planning and design guidelines should be met:

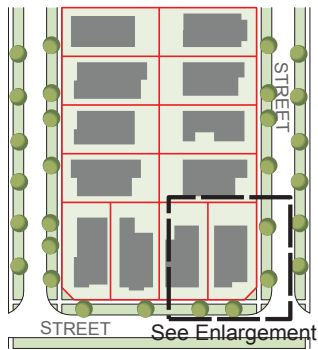
- A density of 15 dwellings per net developable hectare is to be achieved.
- A 'tree envelope' of a minimum of 6 by 6 metres is to be provided to accommodate a canopy tree in the backyard of each lot.

Figure 7a: Indicative Conventional & Medium Density Residential Typologies

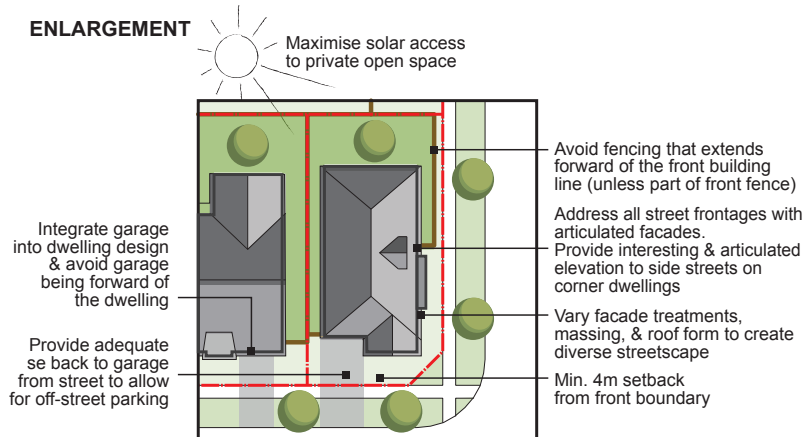
CONVENTIONAL RESIDENTIAL

Lot Size: approx. 500m² **Typology:** Detached dwelling

PLAN



ENLARGEMENT



MEDIUM DENSITY RESIDENTIAL

Lot Size: approx. 350m² **Typology:** Detached dwelling OR attached dwelling

PLAN



ENLARGEMENT

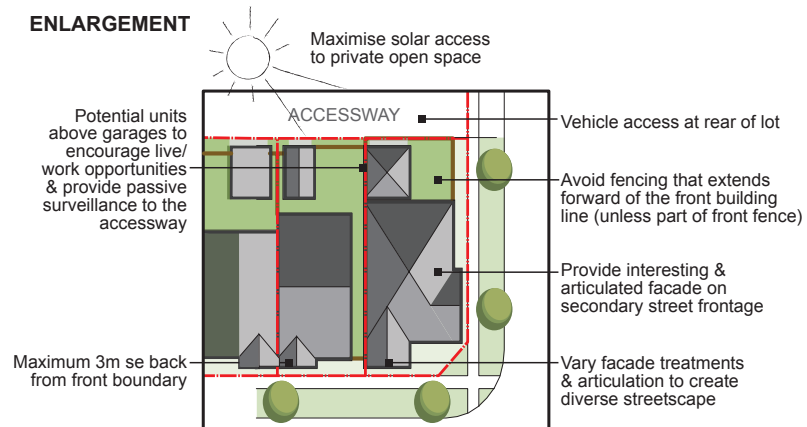
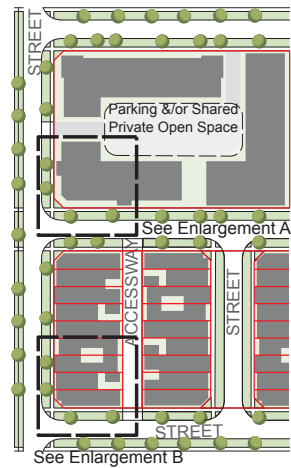


Figure 7b: Indicative High Density Residential Typologies

HIGH DENSITY RESIDENTIAL 1

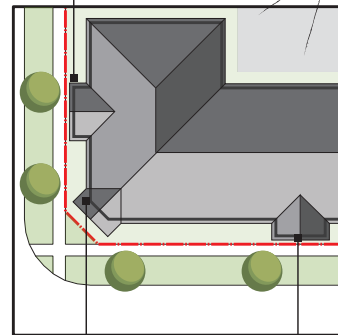
Typology: Attached dwelling on a lot OR unit within 2 storey building with shared entrance

PLAN



ENLARGEMENT 'A'

Ensure articulation of secondary facade to address corners & edge interfaces



ENLARGEMENT 'B'

Maximise solar access to shared private open space

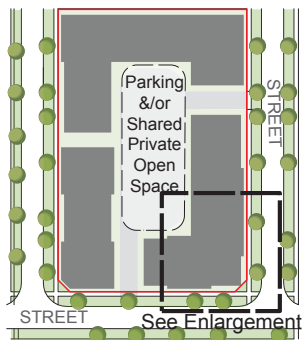
Create active frontage through articulation & massing of built form. Balconies encourage surveillance of adjoining public open space & the street.



HIGH DENSITY RESIDENTIAL 2

Typology: Unit within 3 storey building with shared entrance

PLAN



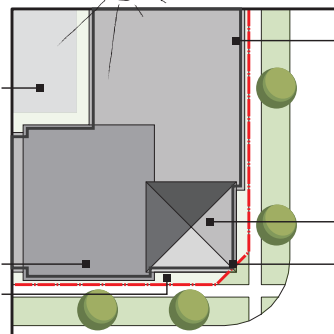
ENLARGEMENT

Maximise solar access to shared private open space

Internal courtyard car parking &/or access to below grade or sheltered car parking

Ensure varied facade articulation across building frontage, using balconies etc to enhance surveillance of the street

Minimise front setback (0-1m)



Ensure articulation of secondary facades to address corners & edge interfaces

Anchor corner with massing &/or detail, particularly when built form is on a significant corner

Shared entry from street to multiple dwellings

4.4 Community Facilities

4.4.1 Objectives

The objectives for community facilities are to:

- provide flexible-use community facilities that enable services to be delivered that meet the needs of businesses, employees, residents and visitors;
- create a focal point for community interaction at Kaduna Park;
- support the level of activity and range of services available in the Activity Centre;
- ensure that non-Council community facilities are located in highly accessible areas; and
- maximise the accessibility of all community facilities in the Precinct by all modes of transport.

4.4.2 Implementation

The objectives for community facilities are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 10: Community Facilities;
- Table 10: Community Facilities;
- Planning and design guidelines set out under 4.4.3;
- Figure 8: Kaduna Park – Indicative Concept Plan;
- Community Facilities Delivery Statement (refer Section 4.4.4);
- Plan 11: Open Space Network;
- Plan 15: Public Transport;
- Plan 16: Walking and Trails; and
- Table 11: Open Space.

Table 10: Community Facilities

Location	Site Description	Facilities and Services	Responsibility
Within the Precinct	Adjacent to the Neighbourhood Activity Centre, central to the employment area	<ul style="list-style-type: none"> • Kaduna Park Business & Community Centre • Passive open space: formal garden area 	Cardinia Shire Council
Outside the Precinct	District Hub at Lakeside Boulevard	<ul style="list-style-type: none"> • Cardinia Cultural Centre • Lakeside Lake • Community Centre (Kindergarten and Community Meeting Space) • Toomuc Regional Recreation Reserve (2 ovals) • Cardinia Life Aquatic and Basketball Centre (8 courts) 	Cardinia Shire Council
Note: These community facilities are outside the PSP area, however as they are located in close proximity to the Precinct, they play an important supporting role. For more detail on the following activity centres refer to the Cardinia Road PSP, September 2008.	District Hub at Cardinia Road South	• Emergency Services Centre	CFA, Victoria Police
		• Private School	Lutheran College
		• Railway Station	Department of Transport
		• State Secondary School	Department of Education and Early Childhood Development
		• State Primary School	Cardinia Shire Council
		• Community Centre including Maternal & Child Health, meeting place and Kindergarten	Cardinia Shire Council
		• Purpose built meeting place	
		• Youth building	
		• Active Open Space (8 hectares)	
		• State Primary School	Department of Education and Early Childhood Development
	Urban Community Hub at Shearwater Drive	• Active Open Space - Oval	Cardinia Shire Council
	Urban Community Hub at Arena Estate	• Community Centre including Maternal & Child Health, meeting place and Kindergarten	Cardinia Shire Council
	Urban Community Hub at Gum Scrub Creek (east)	• State Primary School	Department of Education and Early Childhood Development
		• Community Centre including Maternal & Child Health, meeting place and Kindergarten	Cardinia Shire Council
		• Active Open Space (8 hectares)	

Plan 10: Community Facilities

LEGEND

Precinct Structure Plan Area

Urban Growth Boundary

Movement Network

State Freeway

Arterial Road

Connector Street

Access Street

Controlled Intersections

Signalised Intersection / Crossing

Proposed Pedestrian Crossings

Existing Pedestrian Crossings

Off Road Paths/Trails

On Road Paths/Trails

Land Use within PSP

Activity Centre

Residential

Employment

Heritage and Community Facilities within PSP

Kaduna Park

Neighbourhood Community Centre

Land Uses outside of PSP

Neighbourhood Activity Centre

Neighbourhood Convenience Centre

Community Facilities

Educational Facilities (PS = Primary School, PPS = Post Primary School)

Open Space and Environment

Unencumbered Open Space

Encumbered Open Space

Existing Creeks

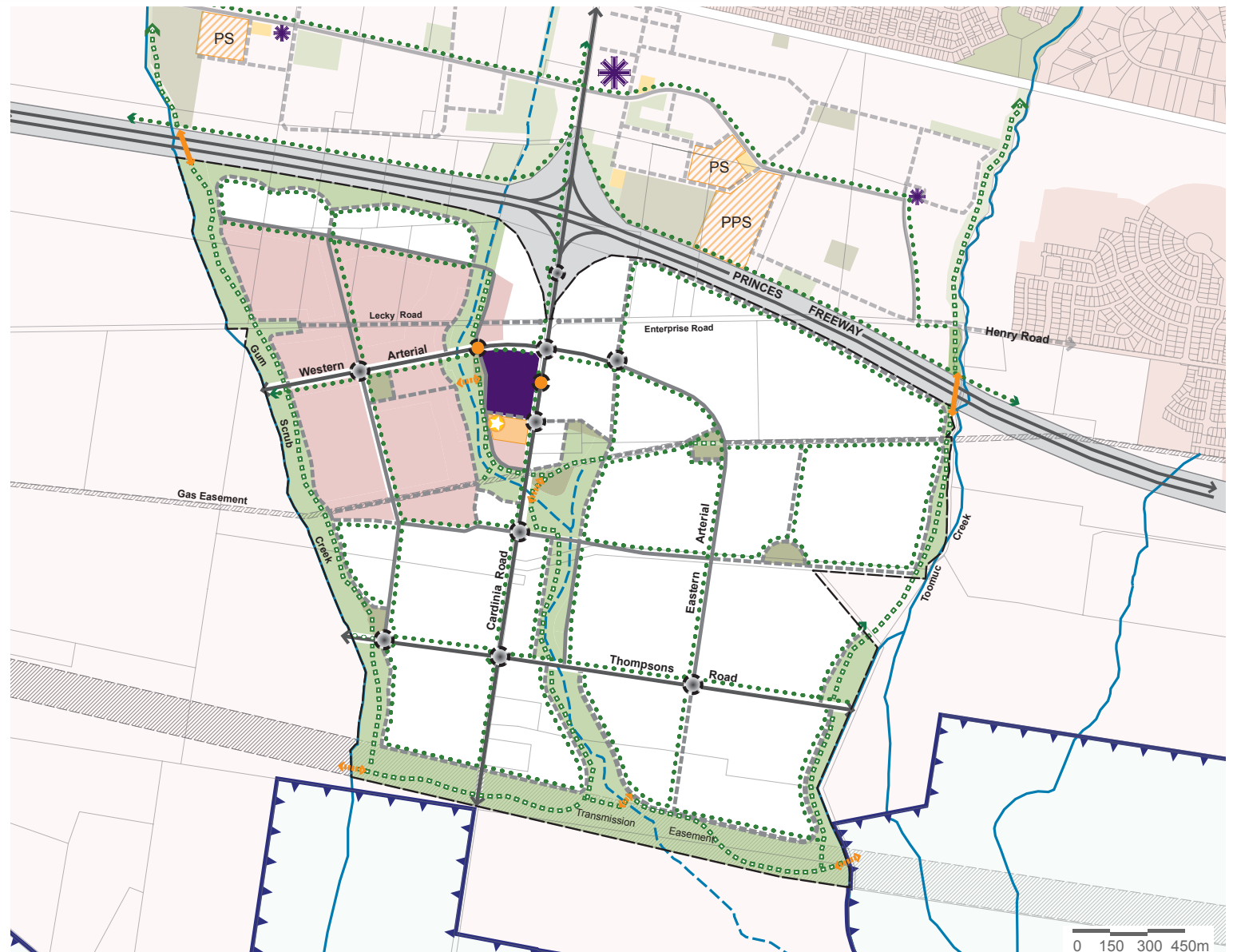
Drainage Lines

Other Land

Existing Major Easements

Future Urban Land

Existing Urban Land



4.4.3 Planning and Design Guidelines

The following planning and design guidelines must be met:

- Community services (public and private, including child care centres, medical and health facilities) are to be located:
 - within easy walking distance of future bus service routes;
 - adjoining planned community facilities;
 - adjacent to or in open space areas;
 - within the activity centre; and
 - where larger facilities such as private hospitals and specialist medical facilities are proposed, they are to be provided as part of integrated developments in the Commercial area.
- The new Business and Community Hub is to:
 - be located adjacent to Kaduna Park Homestead;
 - be well integrated with the built form of the Activity Centre; and
 - overlook the Cardinia Road Open Space Corridor (refer Figure 8).
- Post-secondary education and training facilities to be located in or adjacent to the Commercial area.
- Neighbourhood and local parks are to be provided throughout the Precinct creating a focus for social interaction, with:
 - playgrounds and BBQs in Residential areas;
 - playgrounds and BBQs in appropriate locations along open space corridors; and
 - BBQs in Industrial areas.

The following planning and design guidelines should be met:

- Kaduna Park Homestead may accommodate uses such as community meeting spaces, conference and accommodation in addition to the Business and Community Hub.
- Community facilities to be provided on potential bus service routes.

4.4.4 Community Facilities Delivery Statement

It is important that community facilities are delivered in an integrated and co-ordinated manner to maximise both early and cost effective provision. The following statements guide these outcomes.

Integrated, efficient and timely facility provision

- Funding opportunities and partnerships will be sought to support the early provision of community facilities.
- Cardinia Shire Council will work closely with the Growth Areas Authority through infrastructure working groups to explore and pursue opportunities for partnership approaches to support integrated and timely provision of key community facilities.
- Potential funding sources to be considered include:
 - Cardinia Road Employment Precinct Infrastructure Funding Agreement;
 - Any future Development Contributions Plan, which may apply to the Precinct;
 - Cardinia Shire Council Capital Works Program;

- Development Proponent Funding, which may include an injection of additional funding, or potential for a development proponent to deliver a project through in-kind works. Provision of in-kind works requires approval by Cardinia Shire Council.
- State Grants Programs, with many grants programs being run by the State Government offering funding across a broad range of community facilities and services.
- Non-Government Organisations, which may co-fund some community infrastructure as part of partnership projects with Council.

Consideration in the Commercial Core and Activity Centre Urban Design Framework

It is important that the Community Facility Concept Planning occur concurrently or as part of the preparation of the UDF for the Commercial Core and Activity Centre.

Kaduna Park provides an integral focus for the heart of the Precinct including:

- the existing homestead which may accommodate a range of uses that provide for social interaction;
- formal gardens and open space; and
- the new community facility which will provide a flexible community meeting place.

Specific design issues in relation to the design of buildings adjacent to Kaduna Park should be resolved prior to or as part of considering future design of buildings on the Kaduna Park site (refer Table 8).

Open Space

The delivery of multiple new parks and passive open space will occur as part of the development of the Precinct. Improvements will also be made to creek corridors. Works include earthworks, grassing, tree planting, construction of local playgrounds, shared paths and footpaths, furniture and paving. These projects will be funded by development contributions.

Preliminary Concept Plan

A Preliminary Concept Plan has been prepared for the Kaduna Park Community Facility (refer to Figure 8), providing an indicative design solution. Alternative approaches may be considered, that meet the objectives for Community Infrastructure, to the satisfaction of the responsible authority.

Figure 8: Kaduna Park – Indicative Concept Plan



4.5 Open Space and Natural Systems

4.5.1 Open Space and Natural Systems Objectives

The objectives for open space and natural systems are to:

- create a high amenity setting for the Precinct;
- promote a strong sense of place and provide for community interaction;
- establish an open space network to support a healthy and active community and provide for the passive recreation needs of employees, residents and visitors;
- integrate open space networks between the Precinct and adjacent precincts, through creation of extensive biodiversity corridors;
- maximise the efficient use of land by:
 - maximising the open space value of encumbered land; and
 - ensuring open space corridors serve multiple functions.
- create a network of pedestrian and cycle paths along open space corridors within the Precinct, connecting to adjacent precincts.

4.5.2 Implementation

The objectives for open space and natural systems are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 11: Open Space Network;
- Plan 12: Water Management;
- Figures 9a and 9b: Open Space Interface;

- Plan 13: Biodiversity Management;
- Plan 16: Walking and Trails;
- Planning and design guidelines set out under 4.5.3 including Table 11: Open Space Planning and Design Guidelines;
- Planning and design guidelines set out under 4.5.6 including Table 12: Biodiversity Planning and Design Guidelines;
- Cardinia Road Employment Precinct Native Vegetation Precinct Plan (refer Section 4.5.7); and
- Cardinia Road Employment Precinct Conservation Management Plan for the Growling Grass Frog (Ecology Partners September 2010).

4.5.3 Open Space Planning and Design Guidelines

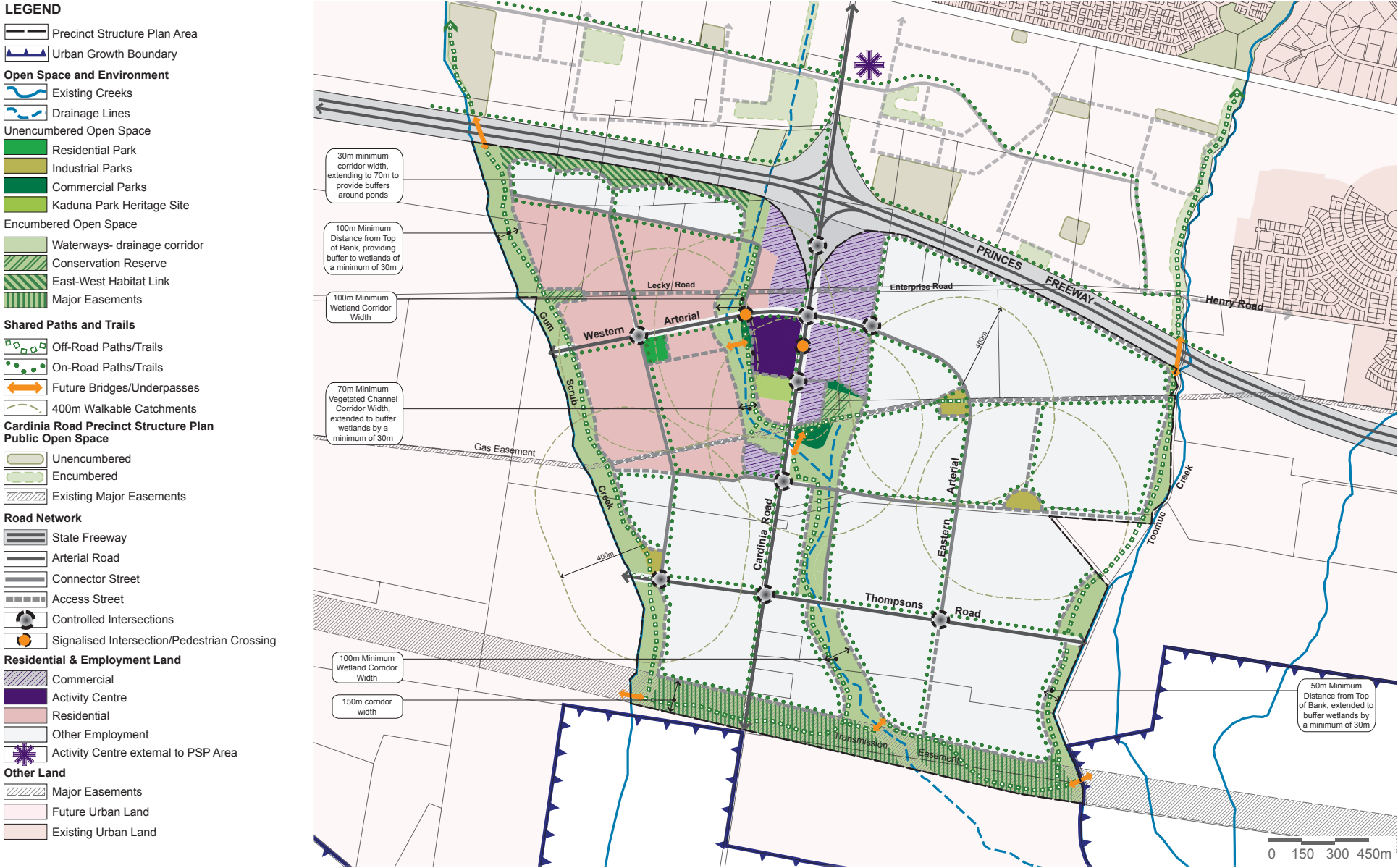
The following planning and design guidelines must be met:

- Along Gum Scrub Creek, an encumbered open space corridor of no less than 100 metres from the top of the bank is to be provided.
- Along Toomuc Creek, an encumbered open space corridor of no less than 50 metres from the top of the bank is to be provided.
- The Cardinia Road Open Space Corridor is to provide a buffer to Cardinia Drain, with:
 - a width of at least 70 metres, which is extended to buffer Growling Grass Frog Ponds by a minimum of 30 metres of terrestrial habitat; and
 - up to a 100 metre width around wetlands and frog ponds to ensure they are buffered by a minimum of 30 metres of terrestrial habitat.

- Waterway corridors are to be wider than the requirements of the 1 in 100 year ARI flood line to provide adequate buffers to biodiversity and accommodate the trail network.
- A new east-west habitat link is to be provided along the edge of the Princes Freeway between Gum Scrub Creek and the Cardinia Road Open Space Corridor, with a minimum width of 30 metres, increasing to 70 metres around Growling Grass Frog Ponds.
- A new east-west open space corridor is to be provided along the length of the Transmission Line Easement, occupying the full width of the easement.
- A neighbourhood park of no less than 1 hectare must be provided centrally to the residential area, south of Western Arterial, with a direct link to the Cardinia Road Open Space Corridor and the Activity Centre in the east to provide a central community spine.
- An area of unencumbered open space must be provided between the Cardinia Road Open Space Corridor and the Activity Centre, with a pedestrian bridge to provide a connection to the residential areas to the west.
- The area identified within the Kaduna Park 'Heritage Overlay Focus Area Plan' is to be provided for public open space. The homestead is to be utilised for community purposes, with a formal garden area and new community building to be provided on the site.
- Local parks are to be provided in the commercial and industrial areas as shown in Plan 11.




























Table 11 also outlines planning and design guidelines for specific design issues relating to open space areas.

Plan 11: Open Space Network



Plan 12: Water Management

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
- Open Space & Environment**
-  Existing Creeks
-  Drainage Lines
-  Areas requiring fill to raise the natural surface level
-  Drainage Corridor (minimum width)
-  Waterways - drainage corridor
-  Conservation Reserve
-  East - West Habitat Link
-  Major Easements
-  Unencumbered Open Space
-  Assumed Drainage Flow & Direction
-  Existing Wetland
-  New Online Linear Wetlands
-  New Offline Linear Wetlands
-  Existing Frog Pond
-  New Frog Pond
-  Potential Location of Future Large Wetland and/or Retarding Basin Sites
-  Vegetated Channel
-  1m Contours
- Road Network**
-  State Freeway
-  Arterial Road
-  Connector Street
-  Access Street
- Other Land**
-  Major Easements
-  Future Urban Land
-  Existing Urban Land

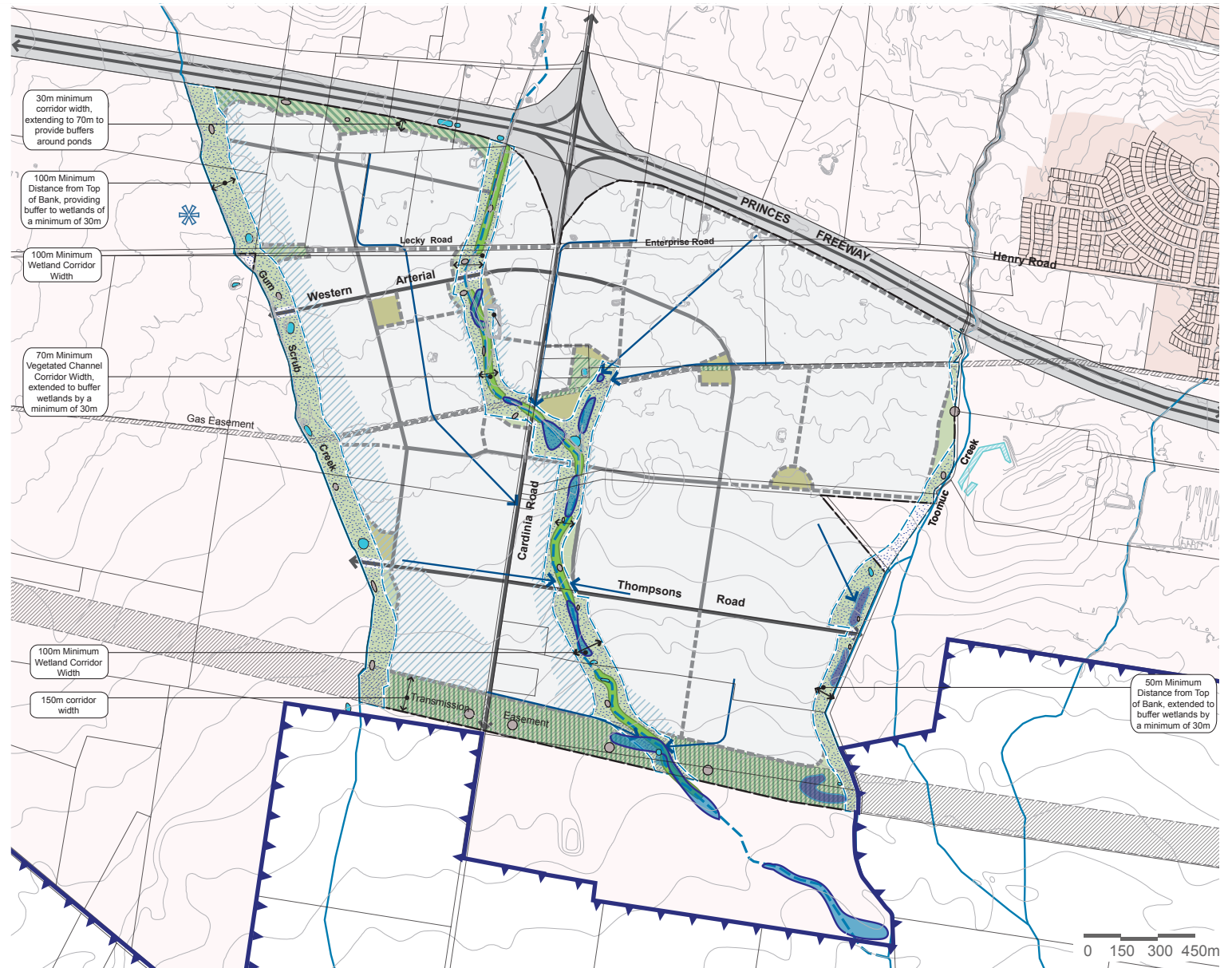
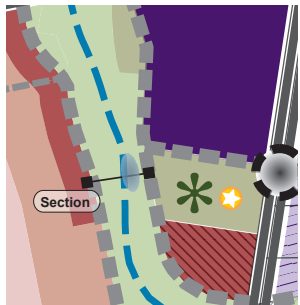
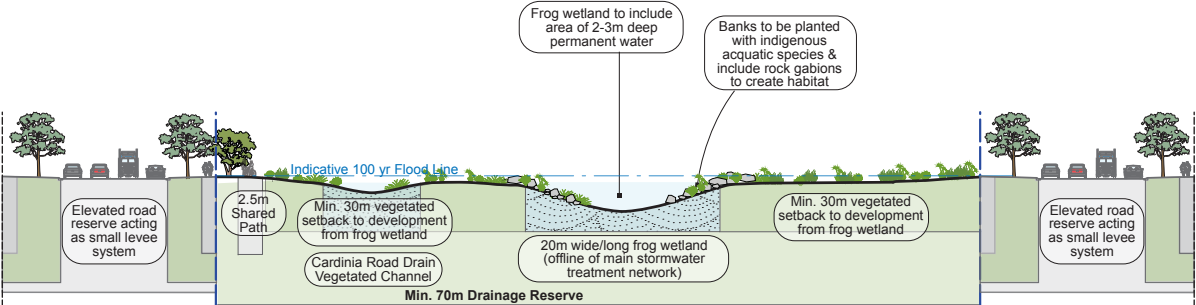


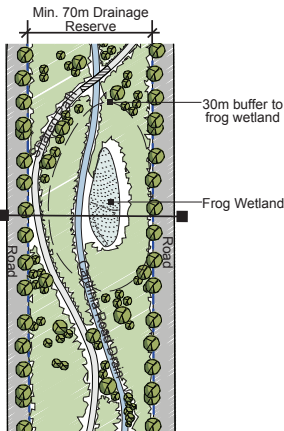
Figure 9a: Open Space Interface



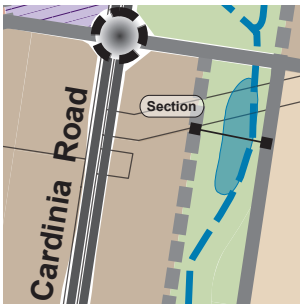
Indicative Section Location



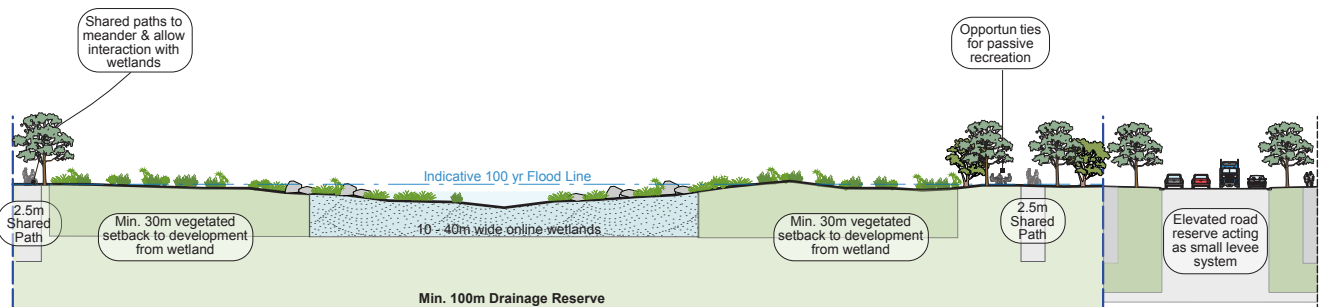
Section 5: Cardinia Road Open Space Corridor - Vegetated Channel



Plan View



Indicative Section Location

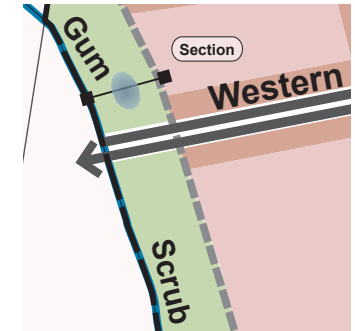
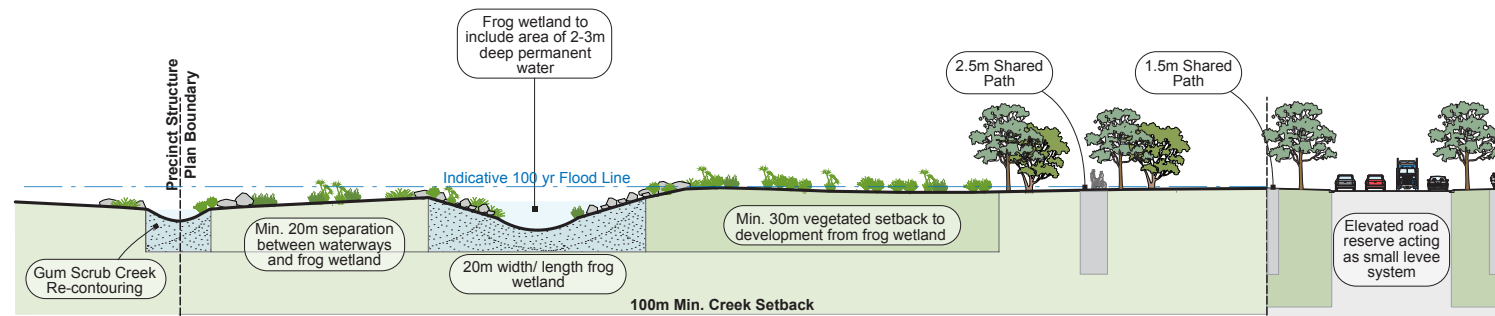


Section 6: Cardinia Road Open Space Corridor - Wetland Treatment



Plan View

Figure 9b: Open Space Interface



Indicative Section Location

Section 7: Creek Corridor

Table 11: Open Space Planning and Design Guidelines

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
General	<ul style="list-style-type: none"> Encumbered open space is to be designed to provide for environmental conservation and management in an attractive landscape setting, including paths and spaces for activity integrated with the design. Open space design is to be contemporary and innovative, reflecting the local, historical and environmental context and community values. 	<ul style="list-style-type: none"> Unencumbered passive open space is to provide for a range of activities, including playgrounds, picnic areas, shade and shelter.
Interface with road network	<ul style="list-style-type: none"> A road reserve is to be provided: <ul style="list-style-type: none"> adjacent and parallel to all open space corridors and waterways; and on all sides of all unencumbered open space areas; except where an edge of the unencumbered open space is shared with encumbered open space. 	<ul style="list-style-type: none"> Streetscape planting and paths are to be completed and integrated with the design of adjoining open space areas.
Interface with adjoining development	<ul style="list-style-type: none"> Development adjoining open space is to 'front onto' the open space, promoting use and provide passive surveillance over the public realm. Blank walls abutting open space are to be avoided. Long high fences abutting open space are to be avoided. Landscaping of sites adjoining open space is to complement the character of the open space areas. 	<ul style="list-style-type: none"> The design of buildings adjoining open space is to maximise passive surveillance over open space areas through careful location of entrances, windows, balconies. Fencing adjoining open space is to maximise the visual relationship between the public and private realm and be visually transparent and low in height.
Interface with conservation areas	<ul style="list-style-type: none"> Existing native vegetation within open space areas is to be retained in accordance with the Native Vegetation Precinct Plan. Open space containing native vegetation, waterways or Growling Grass Frog ponds is to be designed to protect sensitive areas from vehicle, pedestrian and bicycle traffic in line with the Conservation Management Plan. Shared path trails within encumbered open space areas are to be set back from the drainage line and be located at least 30 metres from the edge of Growling Grass Frog ponds. 	
Interface with the drainage system	<ul style="list-style-type: none"> Shared trails along waterway corridors are to be integrated with the street network. Trail bridges across drainage lines and creeks are to be provided to maximise pedestrian and cyclist access throughout the Precinct and to adjacent precincts. The location of trail paths and bridges is to minimise potential impacts on biodiversity. Vegetated swales are to be constructed along the Cardinia Road Open Space Corridor and planted with native grasses leading into trees and shrubs in accordance with Ecological Vegetation Communities likely to have occurred in the Precinct, such as Swamp Scrub or Swampy Riparian Woodland. Paths, bridges and boardwalks are to be located above the 1 in 10 year flood line at a minimum, outside the 30 metre buffer zone for ponds and wetlands. These are to be designed to the satisfaction of the responsible authority. 	
Park buildings	<ul style="list-style-type: none"> Any park building is to be located outside the 1 in 100 year flood line and any ecological buffer. The siting and design of park buildings is to be integrated with the landscaping of the open space area. Park buildings are not to dominate the open space area or adjacent developments. 	<ul style="list-style-type: none"> The siting of park buildings is to respond to key viewlines from the surrounds, including into and through the open space area.

Design Issue	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Public safety and lighting	<ul style="list-style-type: none"> Open space areas are to be designed for use by a wide range of people. Surrounding land use and building design is to promote passive surveillance. Sightlines within the open space area are to be maximised, with landscaping, building design and planting to maximise visibility within, to and from the open space areas. Path and trail networks within open space areas are to maximise connectivity between key destinations within the Precinct, with a clear and direct system of paths. 	<ul style="list-style-type: none"> Lighting within the open space area is to be minimised, with lighting from abutting streets encouraging use of paths in the street network after dark. Lighting is to be energy efficient, minimise unnecessary 'spill' above and to the sides and emit 'white light' to maximise visibility.
Landscape character and vegetation	<ul style="list-style-type: none"> Throughout the Precinct, planting and vegetation is to be Australian native species, preferably local indigenous species. Online wetlands and Growling Grass Frog Ponds are to be vegetated with indigenous grassland species that lead into scattered shrubs and eventually patches of EVCs in areas approximately 40 metres from waterbodies. Large trees are not to be planted adjacent to Growling Grass Frog Ponds and must be located at least 30 metres from the edges of waterbodies. Low-lying vegetation and small trees are to be provided on the Transmission Line Easement to the satisfaction of SP AusNet (refer Your Guide to Planting Near Electricity Lines, SP AusNet 2007). Vegetation provided along the Princes Freeway is to maximise views to and from the Precinct. 	<ul style="list-style-type: none"> Exotic plantings may be provided as 'feature plantings' in key locations such as the Activity Centre.
Other park landscape elements and infrastructure	<ul style="list-style-type: none"> Design of infrastructure is to be contemporary and complement the landscaping of the open space area. Combined seating and BBQ areas are to be provided throughout the Precinct to serve residents, workers and visitors. Open grassed areas (clear of structures) are to be provided for active recreation, including fitness training and trails. Use of fencing is to be minimised. The design of any fencing is to maximise transparency. All structures and facilities are to be located outside the 30 metre buffer zone for ponds and wetlands. 	<ul style="list-style-type: none"> A barbeque, picnic seating, shading structures and half basketball courts are to be provided in all local parks. A playground is to be provided in the park located centrally to the residential area.
Signs	<ul style="list-style-type: none"> Signage is to be provided to indicate the location of open space areas. Design of signage is to be contemporary and complement the landscape theme and any other park infrastructure. 	<ul style="list-style-type: none"> Signage may be provided to indicate areas of cultural heritage or biodiversity value. Directional signage is encouraged at key access points to the trail network and along key shared paths.
Water Sensitive Urban Design (WSUD)	<ul style="list-style-type: none"> Design and layout of open space areas is to maximise efficient water use, stormwater quality and the viability of vegetation through use of Water Sensitive Urban Design (WSUD) initiatives. WSUD is to maximise use of water run-off within open space areas rather than divert it to drains. Where possible, WSUD should be incorporated into unencumbered open space abutting waterways – drainage corridors to provide an offline natural water replenishment source for Growling Grass Frog Ponds. 	
Requirements for transfer of land	<ul style="list-style-type: none"> All open space is to be finished to the satisfaction of the responsible authority prior to the transfer of land, including: <ul style="list-style-type: none"> cleared of all existing disused structures, foundations, pipelines or stockpiles; cleared of all rubbish and environmental weeds; and provision of bollards or other means of restricting vehicle access to open space areas. In the case of unencumbered open space, the following must also be finished: <ul style="list-style-type: none"> site must be levelled, top soiled and grassed with warm climate grass; and provided with a water source suitable for the management of the open space. 	

4.5.4 Biodiversity Conservation Objectives

The objectives for biodiversity conservation and enhancement are to:

- achieve a biological 'net gain' through
 - protection and management of areas supporting ecological value;
 - significant improvements to habitat and connectivity in the Precinct and the broader Cardinia Urban Growth Area;
 - conservation management and enhancement of significant native vegetation and fauna habitat; and
 - management of open space corridors to avoid conflict between their ecological, drainage and recreation functions.
- plan for long term conservation management of significant flora and fauna species and habitats in accordance with:
 - the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog; and
 - the Cardinia Road Employment Precinct Native Vegetation Precinct Plan.

4.5.5 Implementation

The objectives for biodiversity conservation are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 11: Open Space Network;
- Plan 12: Water Management Plan;
- Figures 9a and 9b: Open Space Interface;
- Plan 13: Biodiversity Management;

- Planning and design guidelines set out under 4.5.3 including Table 11: Open Space;
- Planning and design guidelines set out under 4.5.6 including:
 - Table 12: Biodiversity Planning and Design Guidelines; and
 - Table 13: Growling Grass Frog Habitat.
- Figure 10: Growling Grass Frog Ponds;
- Cardinia Road Employment Precinct Native Vegetation Precinct Plan (refer Section 4.5.7), including:
 - NVPP Table 1: Patches of native vegetation to be protected;
 - NVPP Map 1: Area to which the Native Vegetation Precinct Plan applies
 - NVPP Table 2: Scattered trees to be protected;
 - NVPP Map 2: Native vegetation to be protected and removed;
 - NVPP Table 3: Patches of native vegetation to be removed;
 - NVPP Table 4: Scattered trees to be removed;
 - NVPP Table 5: Offset requirements for Remnant Vegetation; and
 - NVPP Table 6: Offset requirements for scattered trees.
- Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog (Ecology Partners September 2010).

4.5.6 Biodiversity Conservation Planning and Design Guidelines

The following planning and design guidelines must be met:

- Development is to be staged to ensure constructed habitat (eg. part of the wetland drainage system) is established prior to removal of existing habitat within the Precinct.
- A Construction Environmental Management Plan must be prepared to the satisfaction of the Department of Sustainability and Environment and the responsible authority, prior to works occurring in proximity to:
 - native vegetation identified to be protected and retained in the Cardinia Road Employment Precinct Native Vegetation Precinct Plan; and
 - any waterbody, including creeks, drains, dams or wetlands as per the Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.
- The Construction Environmental Management Plan must address the following:
 - measures to be used to limit and manage earthworks in proximity to the native vegetation or waterbody, including fencing;
 - erosion and sedimentation controls;
 - weed management actions;
 - feral animal control measures;
 - management of subdivisional and open space drainage to support the health of vegetation or dam/s to be protected or identified; and

- any other conditions and requirements of the Cardinia Road Employment Precinct Native Vegetation Precinct Plan and Cardinia Road Employment Precinct Conservation Management Plan for Growling Grass Frog.
- Prior to the removal of any dams or native vegetation, a salvage and translocation plan for likely threatened species must be prepared and implemented to the satisfaction of the Department of Sustainability and Environment.
- Dam 38 (refer Plan 13), the Turkeys Nest Dam at the rear of the Kaduna Park Homestead, must not be removed until successful reproduction, as defined by the presence of Growling Grass Frog metamorphs, has been demonstrated in at least one waterbody in the Precinct (refer Plan 13), to the satisfaction of the Department of Sustainability and Environment.
- Permits for development of open space and drainage works are to include design requirements for fauna habitat and flora, as appropriate.

Table 12 outlines planning and design guidelines for biodiversity in terms of general precinct design, flora and fauna.

A Conservation Management Plan for the nationally-significant Growling Grass Frog has been prepared concurrently to the PSP (refer Cardinia Road Employment Precinct Conservation Management Plan, Ecology Partners September 2010).

It provides clear requirements for the construction, management and monitoring of Growling Grass Frog habitat and the species, as summarised in Table 13. It also includes site management requirements during building and subdivision works on adjacent sites, which must be addressed in the Construction Environmental Management Plan.

Plan 13: Biodiversity Management

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- Road Network**
 - State Freeway
 - Arterial Road
 - Connector Street
 - Access Street
- Land Use**
 - Employment
 - Residential
- Open Space and Environment**
 - Unencumbered Open Space
 - Parks
 - Encumbered Open Space
 - Waterways - drainage corridor
 - Conservation Reserve - EVCs
 - East - West Habitat Link
 - Major Easements
 - Existing Creeks
 - Drainage Lines
 - Existing Major Easements
 - Existing Wetlands
 - New online linear wetlands
 - New offline linear wetlands
 - Existing waterbodies to be relocated
 - Existing pond with GGF Records
 - Existing pond without GGF Record
 - Indicative location for proposed Growing Grass Frog ponds
 - Offline ponds (30m buffer areas)
 - Online ponds (30m buffer areas)
- Other land**
 - Existing Major Easements
 - Future Urban Land
 - Existing Urban Land

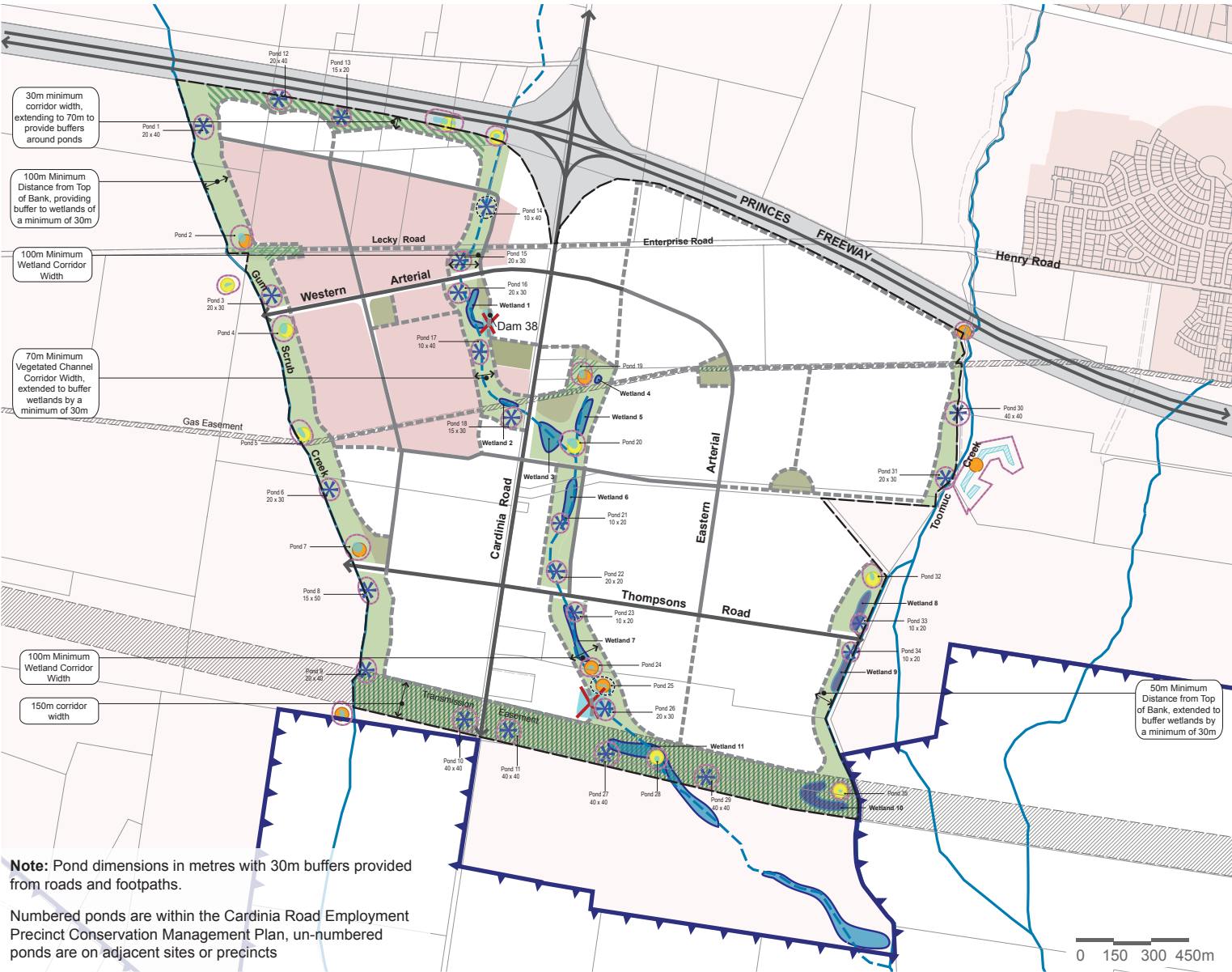


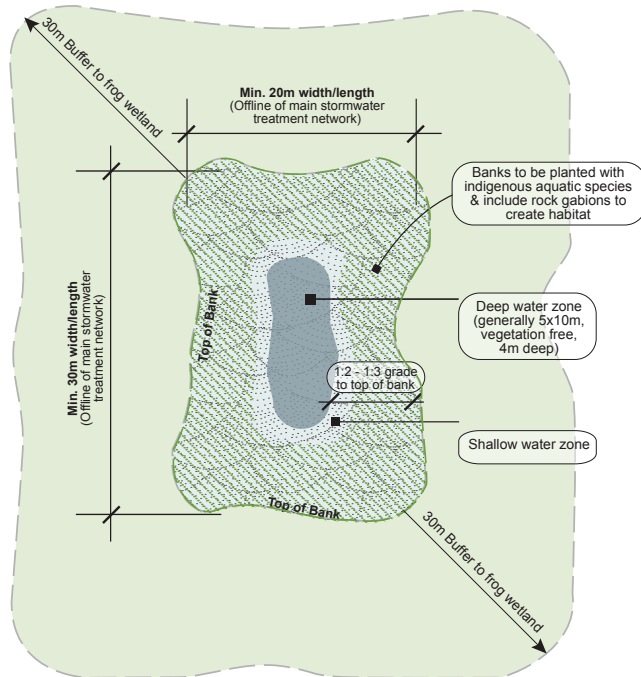
Table 12: Biodiversity Planning and Design Guidelines

Element	Planning and design guidelines that must be met
General	<ul style="list-style-type: none"> Cardinia Road Drain, Toomuc and Gum Scrub creeks are to provide north-south biodiversity corridors. East-west biodiversity corridors are to be provided along the Transmission Line Easement and west of Cardinia Road along Princes Freeway. The use of the Australian Landscape Theme throughout the Precinct is to provide street trees and public open space landscaping to creates habitat for indigenous fauna species.
Flora	<ul style="list-style-type: none"> Native vegetation is to be retained in accordance with the Cardinia Road Employment Precinct Native Vegetation Precinct Plan (refer Section 4.5.7). Any native vegetation located in open space areas is to be retained and incorporated into its design. Lecky Road is to be diverted to accommodate road widening and to avoid the significant native vegetation near Gum Scrub Creek as shown on Plan 5. Revegetation along Gum Scrub Creek, Toomuc Creek and the Cardinia Road Open Space Corridor is to: <ul style="list-style-type: none"> create viable habitat corridors for native species; consist of local indigenous species in line with the Australian Landscape Theme; and create native grasslands leading into patches of existing Ecological Vegetation Communities in the area (eg. Swamp Scrub, Swampy Woodland) that are to be retained.
Fauna	<ul style="list-style-type: none"> Growling Grass Frog ponds are to be retained and managed in accordance with the Cardinia Road Employment Precinct Conservation Management Plan (Ecology Partners September 2010). Habitat for a range of native fauna species is to be provided in constructed environments and areas of remnant vegetation, including public open space areas and waterway corridors. Constructed wetlands forming part of the drainage system are to be designed and constructed to provide additional fauna habitat, particularly for wetland birds and the Growling Grass Frog. Planning and Design Guidelines outlined in Table 13 apply to existing and new Growling Grass Frog Habitat. Open space corridors are to provide a minimum buffer of 30 metres around Growling Grass Frog ponds.

Table 13: Growling Grass Frog Habitat Planning and Design Guidelines

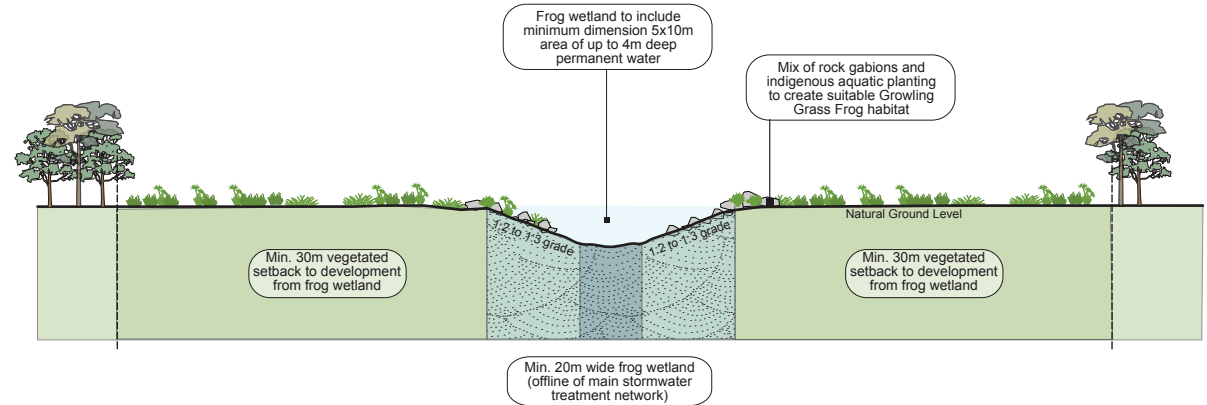
Element	Planning and design guidelines that must be met	Planning and design guidelines that should be met
Existing Habitat	<ul style="list-style-type: none"> Growling Grass Frog habitat must be retained and enhanced in line with the requirements of the Conservation Management Plan and Plan 13. 	<ul style="list-style-type: none"> Existing frog ponds are to be enhanced, complemented and retained where possible.
Habitat Corridors	<ul style="list-style-type: none"> A new habitat corridor must be provided between Gum Scrub Creek and Cardinia Road along the Princes Freeway in accordance with Plan 13. A network of frog ponds are to be established along Gum Scrub Creek, Toomuc Creek, Cardinia Road Open Space Corridor, the Transmission Line Easement and in the new habitat corridor along Princes Freeway, to provide comprehensive habitat connectivity. Small ponds and depressions are to be constructed between created wetlands and potential dispersal corridors such as Gum Scrub Creek, preferably along drainage lines, to act as smaller Growling Grass Frog movement corridors in the study area. 	
Spacing of new wetlands and ponds	<ul style="list-style-type: none"> Dedicated Growling Grass Frog Ponds must be constructed to provide habitat, which is not connected to the online stormwater wetland network. Ponds and wetlands are to be located 200 metres apart increasing up to 300 metres from occupied ponds. Ponds and wetlands are to be located at entrances to underpasses and culvert entrances (where roads cross drainage lines and creeks) to encourage frog movement along habitat corridors. 	<ul style="list-style-type: none"> Smaller ephemeral wetlands are to be created around stormwater wetlands to provide habitat that is more likely to remain fish-free.
Pond dimensions and depth requirements	<ul style="list-style-type: none"> Dedicated Growling Grass Frog ponds must have a minimum area of 400m² with preferred dimensions of 20 metres by 30 metres. Larger ponds must be provided along the Transmission Line Easement and Toomuc Creek, in accordance with the Conservation Management Plan and Plan 13. Pond dimensions may be reduced to 10 metres by 40 metres if it can be demonstrated that: <ul style="list-style-type: none"> a minimum 30 metre buffer can be achieved from roads and footpaths; the wetland is located within a network of Growling Grass Frog ponds and provides diversity and variety within that network; and the pond provides as a transition point to other larger ponds in the network. 	<ul style="list-style-type: none"> A 3 metre deep water zone of 5 metres by 10 metres is to be achieved during drought or low rainfall conditions. Ponds are to generally be 4 metres in depth, measured from top of bank.
Landscaping and maintenance requirements	<ul style="list-style-type: none"> A range of edge habitats are to be provided around each pond. Emergent and floating pond vegetation, deep and still water systems are to be constructed within the Toomuc Creek and Gum Scrub Creek open space corridors and the Cardinia Road Open Space Corridor. Ponds and wetlands are to be surrounded by a terrestrial buffer of 30 metres in which there is no development, but which may be landscaped with indigenous grasses, herbaceous species and low shrubby vegetation (but no trees). Landscaping is to include rock piles, rock matrixes and large woody debris around ponds. Maintenance is to occur in accordance with the approved Conservation Management Plan for the Precinct. 	<ul style="list-style-type: none"> Ponds are to have permanent water levels (between 0.5 metres and 2 metres in depth). To ensure ponds provide suitable habitat, low water turbidity, and low nitrate, phosphate, and salinity levels should be maintained. Mowing, slashing or use of herbicides and pesticides, is to be minimised within 30 metres of ponds and wetlands (unless otherwise set out in the Conservation Management Plan). The presence of predatory fish such as Plague Minnow and non-native fish such as Redfin should be minimised.
Surrounding land use	<ul style="list-style-type: none"> Access tracks, roads, houses and other infrastructure are to be located at least 30 metres from created wetlands, and there should be no apparent barriers to dispersal. Where roads cross open space corridors containing drainage and creek lines, culverts or bridges must be designed to enable fauna movement, particularly Growling Grass Frogs. 	
Monitoring	<ul style="list-style-type: none"> Monitoring is to occur in accordance with the approved Conservation Management Plan for the Precinct. 	

Figure 10: Growing Grass Frog Ponds



Note: Variations in the configuration of frog wetlands are permitted in difficult situations. The minimum requirement is at least 10x40m wide/long, generally requiring a deep water zone of 5x10m.

Typical Preferred Frog Wetland Plan View



Typical Preferred Frog Wetland Cross Section

4.5.7 Cardinia Road Employment Precinct Native Vegetation Precinct Plan

This section of the PSP is the Cardinia Road Employment Precinct Native Vegetation Precinct Plan listed under the Schedule to Clause 52.16 of the Cardinia Planning Scheme. The removal, destruction or lopping of native vegetation in accordance with this Native Vegetation Precinct Plan, does not require a permit, provided conditions and requirements specified in this Native Vegetation Precinct Plan are met.

The Cardinia Road Employment Precinct Native Vegetation Precinct Plan applies to all land shown in NVPP Map 1.

Purpose

The purpose of the Cardinia Road Employment Precinct Native Vegetation Precinct Plan is to:

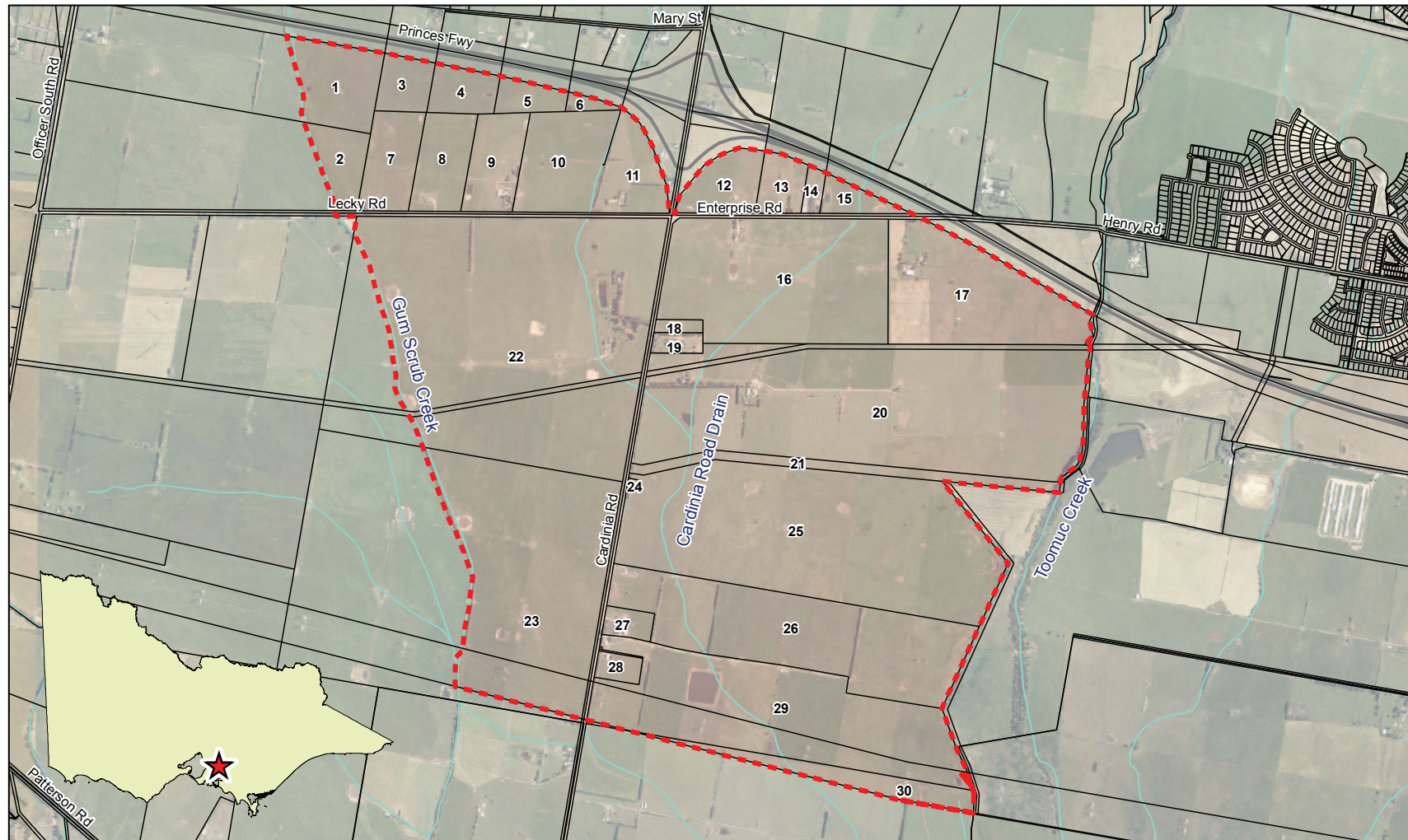
- specify the native vegetation to be protected and the native vegetation that can be removed, destroyed or lopped;
- ensure that areas set aside to protect native vegetation are managed to conserve ecological values in accordance with the Cardinia Road Employment Precinct Structure Plan;
- ensure that the removal, destruction or lopping of native vegetation specified to be protected is consistent with conserving the ecological values of these areas and is in accordance with the three-step approach to net gain as set out in Victoria's Native Vegetation Management – a Framework for Action 2002;
- set out the works or other necessary actions required to offset the removal, destruction or lopping of native vegetation; and
- streamline the planning approvals process through a precinct-wide landscape approach to native vegetation protection and management.

Vegetation Protection Objectives

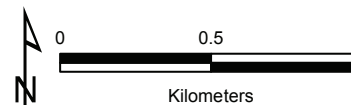
The objectives for native vegetation protection are to:

- manage the vegetation to be retained for conservation and allow for passive recreation on the periphery of habitat zones, without allowing the vegetation to be damaged by human activity;
- protect and manage the habitat zones and scattered trees identified to be retained;
- improve the long-term health and habitat value of the native vegetation specified to be retained and identified offset areas; and
- provide for the protection of revegetation areas of native vegetation as required by the responsible authority.

NVPP Map 1: Area to which the Native Vegetation Precinct Plan applies



- Study Area
- Freeway
- Creeks & Drains
- 26 PSP property number



1915_Map_2_Location_Map.mxd 29/4/2010 DFH

Native vegetation to be protected

The native vegetation to be protected is shown in NVPP Map 2 and described in NVPP Tables 1 and 2. This vegetation should not be removed.

NVPP Table 1: Patches of native vegetation to be protected

PSP Property Number	Property Details (Address; Lot and Plan Number)	Habitat Zone	EVC	Size (ha)	Habitat Hectares within patch	Conservation Status	Conservation Significance
Adjacent to Property 22	Lecky Road reserve	SW1	SW (793)	0.02	0.01	Endangered	High
Adjacent to Property 22	Lecky Road reserve	SW2	SW (793)	0.04	0.01	Endangered	High
Adjacent to Property 23	Cardinia Road reserve	SW11	SW (793)	0.10	0.02	Endangered	High
Adjacent to Property 2	Lecky Road reserve	SS 1	SS (53))	0.01	-	Endangered	High
Adjacent to Property 22	Lecky Road reserve	SS3	SS (53)	0.05	0.01	Endangered	High
Adjacent to Property 7	Lecky Road reserve	SS 4	SS (53)	0.12	0.02	Endangered	High
Adjacent to Property 22	Lecky Road reserve	SS 7	SS (53)	0.04	0.01	Endangered	High
Adjacent to Property 2	Lecky Road reserve	SS 2	SS (53)	0.08	0.01	Endangered	High
Adjacent to Property 22	Lecky Road reserve	SS 5	SS (53))	0.04	0.01	Endangered	High

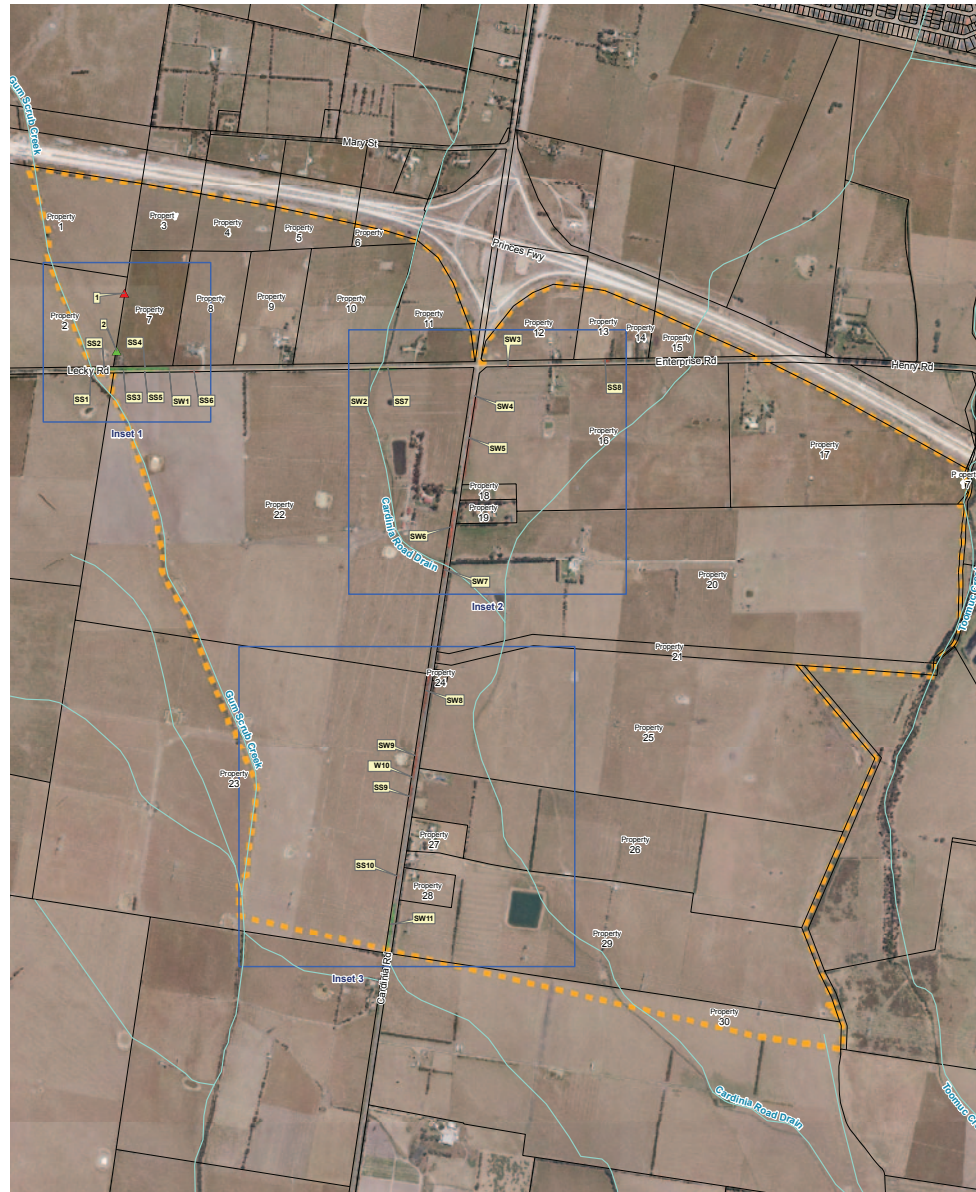
Notes: SS = Swamp Scrub, SW = Swampy Woodland. In some instances the overall Habitat Hectares within the vegetation patch is so small that when rounded to 2 decimal places equates to zero.

NVPP Table 2: Scattered trees to be protected

PSP Property Number	Property Details (Address; Lot and Plan Number)	Id (Tree #)	EVC	Species	Size	Conservation status	Conservation significance	Coordinates (X,Y)
Between Property 7 and Property 2	100 Lecky Road Officer (Lot 6 LP13491)	2	SW (793)	Manna Gum	LOT	Endangered	High	145.41901, -38.080898

Notes: LOT = Large Old Tree, SW = Swampy Woodland.

NVPP Map 2: Native vegetation to be protected and removed



NVPP Map 2: Inset 1

Study Area

Vegetation

Removed
 Retained

NOTE: Where this map does not show vegetation to be retained or removed, these are "areas where there is no native vegetation".

Scattered Trees

Removed
 Retained



NVPP Map 2: Inset 2



NVPP Map 2: Inset 3

Native vegetation which can be removed, destroyed or lopped

The vegetation described in NVPP Tables 3 and 4 and shown in NVPP Map 2 may be removed subject to the requirements and conditions set out in this NVPP under Clause 52.16 of the Cardinia Planning Scheme.

NVPP Table 3: Patches of native vegetation to be removed

PSP Property Number	Property Details (Address; Lot and Plan Number)	Habitat Zone	EVC	Size (ha)	Habitat Hectare Score	Habitat Hectares to be removed	Net Gain Multiplier	Net Gain Target (Habitat Hectares)	Conservation Status	Conservation Significance
Adjacent to Property 22	Lecky Road reserve	SS6	SS (53)	0.02	16	-	1.5	-	Endangered	High
Adjacent to Property 13	Enterprise Road reserve	SS8	SS (53)	0.01	18.5	-	1.5	-	Endangered	High
Adjacent to Property 23	Cardinia Road reserve	SS9	SS (53)	0.04	16	0.01	1.5	0.01	Endangered	High
Adjacent to Property 23	Cardinia Road reserve	SS10	SS (53)	0.01	8	-	1.5	-	Endangered	High
Adjacent to Property 16	Enterprise Road reserve	SW3	SW (793)	0.01	13	-	1.5	-	Endangered	High
Adjacent to Property 16	Cardinia Road reserve	SW4	SW (793)	0.01	13	-	1.5	-	Endangered	High
Adjacent to Property 16	Cardinia Road reserve	SW5	SW (793)	0.17	13	0.02	1.5	0.03	Endangered	High
Adjacent to Property 22	Cardinia Road reserve	SW6	SW (793)	0.10	22	-	1.5	-	Endangered	High
Adjacent to Property 22	Cardinia Road reserve	SW7	SW (793)	0.04	13	0.01	1.5	0.01	Endangered	High
Adjacent to Property 22&23	Cardinia Road reserve	SW8	SW (793)	0.09	22	0.02	1.5	0.03	Endangered	High
Adjacent to Property 23	Cardinia Road reserve	SW9	SW (793)	0.06	13	0.01	1.5	0.01	Endangered	High
Adjacent to Property 23	Cardinia Road reserve	SW10	SW (793)	0.01	13	-	1.5	-	Endangered	High

Notes: SS = Swamp Scrub, SW = Swampy Woodland. In some instances the overall Habitat Hectares within the vegetation patch is so small that when rounded to 2 decimal places equates to zero.

NVPP Table 4: Scattered trees to be removed

PSP Property Number	Property Details (Address; Lot and Plan Number)	Id (Tree #)	EVC	Species	Size	Conservation status	Conservation significance	Coordinates (X,Y)
Between Property 7 and Property 2	100 Lecky Road Officer (Lot 6 LP13491)	1	SW (793)	Manna Gum	LOT	Endangered	High	145.41901, -38.082699

Notes: LOT = Large Old Tree, SW = Swampy Woodland.

Offset Calculations

The offset requirements for vegetation described in NVPP Tables 3 and 4 are set out in NVPP Tables 5 and 6, below.

NVPP Table 5: Offset requirements for remnant vegetation

PSP Property Number	Property Details (Address; Lot and Plan Number)	Description (EVC)	Conservation Significance	Id (Habitat Zone)	Size (ha)	Habitat Hectares to be removed	Net Gain Multiplier	Net Gain Target (Habitat Hectares)
Adjacent to Property 22	Lecky Road reserve	Swamp Scrub (53)	High	SS6	0.02	-	1.5	-
Adjacent to Property 13	Enterprise Road reserve	Swamp Scrub (53)	High	SS8	0.01	-	1.5	-
Adjacent to Property 23	Cardinia Road reserve	Swamp Scrub (53)	High	SS9	0.04	0.01	1.5	0.01
Adjacent to Property 23	Cardinia Road reserve	Swamp Scrub (53)	High	SS10	0.01	-	1.5	-
Adjacent to Property 16	Enterprise Road reserve	Swampy Woodland (793)	High	SW3	0.01	-	1.5	-
Adjacent to Property 16	Cardinia Road reserve	Swampy Woodland (793)	High	SW4	0.01	-	1.5	-
Adjacent to Property 16	Cardinia Road reserve	Swampy Woodland (793)	High	SW5	0.17	0.02	1.5	0.03
Adjacent to Property 22	Cardinia Road reserve	Swampy Woodland (793)	High	SW6	0.10	-	1.5	-
Adjacent to Property 22	Cardinia Road reserve	Swampy Woodland (793)	High	SW7	0.04	0.01	1.5	0.01
Adjacent to Property 22&23	Cardinia Road reserve	Swampy Woodland (793)	High	SW8	0.09	0.02	1.5	0.03
Adjacent to Property 23	Cardinia Road reserve	Swampy Woodland (793)	High	SW9	0.06	0.01	1.5	0.01
Adjacent to Property 23	Cardinia Road reserve	Swampy Woodland (793)	High	SW10	0.01	-	1.5	-

Notes: *These multipliers relate to Table 6 of the Framework. In some instances where the area (ha) of the vegetation patch is small and the quality (Habitat Hectare score) of the vegetation patch is low, the overall Habitat Hectares within the vegetation patch is so small that when rounded to 2 decimal places equates to zero.

NVPP Table 6: Offset Requirements for Scattered Trees

PSP Property Number	Property Details (Address; Lot and Plan Number)	Description (EVC)	Conservation Significance	Loss of LOT's	Offset to be achieved 'protect and recruit'
Between Property 7 and Property 2	100 Lecky Road Officer (Lot 6 LP13491)	Swampy Woodland	High	1	Protect 4, Recruit 20 new plants

Notes: LOT = Large Old Tree.

Conditions

The native vegetation described in NVPP Tables 3 and 4 and shown in NVPP Map 2 can be removed, destroyed or lopped subject to the following conditions:

- Any native vegetation, which is permitted to be removed, must be clearly marked on site to the satisfaction of the Responsible Authority.
- Prior to the removal, destruction or lopping of any native vegetation, offsets must be provided in relation of all native vegetation within that owner's land which this Native Vegetation Precinct Plan allows to be removed, destroyed or lopped, to the satisfaction of the Secretary to the Department of Sustainability and Environment.
- Prior to commencement of any works including vegetation removal a highly visible vegetation protection fence must be erected around the vegetation to be retained at a distance from the trunk which is equal to twice the width of the canopy. For other types of native vegetation, the fence must be erected at least 2 metres from the edge of the native vegetation which has been identified as to be protected except with the consent of the Secretary to the Department of Sustainability and Environment
- Any construction stockpiles, fill and machinery must be placed away from areas supporting native vegetation and drainage lines to the satisfaction of the responsible authority.
- Prior to felling any native tree that is allowed to be removed, the native tree must be examined by a suitably qualified zoologist for the presence of fauna in hollows or external nests. If native fauna species are identified, they must be salvaged and relocated to the closest suitable vegetation in consultation with the Department of Sustainability and Environment to the satisfaction of the Department of Sustainability and Environment.
- All earthworks must be undertaken in a manner that will minimise soil erosion and adhere to Construction Techniques for Sediment Pollution Control, EPA 1991.
- Only indigenous plants of local provenance may be used in revegetation works of conservation areas.
- Water run-off must be designed to ensure that native vegetation to be protected is not compromised.

Exemptions

There are no additional exemptions to those set out under 52.16-4 of the Cardinia Planning Scheme for the removal, destruction or lopping of native vegetation.

Procedures for the collection of any payment

No payments are necessary or specified.

Reference Documents

Cardinia Road Employment Precinct Net Gain Strategy, Ecology Partners August 2010.

4.6 Transport and Movement

4.6.1 Objectives

The objectives for transport and movement are to:

- establish an integrated and sustainable transport network that reduces dependency on the use of private vehicles, maximises access to public transport and encourages walking and cycling within and between neighbourhoods;
- facilitate the expansion of the regional transport network and the early delivery of new arterial roads to provide major freight links;
- deliver a highly permeable and accessible urban environment with a hierarchy of roads that form an interconnected grid;
- facilitate delivery of a direct and efficient public transport service that presents a viable alternative to private vehicles;
- ensure Principal Public Transport Networks (PPTN) and local public transport services link to existing and future railway stations and neighbourhoods;
- provide for safe, efficient and direct walking and cycling paths along streets;
- deliver a pedestrian and cycling network that is oriented towards the Activity Centre as a key destination;
- ensure pedestrian priority in the Activity Centre, while providing for circulation by other modes of transport;
- develop high amenity streetscapes, with boulevard planting and street trees; and
- promote integrated neighbourhood design by providing connections to adjacent precincts by all modes of transport.

4.6.2 Implementation

The objectives for transport and movement are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 14: Road Network;
- Plan 15: Public Transport;
- Plan 16: Walking and Trails; and
- Planning and design guidelines set out under 4.6.3 including:
 - Table 14: Road Hierarchy;
 - Figure 11: Road Cross Sections - Arterials;
 - Figure 12: Road Cross Sections - Connectors;
 - Figure 13: Road Cross Sections – Employment Land;
 - Figure 14: Road Cross Sections – Residential Land; and
 - Figure 15: Activity Centre Main Street Section.

4.6.3 Planning and Design Guidelines

Road Network

The following planning and design guidelines must be met:

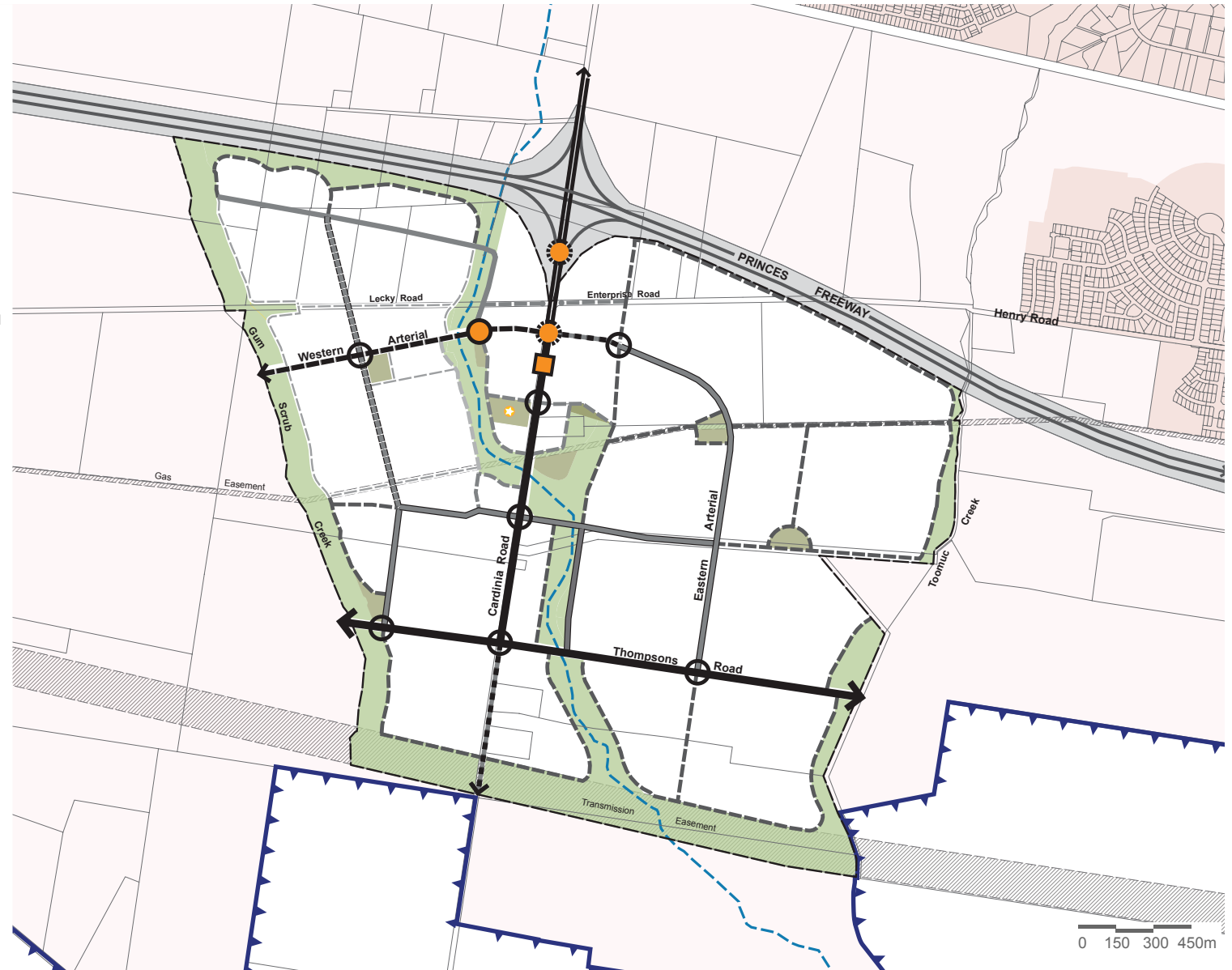
- The road network is to be developed to ensure:
 - Cardinia Road is an attractive boulevard and provides for long-term connections south of the urban area to the greater region of south east Melbourne and the Port of Hastings;
 - Eastern Arterial acts as the primary north-south route for large and heavy vehicles;
 - Western Arterial connects with Officer South area via a bridge over Gum Scrub Creek;

- Thompsons Road provides the primary east-west route for freight and movement across the Frankston-Dandenong-Casey-Cardinia area;
 - north-south movements from Western Arterial to the employment area through the residential precinct are discouraged;
 - a central north-south boulevard connector is to be provided through the heart of the residential area to create a central 'green spine' with a strong treed canopy and distinctive character;
 - a dedicated commercial route is provided for light trucks and commercial traffic to access the Service Business area north of the residential area along the eastern side of the Cardinia Road Open Space Corridor;
 - Lecky Road is closed east of Gum Scrub Creek to avoid impacts upon significant native vegetation; and
 - impacts on significant trees on the Kaduna Park site are minimised during road construction and widening.
- Roads shown in Plan 14 are to be constructed in accordance with Plan 14, Table 14 and the corresponding cross section shown in Figure 11 to Figure 14 (except Figure 12, Section 3).
Note: Arterial Road median plantings must meet VicRoads clear zone requirements.
 - Road reservation widths and design are to be in accordance with Table 14.
 - The Activity Centre Main Street is a shared space that generally reflects Figure 15.
 - Culverts over waterways and creeks are to be constructed to avoid adverse impacts on the fauna connections, flood paths or pedestrian safety.

Plan 14: Road Network

LEGEND

	Precinct Structure Plan Area
	Urban Growth Boundary
Road Network	
	State Freeway
	Future Declared Arterial (up to 6 lanes)
	Future Declared Arterial (4 lanes)
	Potential Future Declared Arterial (4 lanes)
	Undeclared Arterial (4 lanes)
	Connector Street - Industrial
	Connector Street - Commercial & Residential
	Residential Connector Street (Boulevard)
	Industrial Access Street- Level 2
	Commercial Access Street- Level 2
	Residential Access Street- Level 2
	Residential Access Street- Level 1
	Signalised Intersection
	Potential Future Signalised Intersection
	Roundabout
	Signalised Pedestrian Crossing
Heritage and Community	
	Community Facility
Open Space and Environment	
	Unencumbered Open Space
	Encumbered Open Space
	Existing Creeks
	Drainage Lines
Other land	
	Existing Major Easements
	Future Urban Land
	Existing Urban Land



- Design of bridges and culverts over Cardinia Road Open Space Corridor are to positively contribute to the public realm and amenity of the Activity Centre.
- A road reservation is to be provided along the edge of all open space areas and waterway corridors.
- Where a road has an abuttal to residential and Service Business uses, indented parking with tree outstands is required to restrict use of car spaces to small vehicles.

The following planning and design guidelines should be met:

- Roads are to be located along existing and proposed easements where possible.
- Local streets are to provide direct connection and view lines to open space areas, particularly to drainage/creek lines and local parks.
- Local streets are to be designed to maximise on-street car parking.
- 'Loop roads' may be provided in the Commercial area where access to Cardinia Road is limited.
- 'Service Roads' or 'Loop Roads' are encouraged in the Service Business and Industrial Areas in the southern parts of the Precinct, with other streets having access from the service road rather than directly from the arterial. These are subject to VicRoads approval and will be considered on a case-by-case basis.
- Section 3: Connector Street (Boulevard) – Residential (refer Figure 12) is to be constructed in accordance with Plan 14 and Table 14, unless an alternative proposal providing a 'treed boulevard' prepared to the satisfaction of the Department of Transport and the responsible authority.

Public Transport

The following planning and design guidelines must be met:

- Public transport infrastructure is to be provided in accordance with Table 16 and the Public Transport Plan (refer Plan 15).
- Roads and streets forming part of a potential bus route to be designed in accordance with the Public Transport Guidelines for Land Use and Development (DoT 2008).
- In relation to bus stops:
 - Local bus stop facilities must be constructed by development proponents as part of the subdivision works (prior to the issue of a statement of compliance for the relevant stage) to accord with the requirements of the Public Transport Guidelines for Land Use and Development and to the satisfaction of the Director of Public Transport;
 - The facilities must be provided with DDA compliant, direct and safe pedestrian access connected to an existing pedestrian/ shared path;
 - The facilities must be designed as an integral part of activity centres and activity generating land uses, such as schools, sports fields and employment areas; and
 - Upon referral of an application to the Director of Public Transport, a permit condition must be included to allow for the Department of Transport to nominate the location and type of bus stops to be provided by the developer.

The following planning and design guidelines should be met:

- Bus stop facilities are to be located adjacent to uses that operate for long hours.
- Bus stop facilities adjacent to the Activity Centre are to be visible from the Main Street.

Walking and Cycling

The following planning and design guidelines must be met:

- Footpaths, shared paths, trails and on-road cycle lanes to be provided in accordance with Plan 16 and Table 16.
- Pedestrian and cycle access to be provided as part of all bridges, overpasses and creek crossings, including:
 - Cardinia Road over the Cardinia Road Open Space Corridor;
 - Cardinia Road over the Princes Freeway;
 - Western Arterial over Gum Scrub Creek; and
 - Thompsons Road over Gum Scrub and Toomuc Creeks.
- Cycle lanes are to extend through to intersection signals and not suffer early truncation.
- The design of walking and cycle paths is to maximise the level use and user safety through choice of materials (all weather surfacing), lighting, and path design.
- Shared walking and cycle paths are to be provided along the Cardinia Road Open Space Corridor, Gum Scrub and Toomuc Creeks and the Transmission Line Easement in accordance with Plan 16.

- Dedicated pedestrian and bicycle crossings are to be provided to:
 - north of the Princes Freeway at Toomuc Creek and Gum Scrub Creek;
 - east of the Precinct from the Transmission Line Easement; and
 - west of the Precinct from the Transmission Line Easement.
- Off road walking and cycle paths will not be provided adjacent to the Princes Freeway (within the encumbered open space area) west of Cardinia Road, to minimise recreation activity in Growling Grass Frog habitat and breeding areas. All paths to be within the road reserve.
- Cycle parking facilities are to be provided in convenient and prominent locations in the Activity Centre, Kaduna Park and High Density Residential Developments.

The following planning and design guidelines should be met:

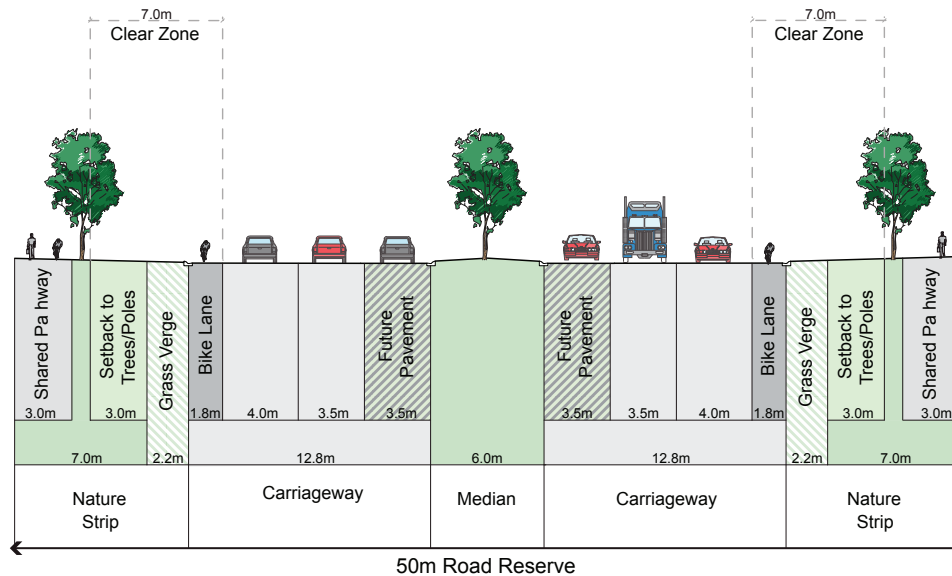
- Cycle parking and associated cyclist facilities are to be integrated into all Commercial, Service Business and Industrial developments.

Table 14: Road Hierarchy

Road / Street	Road Cross Section Number	Figure Number Reference	Existing Reserve (metres)	Ultimate Reserve (metres)	Access Management Policy (AMP)	Indicative VPD	Traffic Lanes	Median	Speed Limit (km/h)	Bus Service	Property Access and Parking	On-Road Cycle Path	Shared Path	Responsibility (Ultimate)
Cardinia Road (north of Western Arterial)	1	11	22	50	AMP 2	38,000	4 (up to 6)	Yes	80	Regional	No	Yes	Yes	VicRoads
Cardinia Road (from Western Arterial to Kaduna Park)	2	11	22	50	AMP 2	32,000	4	Yes	80	Regional	No	Yes	Yes	VicRoads
Cardinia Road (from Kaduna Park to Thompsons Road)	2	11	22	40	AMP 2	19,000 to 32,000	4	Yes	80	Regional	No	Yes	Yes	VicRoads
Cardinia Road (south of Thompsons Road)	2	11	22	40	AMP 4	N/A	4	Yes	80	No	No	Yes	Yes	Council
Western Arterial	2	11	N/A	40	AMP 2	15,000	4	Yes	80	Regional	No	Yes	Yes	Council (potentially VicRoads) *
Eastern Arterial (to first roundabout)	2	11	N/A	40	AMP 2	12,000	4	Yes	80	Local	No	Yes	Yes	Council
Eastern Arterial	5	12	N/A	25	AMP 5	3,000	4	No	60	Local	Yes	Yes	Yes	Council
Thompsons Road	2	11	N/A	40	AMP 2	35,000	4	Yes	80	Regional	No	Yes	Yes	VicRoads
Connector Street (Boulevard) – Residential	3	12	N/A	33	N/A	Up to 7,000	2	Yes	50	Local	Yes	Yes	Yes	Council
Connector Street – Commercial & Residential	4	12	N/A	23.5	N/A	Up to 7,000	2	No	50	Local	Yes	Yes	Yes	Council
Connector Street – Industrial	5	12	N/A	25	N/A	Up to 7,000	2	No	50	Local	Yes	Yes	Yes	Council
Industrial Access Street – Level 2	6	13	N/A	23	N/A	Up to 2,000	2	No	50	No	Yes	No	Yes	Council
Commercial Access Street – Level 2	7	13	N/A	23	N/A	Up to 5,000	2	No	50	No	Yes	No	No	Council
Industrial / Commercial Service Road	8	13	N/A	18.5	N/A	Up to 2,000	1	No	50	No	Yes	No	Yes	Council
Residential Access Street – Level 2	9	14	N/A	18.5	N/A	Up to 3,000	2	No	50	Local	Yes	No	No	Council
Residential Access Street – Level 1	10	14	N/A	17.5	N/A	Up to 1,000	2	No	50	No	Yes	No	No	Council
Residential Service Road	11	14	N/A	10.5	N/A	Up to 1,000	1	No	50	No	Yes	No	No	Council

* Note: If Western Arterial (Glasscocks/Grices Road extension) is shown in the revised Growth Area Framework Plans (DPCD, expected 2010/11) as a future arterial road, the arterial road protocol will apply to Western Arterial and the road will be designated VicRoads ultimate responsibility instead of Council.

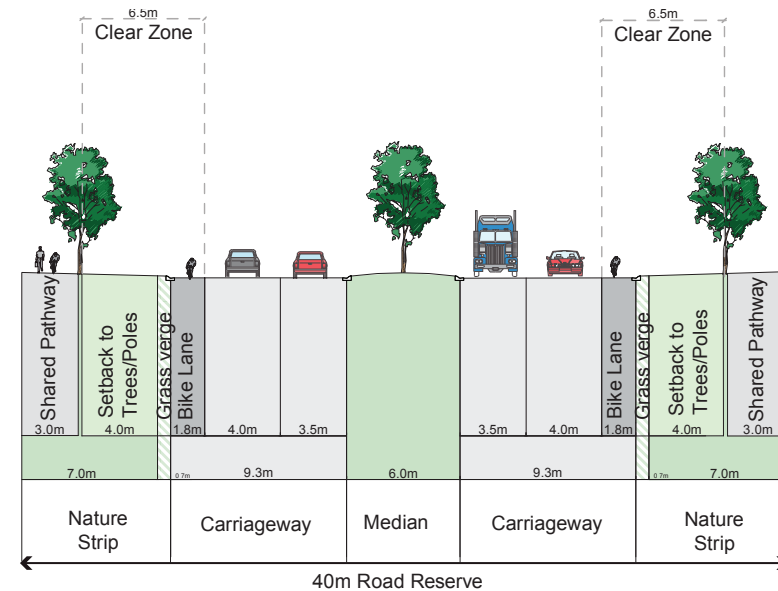
Figure 11: Road Cross Sections



Section 1: Arterial Road: VicRoads Declared Road (up to 6 Lane)

- Road reservation of 50m has been set aside.
- Provision for up to six lane Arterial Road, with sufficient reservation to accommodate an ultimate pavement of 11m (each carriageway).
- Initial construction delivers four lane Arterial with a 13m median, which will be reduced to 6m upon construction of additional lanes.
- No direct vehicular access to Arterial Roads is permitted from abutting properties. For properties abutting Section 1 Arterial Roads, access is to be provided from the internal street network, which should include 'loop roads' that run parallel to the Arterial Road (consistent with the Section 7 Service Road).
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

* 'Grass Verge' will form part of slip lanes, turning lanes etc where required. Otherwise it will form an extension of the nature strip.

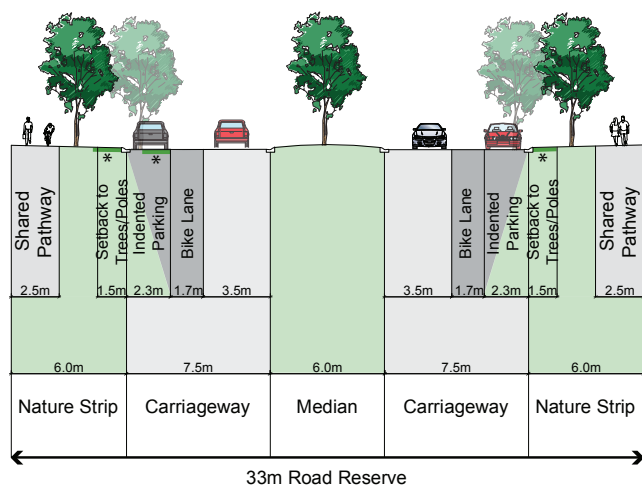


Section 2: Arterial Road: VicRoads Declared Road (4 lane) Arterial Road: Potential Future Declared Road (4 lane) Arterial Road: Undeclared Road (4 lane)

- Road reservation of 40m for Section 2, except 50m reservation provided for Cardinia Road between Eastern/Western Arterial and Kaduna Park intersection.
- No direct vehicular access to Arterial Roads is permitted from abutting properties. Access is to be provided either from Service Roads or the internal street network, which should include 'loop roads' that run parallel to the Arterial Road (consistent with Section 7 or 10).
- Where service roads or 'loop roads' are provided for in residential areas, a 10.5m road reserve (Section 10) will be required as part of the development.
- Where service roads or 'loop roads' are provided for in commercial or industrial areas (Section 7), a road reserve of up to 18.5m will be required as part of the development. The pavement width is variable depending on the orientation of on-street parking and may reduce the overall road reservation.
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

* 'Grass Verge' will form part of slip lanes, turning lanes etc where required. Otherwise it will form an extension of the nature strip. May be up to 5.7m wide in Cardinia Road between Eastern/Western Arterial and Kaduna Park intersection (50m reservation), however majority will be absorbed by turning lanes etc.

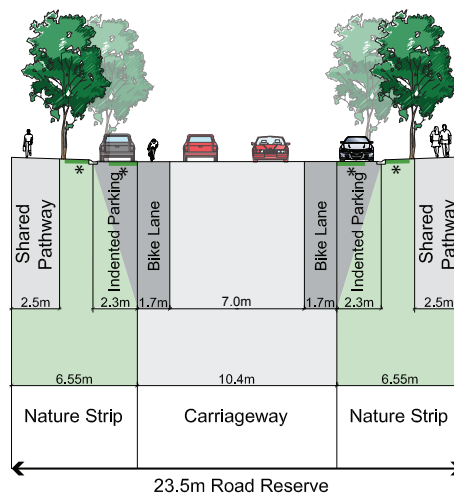
Figure 12: Road Cross Sections



Section 3: Connector Street (Boulevard) - Residential

- On-street parking with indented bays and tree outstands are compulsory.
- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (divided).
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

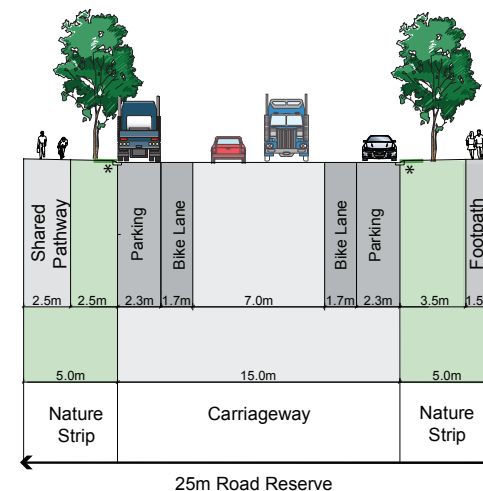
* 1.5m setback from kerb to trees and poles



Section 4: Connector Street - Commercial & Residential

- On-street parking with indented bays and tree outstands are compulsory.
- Up to three carpaces between outstands may be provided, subject to detailed subdivision design.
- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (undivided).
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

* 1.5m setback from kerb to trees and poles

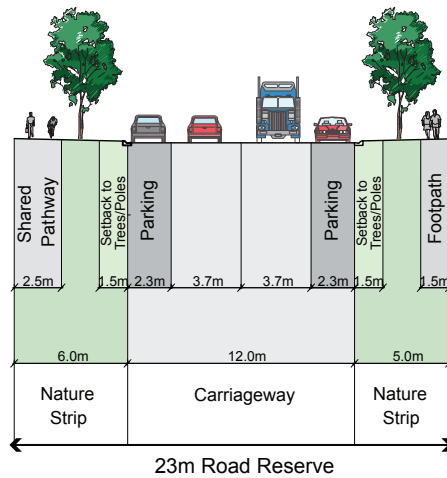


Section 5: Connector Street - Industrial

- On-street parking with indented bays and tree outstands are compulsory.
- Tree outstands are encouraged and may be required where the spacing between driveways is such that the parking area is intended to provide principally for visitor carparking at the front of premises, as opposed to truck parking.
- Where this section provides an interface between residential and service business areas, indented parking must be provided.
- Up to three carpaces between outstands may be provided, subject to detailed subdivision design.
- Based on Cardinia Shire Council Standard Drawing Local Arterial Road (undivided).
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

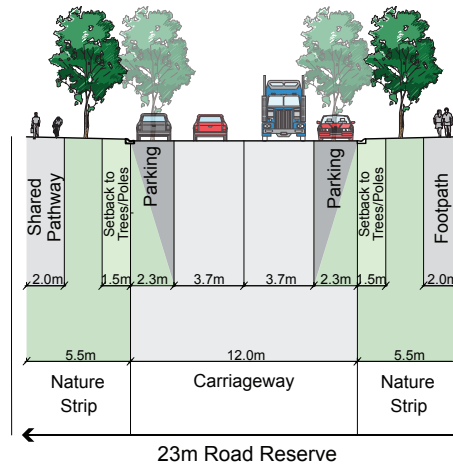
* 1.5m setback from kerb to trees and poles

Figure 13: Road Cross Sections



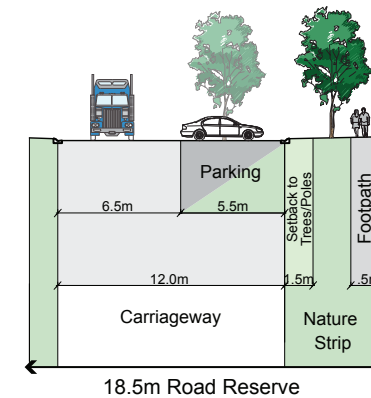
Section 6: Industrial Access Street - Level 2

- On-street parking on both sides of road.
- Tree outstands are encouraged and may be required where the spacing between driveways is such that the parking area is intended to provide principally for visitor carparking at the front of premises, as opposed to truck parking.
- Where this section provides an interface between residential and service business areas, indented parking must be provided.
- Up to three carpaces between outstands may be provided, subject to detailed subdivision design.
- Based on minimum standard for Collector Roads in Cardinia Shire Council Standard Drawings. Note: Provision of wider nature strip and shared path one side, also increased pavement width from minimum standards.
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.



Section 7: Commercial Access Street - Level 2

- On-street parking on both sides of the road.
- Indented parking with tree outstands is required.
- Based on minimum standard for Collector Roads in Cardinia Shire Council Standard Drawings. Note: Increased footpath and pavement widths from minimum requirements.
- Shared Paths must be offset from property boundaries in accordance with the requirements of AS 1742.0 in relation to clearance from obstacles.

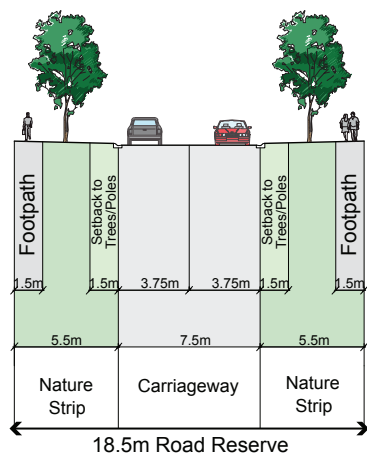


Section 8: Industrial / Commercial Service Road

- On-street, angle parking on developed edge of road.
- Single-lane, one way traffic.
- Indented parking with tree outstands is optional for Commercial Service Roads.
- May be utilised for either service roads, connecting to an Arterial Road (Section 2) or 'loop roads' that run parallel to the Arterial Road.
- A road reserve of up to 18.5m will be required, with a variable pavement width* depending on the orientation of on-street parking and may reduce the overall road reservation.

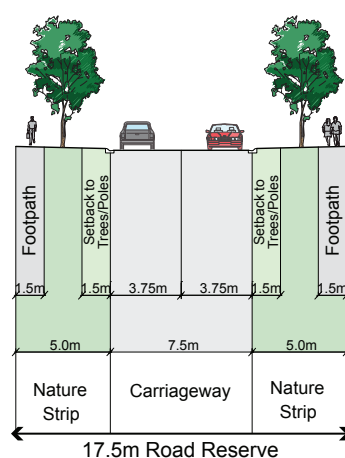
*Pavement width may be reduced depending on angle of car spaces and the relevant Australian Standard.

Figure 14: Road Cross Sections



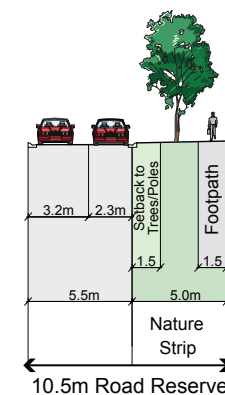
Section 9: Residential Access Street - Level 2

- Sufficient pavement width for two circulation lanes plus 'informal' on-street parking (unmarked spaces).
- Where road reserve abuts public open space, footpath is required on the developed edge only.
- Refer to Cardinia Shire Council Standard Drawing Collector Road for minimum standards.



Section 10: Residential Access Street - Level 1

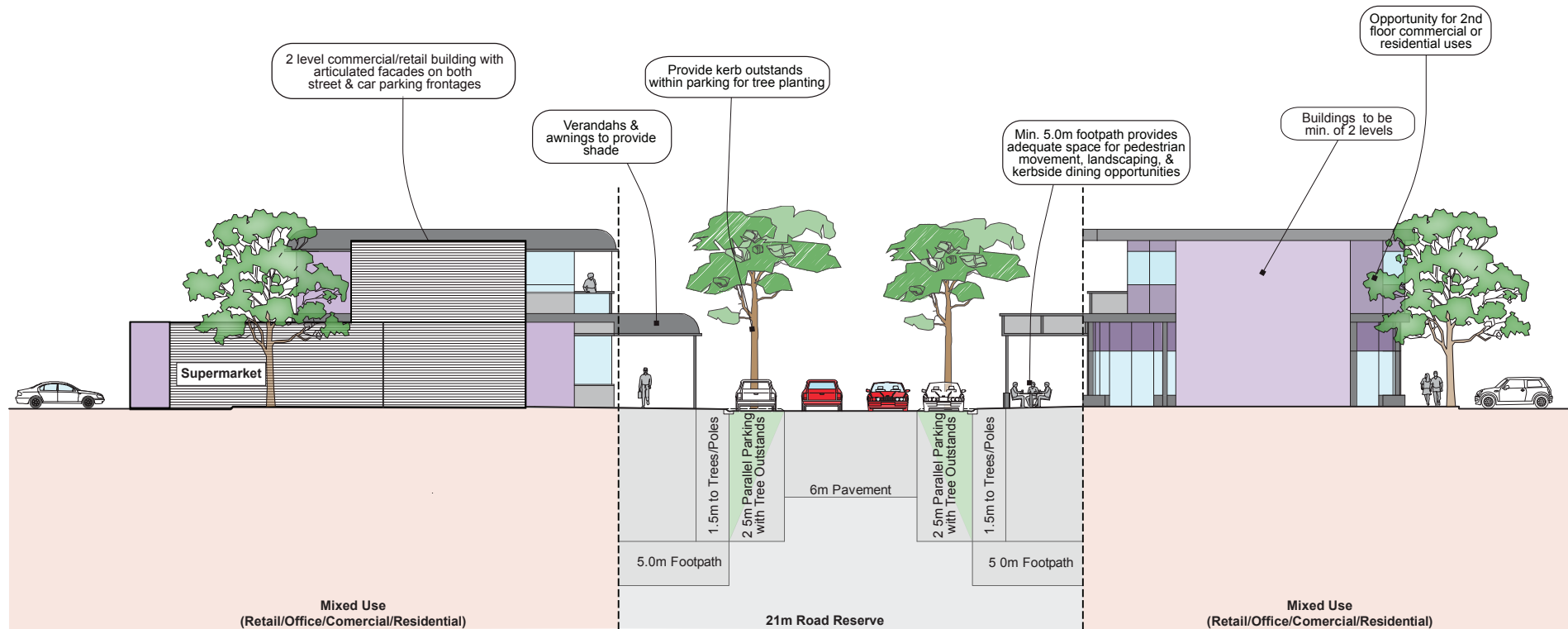
- Sufficient pavement width for two circulation lanes plus 'informal' on-street parking (unmarked spaces).
- Where road reserve abuts public open space, footpath is required on the developed edge only, depending on the design of the park.
- Refer to Cardinia Shire Council Standard Drawing Local Street for minimum standards.



Section 11: Residential Service Road

- On-street parallel parking on developed edge of road.
- Single-lane, one way traffic.
- May be utilised for either service roads, connecting to an Arterial Road (Section 2) or 'loop roads' that run parallel to the Arterial Road.

Figure 15: Activity Centre Main Street Section



Plan 15: Public Transport

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- Public Transport Network**

Rail line and Stations

Principal Public Transport Network (PPTN) Bus Route

Potential Regional Bus Route
(Frankston to Pakenham via Glasscocks Rd Extension)

Potential Regional Bus Route
(Frankston to Pakenham via Thompsons Road)

Potential Local Bus Route

Local Loop (Potential Local Bus Route)

Bus Stops (approx. location)

Future Grade Separated Crossing

Future Freeway Interchange
- Residential & Employment Land**

Neighbourhood Activity Centre

Major Activity Centre (External to PSP)

Neighbourhood Activity Centre
(External to PSP)

Employment

Residential
- Heritage and Community**

Community Facility
- Open Space and Environment**

Unencumbered Open Space

Encumbered Open Space

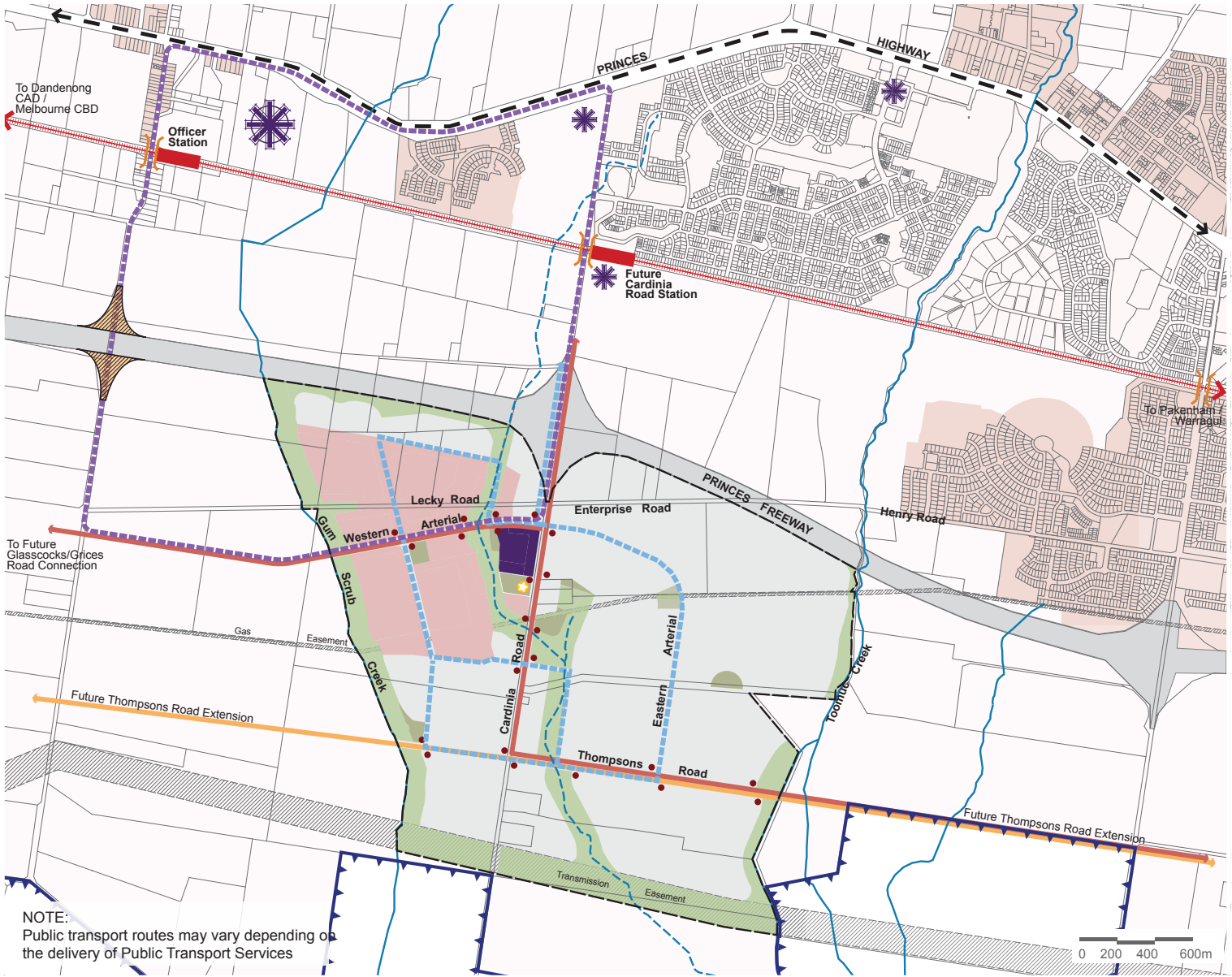
Existing Creeks

Drainage Lines
- Other land**

Existing Major Easement

























Future Urban Land

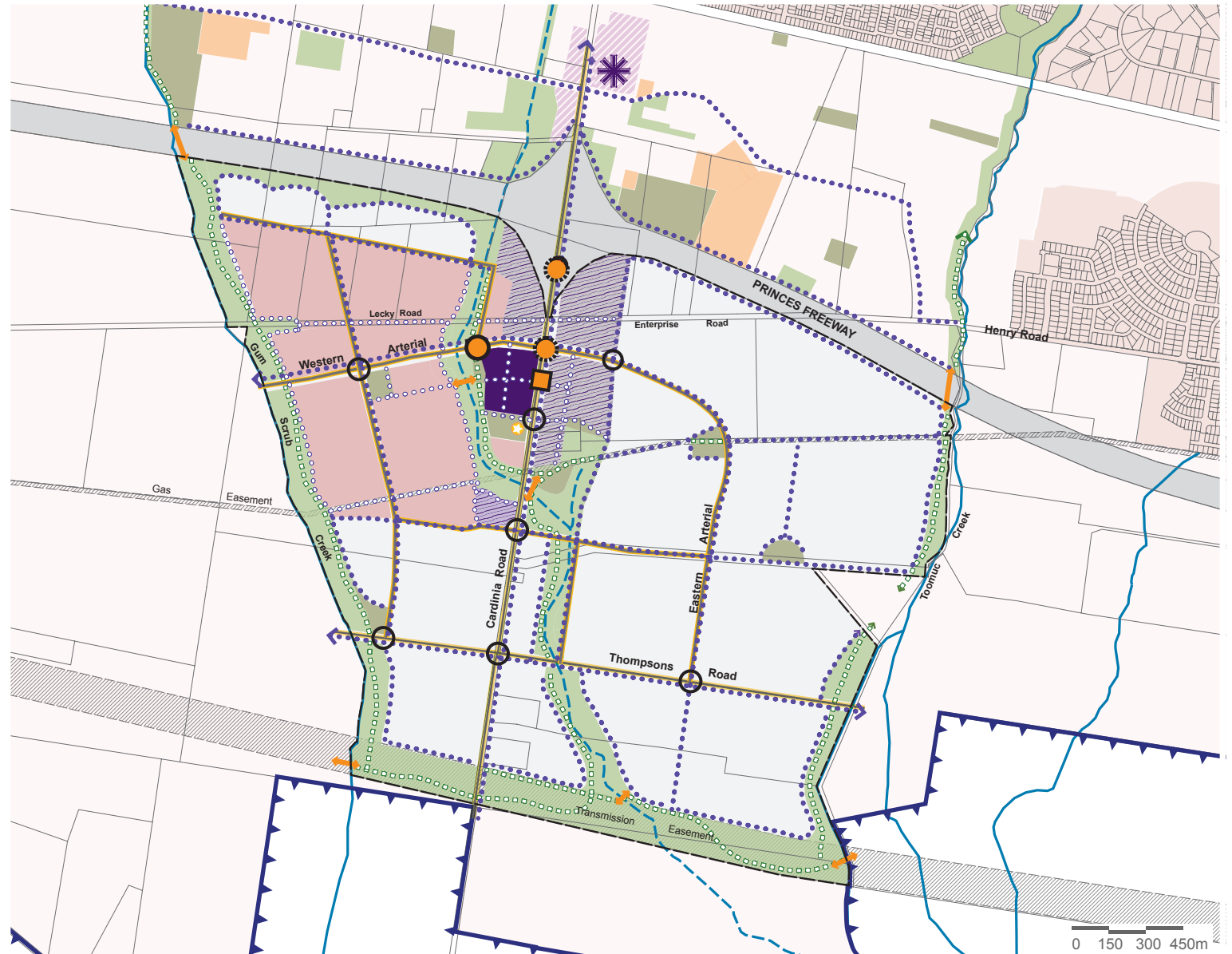
Existing Urban Land



Plan 16: Walking and Trails

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
- Movement Network**
 -  Signalised Intersection
 -  Potential Future Signalised Intersection
 -  Roundabout
 -  Signalised Pedestrian Crossing
 -  On Road Cycle lanes
 -  Shared Paths
 -  Key Local Footpaths
 -  Trail Network
 -  Future Bridges/Underpasses
- Residential & Employment**
 -  Neighbourhood Activity Centre
 -  Commercial
 -  Residential
 -  Activity Centre External to PSP area
- Open Space & Environment**
 -  Unencumbered Open Space
 -  Encumbered Open Space
 -  Existing Creeks
 -  Drainage Lines
- Community**
 -  Community Centre
 -  Community Facilities External to PSP area
- Other Land**
 -  Existing Major Easements
 -  Future Urban Land
 -  Existing Urban Land



4.7 Utilities, Energy and Sustainability

4.7.1 Objectives

The objectives for utilities, energy and sustainability are to:

- provide all developed lots, to the satisfaction of the relevant authority, with standard infrastructure, including:
 - a potable water service;
 - electricity;
 - a reticulated sewage service;
 - drainage;
 - gas; and
 - telecommunications.
- ensure the delivery of fibre optic broadband internet to all dwellings and premises;
- provide all residential lots with a recycled water supply;
- implement the Development Services Scheme and minimise fill requirements;
- achieve best practice environmentally sustainable development in the planning and development of the Precinct; and
- promote environmentally sustainable design as a key attractor for investment in the Precinct.

4.7.2 Implementation

The objectives for utilities, energy and sustainability are met by implementation of all of the following:

- Plan 5: Future Urban Structure;
- Plan 12: Water Management;

- Plan 17: Physical Services;
- Planning and design guidelines set out in Section 4.7.3; and
- Table 15: Environmentally Sustainable Design Planning and Design Guidelines.

4.7.3 Planning and Design Guidelines

General

The following planning and design guidelines must be met:

- Requirements of the relevant authority or provider are to be met.
- The location of services are:
 - not to impede future road alignments;
 - to be located along the edges of open space/ waterway corridors, ideally within abutting road reserves;
 - have regard to the requirements for the location of stormwater wetlands and frog ponds so as not to compromise biodiversity outcomes.

The following planning and design guidelines should be met:

- Service infrastructure is to be provided in accordance with Plan 17: Physical Services.
- Services are to cross waterways and creek corridors at the following locations:
 - planned road culverts and bridges;
 - existing culverts or underpasses (if they are being retained); or
 - adjacent to or as part of existing easements for other service infrastructure.

Water Supply

The following planning and design guidelines should be met:

- A Pressure Reducing Station is required to be installed south of the Princes Freeway.
- Water supply infrastructure is to be extended outwards from the new Pressure Reducing Station to service development in other parts of the Precinct.

Recycled and Tank Water Supply

The following planning and design guidelines must be met:

- A third pipe system for recycled water is to be provided in residential areas to be developed in consultation with South East Water.
- Rainwater tanks and systems are to be installed in accordance with the requirements of the Department of Human Services.
- Water tanks and other water sensitive urban design initiatives are to be integrated into developments and car parking areas of all non-residential areas.

The following planning and design guidelines should be met:

- Recycled water including use of grey water and irrigation ponds/dams are encouraged throughout the Precinct.































Electricity

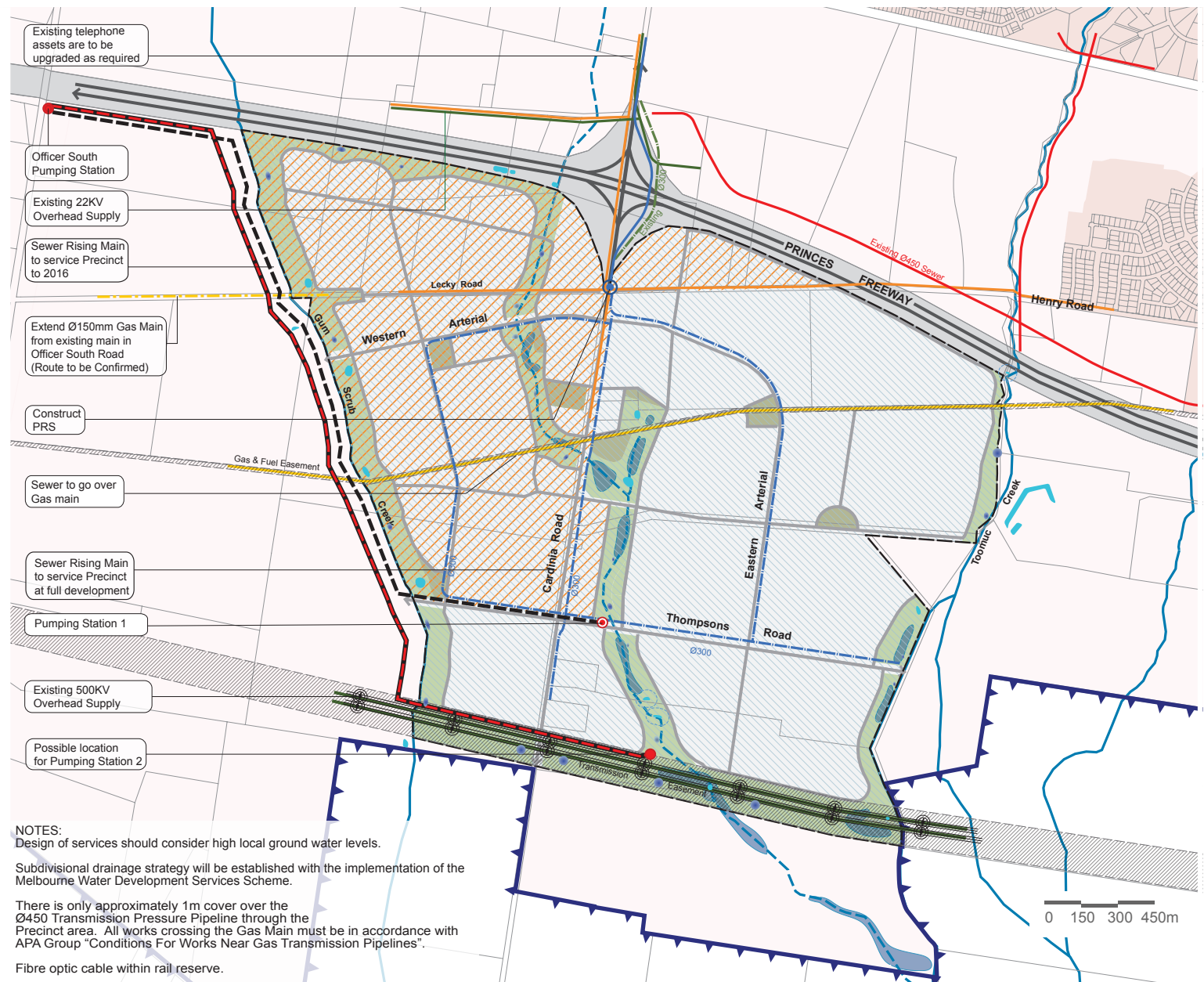
The following planning and design guidelines must be met:

- All new power lines are to be located underground.
- Any existing overhead powerlines are to be relocated underground or removed where an alternative underground power source is made available.

Plan 17: Physical Services

LEGEND

-  Precinct Structure Plan Area
-  Urban Growth Boundary
- Physical Services**
-  Existing Major Easements
-  Existing Electricity Supply
-  Future Electricity Supply
-  Indicative Location of Existing Transmission Tower
-  Existing Ø450 Gas Pipeline (Morwell-Dandenong)
-  Future Gas Main
-  Existing Telephone Line
-  Existing Sewer Reticulation
-  Existing Water Reticulation
-  Future Water Reticulation
-  Future Sewer Rising Main - 275mm
-  Future Sewer Rising Main - 400mm
-  Water Supply Pressure Reducing Station (PRS)
-  Sewage Pump Station (Permanent)
-  Sewage Pump Station (Temporary)
-  Catchment for Pumping Station 1
-  Catchment for Pumping Station 2
- Road Network**
-  State Freeway
-  PSP Road Network
- Open Space and Environment**
-  Unencumbered Open Space
-  Encumbered Open Space
-  Existing Creeks
-  Drainage Lines
-  Existing ponds
-  Proposed ponds
-  Wetland system
- Other land**
-  Future Urban Land
-  Existing Urban Land



- Development and staging is to be coordinated with SP AusNet to deliver the timely upgrading and extension of electricity supply facilities to meet demand.
- Within the Transmission Line Easement ground level sporting activities, passive recreation, water sensitive urban design, water storages and dams may be permitted, subject to approval by SP AusNet.

The following planning and design guidelines should be met:

- Renewable energy systems are encouraged (such as solar).

Sewage

The following planning and design guidelines must be met:

- The implementation of sewerage facilities is to be staged.
- A pump station and associated rising sewer main is to be constructed adjacent to the Treatment Plant.
- Development and Staging of the Construction of sewer reticulation services is to be coordinated with South East Water.

The following planning and design guidelines should be met:

- A temporary sewage pump station is to be located east of Cardinia Road at Thompsons Road. A sewer rising main from the pump station is to discharge to a location determined by South East Water.
- A permanent pump station is to be constructed at the southern end of the Precinct, with the route for a Rising Sewer Main to suit the Pump Station location adopted.
- The catchments for the temporary and permanent pumping station are to be generally consistent with Plan 17.

Drainage

The following planning and design guidelines must be met:

- Underground drainage is to be designed to convey 1 in 10 year storm events to discharge into open drainage channels or waterways through the area.
- Design and construction of waterways is to:
 - comply with the future Melbourne Water Development Services Scheme requirements; and
 - meet the minimum buffer and corridor width requirements (as shown in Plan 12) for the waterways to ensure they provide adequate land for biodiversity conservation and recreation purposes.
- Drainage systems are to be shallow to facilitate outfall drainage into the Koo Wee Rup Flood Protection District (KWRFPD) and minimise groundwater and salinity constraints.
- Drainage systems (including the design of arterial and collector roads) are to be designed to ensure that no increase in the 100 year ARI flood levels occur upstream or adjacent to the development area.
- The finished surface level of the area is to be at least 300 millimetres freeboard to the 100 Year ARI flood level, as per Melbourne Water requirements. The following applies:
 - all habitable buildings are to have a finished floor level of 600 millimetres freeboard to the 100 Year ARI flood level; and
 - the finished surface level of the Activity Centre site is to match the finished floor level of buildings. The edges of the Activity Centre site may be at a grade of 1:40 to enable seamless transition to the surface level of the surrounds.

Gas

The following planning and design guidelines must be met:

- Development south of the Western Arterial cannot commence until the gas line that traverses the Precinct is lowered.
- Land encumbered by the Gas and Fuel Easement is to be:
 - developed as a road, with a reservation that extends across the full width of the easement;
 - used for open space; or
 - be land required for drainage purposes.

Telecommunications

The following planning and design guidelines must be met:

- Fibre optic cable (or superior technology) is to be made directly available to every building, dwelling or separate leasable tenancy in the Precinct.
- The best available technology for telecommunications at the time of development is to be made available to all properties and separate tenancies in the Precinct.
- Development and staging is to be coordinated with Telstra and other potential providers to deliver the timely upgrading and extension of telecommunication facilities to meet demand within the Precinct.
- Telecommunications towers are to be located where they have minimal impact on the visual amenity of the Precinct, and:
 - be integrated within the built form in the Activity Centre, Commercial and Service Business areas; or
 - be located in the Industrial areas.

Environmentally Sustainable Design

Planning and design guidelines for environmentally sustainable design and development are outlined in Table 15.

Table 15: Environmentally Sustainable Design Planning and Design Guidelines

Element	Planning and Design Guidelines that must be met	Planning and design guidelines that should be met
Energy and Greenhouse		<ul style="list-style-type: none"> Buildings are to be designed to minimise lifecycle energy consumption and greenhouse emissions. Buildings are to be designed to maximise and monitor energy efficiency. The installation of renewable energy systems and use of natural gas is encouraged.
Water Management	<ul style="list-style-type: none"> Efficient use of potable water supplies is to be demonstrated. Third pipe recycled water supply is to be provided throughout the residential area. 	<ul style="list-style-type: none"> New development is to incorporate water sensitive urban design practices. Alternative water sources to potable mains supply are encouraged in all developments. Reuse and recycling of water is encouraged. The integrated stormwater treatment systems are to be provided and landscapes should be designed to significantly minimise the demand for irrigation water from potable sources and to improve the quality of stormwater runoff.
Internal Environmental Quality	<ul style="list-style-type: none"> Buildings are to be designed to maximise the quality of indoor environmental quality for all occupants. Adequate daylight to all occupied spaces is required. External views for occupants are to be maximised. 	<ul style="list-style-type: none"> Building design, choice of materials, and ventilation is to combine to minimise the concentration of volatile organic compounds from paints, adhesives and sealants, office equipment, carpets and furniture during building occupation.
Materials	<ul style="list-style-type: none"> The quantity of materials required to construct a building is to be minimised, along with the materials required to adapt a building to new uses. Natural ventilation of internal spaces is encouraged. 	<ul style="list-style-type: none"> Buildings are to be constructed of durable materials (with low lifecycle environmental impact) that maximise the longevity and utilisation of a development, with minimal maintenance.
Waste Minimisation	<ul style="list-style-type: none"> All new buildings are to be designed and constructed to minimise waste to landfill. Facilities to enable recycling of materials are to be provided during occupation of the building. 	<ul style="list-style-type: none"> Re-use or recycling of the building components at the end of the life of the building is to be considered. Construction waste materials are to be re-used and recycled wherever possible.
Transport	<ul style="list-style-type: none"> All new developments are to be designed to reduce car travel, by encouraging vehicle pooling and sharing, the use of public transport and the pedestrian and cycle network. Bicycle parking is to be provided at the Activity Centre and in new buildings in the Commercial area, Service Business and Industrial areas, High Density Residential areas and Kaduna Park. Showering and changing facilities are to be provided in association with bicycle parking. 	<ul style="list-style-type: none"> Within new developments, car parking spaces are to be nominated for the exclusive use of share/pool cars.
Landscaping	<ul style="list-style-type: none"> All new developments are to be landscaped incorporating the "Australian Landscape" theme. Landscaped areas are to be designed to minimise potable water use. 	<ul style="list-style-type: none"> Landscaping is to be incorporated into the design of buildings and structures, maximising shade and providing "green" facades and roof gardens. Permeable paving and footpath treatments are encouraged. Impervious paving surfaces are to be avoided.

4.7.4 Energy Statement

Overall, the future urban structure of the Precinct and the planning and design guidelines to deliver the Vision, encourages minimisation of non-renewable and non-sustainable energy by:

- providing employment opportunities that meet the needs and skills of the local workforce to reduce out-commuting and travel distanced by fostering greater self containment in Casey-Cardinia;
- encouraging alternative modes of transport particularly for journey-to-work trips, by providing walking, cycling and bus links to, from and within the Precinct, including linking key destinations, open space, employment and residential areas;
- encouraging bus usage by intensifying development of housing, core retail and office development within close proximity of proposed public transport routes;
- providing a road network that enables efficient transport movements, with a hierarchical system of streets including direct arterial roads, a permeable network of lower order streets, cycle and walking paths;
- providing an integrated path system connecting roads with the linear open space network;
- promoting development of a grid-based road network to enable subdivision layouts to incorporate passive solar orientation, reducing energy use and carbon dioxide emissions particularly for residential areas; and
- encouraging innovative development design, with a requirement for non-residential buildings to demonstrate energy and water efficiency at the time of planning permit application.

4.7.5 Sustainability Statement Requirements

All planning permit applications to subdivide land, construct a building or to construct and carry out works must be accompanied by a Sustainability Statement that demonstrates how the development meets the sustainability objectives and planning and design guidelines (outlined in Sections 4.7.1 to 4.7.3) including:

- a site analysis plan that highlights the physical attributes of the site, including solar access, prevailing winds, topography, soil conditions, vegetation and visual links;
- details of all performance standards relating to the planning and design guidelines, met by the development including the assumptions forming the basis of any calculations;
- details of environmentally sustainable design strategies, initiatives and features integrated into the development;
- plans indicating the location of environmentally sustainable design features as appropriate;
- a Construction Waste Management Plan which details the facilities and methods to be adopted to minimise construction waste and enhance opportunities for recycling; and
- management protocols for systems requiring ongoing maintenance and management.

If in the opinion of the responsible authority this requirement is not relevant to the evaluation of an application, it may waive or reduce the requirement.

05 PRECINCT INFRASTRUCTURE PLAN

5.1 Introduction

This Precinct Infrastructure Plan (PIP) sets out infrastructure and services required to meet the needs of development of the Precinct. The infrastructure and services are to be provided through a number of mechanisms including:

- subdivision construction works by developers;
- development contributions (through either Section 173 Agreement or a future Development Contributions Plan incorporated into the Cardinia Planning Scheme);
- utility service provider contributions and infrastructure development schemes; and
- capital works projects by Council, State Government agencies and non-government organisations.

5.1.1 Subdivision Construction Works by Developers

As part of subdivision construction works, new development is required to meet the total cost of delivering the following infrastructure (except for where a specific project is included Table 16):

- connector streets and local access streets (including sealing of existing roads, except future arterials).
- landscaping of all existing and future roads and local streets.
- intersection works and traffic management measures along arterial roads, collector roads and local streets.
- local pedestrian, bicycle and shared paths along all existing and future roads and local streets.
- local drainage systems.
- infrastructure as required by utility services providers including water, sewerage, drainage (except where the item is funded through a Development Services Scheme), electricity, gas, and telecommunications.

Note: Subject to the approval of Cardinia Shire Council, part or all of the cost of projects included in the works schedule set out in the Infrastructure Funding Agreement for the Precinct or any future Development Contribution Plan may be able to be provided as in-kind works in lieu of cash payments.

5.1.2 Development Contributions

An Infrastructure Funding Agreement under Section 173 of the Planning and Environment Act has been prepared for the Cardinia Road Employment Precinct in conjunction with this PSP. It will exempt any property from the requirements of any Development Contribution Plan that may be incorporated into the Cardinia Planning Scheme in the future.

For any landowners who elect not to sign the Section 173 Agreement, their property will be subject to a DCP in order to develop.

The use of a Section 173 Agreement for developer contributions is dependent upon a developer providing upfront funding for 'Open for Business' works. If no commitment is made by a developer to fund 'Open for Business' works, then the DCP will include financial costs associated with upfront infrastructure delivery. Any future DCP would also include contributions towards community facilities and other infrastructure supporting the Precinct, that is located outside the Precinct.

Projects included in the Infrastructure Funding Agreement are outlined in the Infrastructure Project List, which is an annexure to the Agreement. The items included in the Infrastructure Project List are outlined in this section; however the Agreement and the Infrastructure Project List may be updated more regularly than the PIP.

It should be noted that these items included in the Infrastructure Project List will be included in any future DCP for the Precinct, which will also incorporate the costs of DCP preparation.

5.2 Infrastructure and services required

Table 16 sets out the list of infrastructure and services required within the precinct to support its development, including details of:

- Project Group and Category;
- Project Title and Description;
- Project numbers for items included in the Infrastructure Funding Agreement;
- Lead Agency (i.e. The agency responsible for the coordination and approval of the project. Other agencies and/or developers may have an involvement in the project); and
- Indicative Timing, Indicative Total Project Cost and Precinct Contribution Cost (in December 2008 Dollars).

5.3 Project Coordination

A number of projects can be grouped, as if delivered they are together or in a co-ordinated way, the projects will deliver significant benefits to the community beyond the benefits of each project being delivered individually.

Examples of the projects that could be grouped for co-ordinated delivery include:

- full construction of Western Arterial, including landscaping to enable early establishment of a strong boulevard.
- construction of the east-west road along the northern boundary of Kaduna Park, concurrently to the Kaduna Park community facility to extensive landscaping of the formal garden area to create a strong community focus.

5.4 Delivery and monitoring

Cardinia Shire Council and the Growth Areas Authority will jointly monitor the implementation of the Precinct Infrastructure Plan.

Cardinia Shire Council and the Growth Areas Authority will work in conjunction as part of the Cardinia Infrastructure Working Group to manage the monitoring, review, implementation and prioritisation of identified projects.

Table 16: Infrastructure and services required

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
TRANSPORT							
Roads	Cardinia Road Duplication (From southern freeway interchange to intersection with Eastern and Western Arterial)	Land acquisition for 50m road reserve to provide divided arterial (up to 6 lanes at ultimate development). Construction of four lane divided road with widened median.	DI_RD_01 & DI_LA_01	Cardinia Shire Council	S	\$1.07	\$1.07
Roads	Cardinia Road Upgrade (From southern freeway interchange to intersection with Eastern and Western Arterial)	Upgrade of four divided arterial to six lane divided road.		VicRoads	L	Undetermined	Undetermined
Roads	Cardinia Road Interim Works (Delivery of Interim southern approach to intersection with Eastern and Western Arterial)	Land acquisition for 50m road reserve to provide divided arterial. Interim works, tapering four newly-constructed urban lanes into existing two lane rural seal.	DI_RD_02 OFB & DI_LA_02	Cardinia Shire Council	S	\$0.64	\$0.64
Roads	Cardinia Road Duplication (From intersection with Eastern and Western Arterial to Kaduna Park Intersection)	Upgrade works to provide four lane divided arterial with widened median.	DI_RD_02 UP	Cardinia Shire Council	S	\$0.63	\$0.63
Roads	Cardinia Road Upgrade (From Kaduna Park Intersection to East-West Connector Street)	Land acquisition for 40m road reserve for ultimate provision of four lane divided arterial. Initial construction of first carriageway.	DI_RD_03 & DI_LA_03	Cardinia Shire Council	M	\$1.67	\$1.67
Roads	Cardinia Road Duplication (From Kaduna Park Intersection to East-West Connector Street)	Construction of second carriageway.		VicRoads	L	Undetermined	Undetermined
Roads	Cardinia Road Upgrade (From East-West Connector Street to Thompsons Road)	Land acquisition for 40m road reserve for ultimate provision of four lane divided arterial. Initial construction of first carriageway.	DI_RD_04 & DI_LA_04	Cardinia Shire Council	M	\$1.69	\$1.69
Roads	Cardinia Road Duplication (From East-West Connector Street to Thompsons Road)	Construction of second carriageway.		VicRoads	L	Undetermined	Undetermined
Roads	Cardinia Road Widening (Thompsons Road to southern edge of Transmission Line Easement)	Land required to preserve potential future arterial options to South Gippsland Highway and the Port of Hastings.	DI_LA_22	Cardinia Shire Council	L	\$0.34	\$0.34
Roads	Eastern Arterial Duplication (From Cardinia Road to Activity Centre Ring Road)	Land acquisition for 40m road reserve and construction of four lane divided arterial.	DI_RD_05 & DI_LA_05	Cardinia Shire Council	S	\$1.32	\$1.32
Roads	Western Arterial Duplication (From Cardinia Road to Activity Centre Ring Road)	Land acquisition for 40m road reserve and construction of four lane divided arterial.	DI_RD_06 & DI_LA_06	Cardinia Shire Council	S	\$1.26	\$1.26
Roads	Western Arterial Duplication (From Activity Centre Ring Road to western side of Cardinia Road Open Space Corridor)	Land acquisition for 40m road reserve and construction of four lane divided arterial, including temporary works.	DI_RD_07 OFB & DI_LA_07	Cardinia Shire Council	S	\$0.72	\$0.72
Roads	Western Arterial Upgrade (From Activity Centre Ring Road to western side of Cardinia Road Open Space Corridor)	Restoration works to provide access further west associated with delivery of RD_07a.	DI_RD_07 UP	Cardinia Shire Council	S	\$0.07	\$0.07
Roads	Western Arterial (From Western side of Cardinia Road Open Space Corridor to North-South Connector Street - Boulevard)	Land acquisition for 40m road reserve and construction of one carriageway of four lane divided arterial.	DI_RD_07a & DI_LA_07a	Cardinia Shire Council	S	\$1.34	\$1.34

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
Roads	Western Arterial (From Western side of Cardinia Road Open Space Corridor to North-South Connector Street - Boulevard)	Construction of one carriageway of four lane divided arterial road.		Cardinia Shire Council / VicRoads	M - L	Undetermined	Undetermined
Roads	Western Arterial (From North-South Connector Street - Boulevard to Gum Scrub Creek)	Land acquisition for 40m road reserve and construction of first carriageway of four lane divided arterial.	DI_RD_08 & DI_LA_08	Cardinia Shire Council	M - L	\$1.50	\$1.50
Roads	Western Arterial (From North-South Connector Street - Boulevard to Gum Scrub Creek)	Construction of second carriageway.		Cardinia Shire Council / VicRoads	M - L	Undetermined	Undetermined
Roads	Thompsons Road Delivery (From Gum Scrub Creek to Cardinia Road)	Land acquisition for 40m road reserve and construction of first carriageway of four lane divided arterial.	DI_RD_09 & DI_LA_09	Cardinia Shire Council	M - L	\$1.86	\$1.86
Roads	Thompsons Road Duplication (From Gum Scrub Creek to Cardinia Road)	Construction of second carriageway.		VicRoads	L	Undetermined	Undetermined
Roads	Thompsons Road Delivery (From Cardinia Road to Eastern Arterial)	Land acquisition for 40m road reserve and construction of first carriageway of four lane divided arterial.	DI_RD_10 & DI_LA_10	Cardinia Shire Council	M - L	\$3.24	\$3.24
Roads	Thompsons Road Duplication (From Cardinia Road to Eastern Arterial)	Construction of second carriageway.		VicRoads	L	Undetermined	Undetermined
Roads	Thompsons Road Delivery (From Eastern Arterial to Toomuc Creek)	Land acquisition for 40m road reserve and construction of first carriageway of four lane divided arterial.	DI_RD_11 & DI_LA_11	Cardinia Shire Council	M-L	\$2.68	\$2.68
Roads	Thompsons Road Duplication (From Eastern Arterial to Toomuc Creek)	Construction of second carriageway.		VicRoads	L	Undetermined	Undetermined
Roads	North-South Connector Street - Commercial & Residential (From Lecky Road to Western Arterial along Eastern edge of Open Space Corridor)	Provision of alternative access to Lecky Road upon closure of intersection with Cardinia Road.	DI_RD_12	Cardinia Shire Council	S	\$0.21	\$0.21
Roads	North-South Residential Access Street - Level 1 (From Lecky Road to Western Arterial along western edge of Open Space Corridor)	Provision of alternative access to Lecky Road upon closure of intersection with Cardinia Road.	DI_RD_13 OFB	Cardinia Shire Council	S	\$0.29	\$0.29
Roads	North-South Residential Access Street - Level 1 Upgrade (From Lecky Road to Western Arterial along western edge of Open Space Corridor)	Restoration works to provide access further west associated with delivery of RD_07a.	DI_RD_13 UP	Cardinia Shire Council	S	\$0.05	\$0.05
Roads	Connector Street - Commercial & Residential crossing Cardinia Road Main Drain (north of Lecky Road)	Provision of crossing over encumbered open space, delivering loop to service employment land abutting Freeway.	DI_RD_14	Cardinia Shire Council	S	\$0.30	\$0.30
Roads	East-West Commercial Access Street - Level 2 (From Cardinia Road to Eastern Boundry of Property 18)	Provision of key east-west road within commercial core, which straddles property boundaries.	DI_RD_15 & DI_LA_23	Cardinia Shire Council	M	\$0.52	\$0.52
Intersections	Cardinia Road Southern Freeway Interchange Initial Upgrade	Roundabout upgrade: addition of second lane.	DI_IN_01 OFB	Cardinia Shire Council	S	\$0.86	\$0.86
Intersections	Cardinia Road Southern Freeway Interchange Interim Upgrade	Roundabout upgrade: freeway exit lane and bridge ramp works.	DI_IN_01 UP	Cardinia Shire Council	S	\$0.82	\$0.82
Intersections	Cardinia Road Southern Freeway Interchange Ultimate Signalisation	Ultimate signalisation (potential future) and provision of second bridge over Freeway.		VicRoads	L	Undetermined	Undetermined

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
Intersections	Cardinia Road, Eastern and Western Arterial Roundabout Construction	Construction of two lane roundabout.	DI_IN_02 OFB	Cardinia Shire Council	S	\$1.27	\$1.27
Intersections	Cardinia Road, Eastern and Western Arterial Roundabout Upgrade	Upgrade of roundabout access.	DI_IN_02 UP	Cardinia Shire Council	S	\$0.47	\$0.47
Intersections	Cardinia Road, Eastern and Western Arterial Ultimate signalisation	Potential future signalisation of intersection		VicRoads	L	Undetermined	Undetermined
Intersections	Western Arterial and the Activity Centre Ring Road Intersection Construction	Initial construction of intersection (unsignalised, including conduits for future signalisation)	DI_IN_03 OFB	Cardinia Shire Council	S	\$1.08	\$1.08
Intersections	Western Arterial and the Activity Centre Ring Road Intersection Upgrade	Signalisation of intersection.	DI_IN_03 UP	Cardinia Shire Council	S-M	\$0.27	\$0.27
Intersections	Western Arterial and the North-South Connector Street Boulevard Roundabout Construction	Construction of single lane roundabout.	DI_IN_04	Cardinia Shire Council	S	\$1.33	\$1.33
Intersections	Western Arterial and the North-South Connector Street Boulevard Roundabout Upgrade	Upgrade of roundabout to provide second lane.		Cardinia Shire Council / VicRoads	S	Undetermined	Undetermined
Intersections	Eastern Arterial and Activity Centre Ring Road Roundabout Construction	Construction of two lane roundabout.	DI_IN_05	Cardinia Shire Council	S	\$1.65	\$1.65
Intersections	Cardinia Road at Kaduna Park corner Roundabout Construction	Construction of two lane roundabout.	DI_IN_06	Cardinia Shire Council	S	\$1.63	\$1.63
Intersections	Cardinia Road and East-West Connector Street Roundabout Construction	Construction of single lane roundabout.	DI_IN_07	Cardinia Shire Council	M	\$1.35	\$1.35
Intersections	Cardinia Road and East-West Connector Street Roundabout Upgrade	Upgrade of roundabout to provide second lane.		VicRoads	L	Undetermined	Undetermined
Intersections	Cardinia Road and Thompsons Road Roundabout Construction	Construction of single lane roundabout.	DI_IN_08	Cardinia Shire Council	L	\$1.35	\$1.35
Intersections	Cardinia Road and Thompsons Road Roundabout Upgrade	Upgrade of roundabout to provide second lane.		VicRoads	L	Undetermined	Undetermined
Intersections	Thompsons Road Roundabout Construction (just east of Gum Scrub Creek)	Construction of single lane roundabout.	DI_IN_09	Cardinia Shire Council	L	\$1.33	\$1.33
Intersections	Thompsons Road Roundabout Upgrade (just east of Gum Scrub Creek)	Upgrade of roundabout to provide second lane.		VicRoads	L	Undetermined	Undetermined
Intersections	Thompsons Road and Eastern Arterial Roundabout Construction	Construction of single lane roundabout.	DI_IN_10	Cardinia Shire Council	L	\$1.33	\$1.33
Intersections	Thompsons Road and Eastern Arterial Roundabout Upgrade	Upgrade of roundabout to provide second lane.		VicRoads	L	Undetermined	Undetermined
Intersections	Cardinia Road Pedestrian Crossing Construction (opposite Activity Centre)	Signalised pedestrian crossing construction.	DI_IN_11	Cardinia Shire Council	S	\$0.22	\$0.22

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
Bridges & Crossings	Western Arterial Culvert Construction over Cardinia Road Open Space Corridor	Provide for four lane road crossing over Cardinia Road Open Space Corridor.	DI_RC_01	Cardinia Shire Council	S	\$0.90	\$0.90
Bridges & Crossings	Western Arterial Bridge Construction over Gum Scrub Creek	Provide for two lane road crossing over Gum Scrub Creek	DI_RC_02	Cardinia Shire Council	M	\$2.41	\$1.20
Bridges & Crossings	Thompsons Road Culvert Construction over Cardinia Road Open Space Corridor	Provide for two lane road crossing over Cardinia Road Open Space Corridor.	DI_RC_03	Cardinia Shire Council	L	\$0.59	\$0.59
Bridges & Crossings	Thompsons Road Bridge Construction over Gum Scrub Creek	Provide for two lane road crossing over Gum Scrub Creek	DI_RC_04	Cardinia Shire Council	L	\$2.41	\$1.20
Bridges & Crossings	Thompsons Road Bridge Construction over Toomuc Creek	Provide for two lane road crossing over Toomuc Creek	DI_RC_05	Cardinia Shire Council	L	\$2.41	\$2.41
Bridges & Crossings	Road Culvert construction - East-West Connector Street - Commercial & Residential over Cardinia Road Open Space Corridor (north of Lecky Road)	Road crossing over Cardinia Road Open Space Corridor (between Lecky Road and Bypass).	DI_RC_06	Cardinia Shire Council	S	\$0.61	\$0.61
PUBLIC TRANSPORT							
Bus	Local bus services	Extension of existing services or delivery of new services into the Precinct		Department of Transport	S-L	Undetermined	Undetermined
Bus	Bus stops along arterial roads	Delivery of bus stops along Western Arterial, Cardinia Road and Thompsons Road	DI_PT_01 & DI_PT_01a & DI_PT_02 & DI_PT_03 & DI_PT_04	Cardinia Shire Council	S-L	\$0.55	\$0.55
COMMUNITY							
Business & Community Centre	Kaduna Park Homestead	Construction of new community building	DI_CF_01	Cardinia Shire Council	S	\$3.95	\$3.95
OPEN SPACE & LANDSCAPING							
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Cardinia Road Open Space Corridor (Pakenham Bypass to Western Arterial)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_01	Cardinia Shire Council	S	\$0.05	\$0.05
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Cardinia Road Open Space Corridor (Western Arterial to Crown Land boundary)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_01a	Cardinia Shire Council	S	\$0.09	\$0.09
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Cardinia Road Open Space Corridor (Crown Land to southern Precinct boundary)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_01b	Cardinia Shire Council	M-L	\$0.09	\$0.09
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Gum Scrub Creek (Pakenham Bypass to south of Gas Easement)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_02	Cardinia Shire Council	S-M	\$0.11	\$0.11
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Gum Scrub Creek (north of Gas Easement to southern Precinct boundary)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_02 a	Cardinia Shire Council	S-M	\$0.05	\$0.05

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Toomuc Creek (Pakenham Bypass to Crown Land)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_03	Cardinia Shire Council	S-L	\$0.05	\$0.05
Waterway plantings	CREEK CORRIDORS / DRAINAGE LINES: Toomuc Creek (Crown Land to southern Precinct boundary)	Supplementary plantings (in addition to Melbourne Water Development Services Scheme works)	DI_OS_03a	Cardinia Shire Council	L	\$0.11	\$0.11
Passive parks	LOCAL PARK - ACTIVITY CENTRE (Integrated with Cardinia Road Open Space Corridor)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_04 & DI_LA_12	Cardinia Shire Council	S	\$0.67	\$0.67
Passive parks	LOCAL PARK - COMMERCIAL (Integrated with Cardinia Road Open Space Corridor)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_05 & DI_LA_13	Cardinia Shire Council	M	\$1.06	\$1.06
Passive parks	LOCAL PARK - INDUSTRIAL	Landscaping of park, including associated recreation spaces and furniture.	DI_OS_06	Cardinia Shire Council	M	\$0.20	\$0.20
Passive parks	LOCAL PARK - INDUSTRIAL (On Gum Scrub Creek at Thompsons Road)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_07 & DI_LA_14	Cardinia Shire Council	M	\$0.80	\$0.80
Passive parks	LOCAL PARK - INDUSTRIAL	Landscaping of park, including associated recreation spaces and furniture.	DI_OS_08	Cardinia Shire Council	L	\$0.12	\$0.12
Passive parks	LOCAL PARK - INDUSTRIAL	Landscaping of park, including associated recreation spaces and furniture.	DI_OS_09	Cardinia Shire Council	L	\$0.26	\$0.26
Passive parks	LOCAL PARK - INDUSTRIAL (On Eastern Arterial)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_10 & DI_LA_15	Cardinia Shire Council	M	\$0.85	\$0.85
Passive parks	LOCAL PARK - INDUSTRIAL (East of Eastern Arterial)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_11 & DI_LA_16	Cardinia Shire Council	M	\$0.72	\$0.72
Passive parks	NEIGHBOURHOOD PARK - RESIDENTIAL (At the intersection of Western Arterial and the North-South Connector Street Boulevard)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_12 & DI_LA_18	Cardinia Shire Council	S	\$1.08	\$1.08
Passive parks	NEIGHBOURHOOD PARK - ACTIVITY CENTRE (Kaduna Park site)	Acquisition of Kaduna Park heritage homestead and gardens, landscape works including provision of playground, furniture and enhancement of existing garden.	DI_OS_13 & DI_LA_19	Cardinia Shire Council	S	\$2.96	\$2.96
Streetscaping	STREETSCAPES: Cardinia Road (Pakenham Bypass to Western Arterial). Central Median Planting - Canopy Trees; native shrubs and grasses understorey.	Central median plantings.	DI_OS_14	Cardinia Shire Council	S	\$0.23	\$0.23
Streetscaping	STREETSCAPES: Cardinia Road (Western Arterial to end of divided road). Central Median Planting - native shrubs and grasses only.	Central median plantings.	DI_OS_14a	Cardinia Shire Council	S	\$0.34	\$0.34

Project Category	Title	Description	Project Number/s	Lead Agency	Timing: S=2010-2015, M=2016-2021, L=2022+	Indicative Costs (\$ Million in December 2008\$)	
						Total Estimated Project Cost	Total Precinct Contribution to Project
Streetscaping	STREETSCAPES: Western Arterial (Cardinia Road to west side of Cardinia Drain culverts) Central Median Planting - native shrubs and grasses only.	Central median plantings.	DI_OS_15	Cardinia Shire Council	S	\$0.15	\$0.15
Streetscaping	STREETSCAPES: Western Arterial (west of Cardinia Drain to Precinct boundary) and Eastern Arterial Central Median Planting - native shrubs and grasses only.	Central median plantings.	DI_OS_15a	Cardinia Shire Council	S	\$0.36	\$0.36
Conservation	BYPASS FRONTAGE - BIODIVERSITY CORRIDOR	Construction of frog ponds and landscaping of movement corridors.	DI_OS_16 & DI_LA_20	Cardinia Shire Council	S-M	\$2.00	\$2.00
Conservation	EASEMENT RESERVE - BIODIVERSITY CORRIDOR	Construction of frog ponds and landscaping of movement corridors.	DI_OS_17 & DI_LA_21	Cardinia Shire Council	L	\$3.62	\$3.62
Passive parks	LOCAL PARK - COMMERCIAL (Adjoining the Open Space Corridor)	Acquisition and landscaping of park, including associated recreation spaces and furniture.	DI_OS_18 & DI_LA_17	Cardinia Shire Council	L	\$0.22	\$0.22
TRAIL NETWORK							
Trails	Gum Scrub Creek Trail	Shared path along Gum Scrub Creek encumbered open space corridor	DI_TN_01	Cardinia Shire Council	S-L	\$1.00	\$1.00
Trails	Cardinia Road Open Space Corridor Trail	Shared path along Cardinia Road Open Space Corridor	DI_TN_02	Cardinia Shire Council	S-L	\$1.10	\$1.10
Trails	Toomuc Creek Trail	Shared path along Toomuc Creek encumbered open space corridor	DI_TN_03	Cardinia Shire Council	S-L	\$0.77	\$0.77
Trails	Transmission Easement Trail	Trail Network - Transmission Easement	DI_TN_04	Cardinia Shire Council	L	\$0.76	\$0.76
Trail Bridge	Cardinia Road Open Space Corridor - Bridge 1	Pedestrian Bridge between the Western Arterial and Cardinia Road	DI_TB_01	Cardinia Shire Council	S	\$0.33	\$0.33
Trail Bridge	Cardinia Road Open Space Corridor - Bridge 2	Pedestrian Bridge just east of Cardinia Road	DI_TB_02	Cardinia Shire Council	S-M	\$0.18	\$0.18
Trail Bridge	Cardinia Road Open Space Corridor - Bridge 3	Pedestrian Bridge between Thompsons Road and the Transmission Easement	DI_TB_03	Cardinia Shire Council	L	\$0.15	\$0.15
Trail Bridge	Gum Scrub Creek Bridge	Pedestrian Bridge between Thompsons Road and the southern Precinct boundary	DI_TB_04	Cardinia Shire Council	L	\$0.33	\$0.33
Trail Bridge	Toomuc Creek Bridge	Pedestrian Bridge between Thompsons Road and the southern Precinct boundary	DI_TB_05	Cardinia Shire Council	L	\$0.33	\$0.33

06 DEVELOPMENT STAGING

6.1 Development Staging

6.1.1 Objectives

The objectives for development staging are to:

- provide for orderly delivery of infrastructure;
- maintain access to properties as the road network develops; and
- create dedicated access to employment uses to minimise impacts on the amenity of residential areas.

6.1.2 Implementation

The objectives for development staging are met by implementation of all of the following:

- Plan 5: Future Urban Structure; and
- Planning and design guidelines set out in Section 6.1.3.

6.1.3 Planning and Design Guidelines

General

The following planning and design guidelines must be met:

- Staging must not create circumstances where residents or businesses are unreasonably isolated from the activity centre or the arterial road network.
- Staging should maximise opportunities for integration with adjoining developments, particularly in terms of road connections, footpaths, shared paths and bicycle routes.
- Access to each new lot is to be via sealed road.

Arterial Road Access

The access arrangements provided at intersections of local roads with the future arterial roads (Cardinia Road, Thompsons Road and Western Arterial) during the initial and interim stages of development may be restricted when any ultimate road duplication may be constructed.

Cardinia Road

Upon duplication of Cardinia Road north of Western Arterial:

- access to Lecky Road must be closed.
After alternative access routes to Cardinia Road have been constructed, Cardinia Road works must be completed to final standard. Associated works terminating Lecky Road must be carried out at this time; and
- turning movements to and from Enterprise Road will be limited to left-in, left-out.

Cardinia Road south of the future Thompsons Road alignment will ultimately be upgraded to an urban standard four-lane divided arterial road, generally in accordance with Figure 11: Section 2:

- Land for road widening is included in the Infrastructure Funding Agreement to increase with width of the existing road reserve from 22 to 40 metres.
- Construction of this section of Cardinia Road will be the responsibility of owners/developers of:
 - Lots abutting Cardinia Road south of the future Thompsons Road alignment, where subdivision will trigger the requirement for the first carriageway to be constructed to the satisfaction of the relevant road authority.
 - Development south of the PSP area, which will fund the delivery of the second carriageway.

Lecky Road

Upon duplication of Cardinia Road north of Western Arterial, alternative access to properties serviced by Lecky Road must be provided. The following infrastructure is to be delivered to the satisfaction of the relevant road authority:

- a north-south Connector Street – Commercial & Residential must be delivered from Western Arterial to Lecky Road on the eastern side of Cardinia Road Open Space Corridor, generally in accordance with Plan 14 and Figure 12: Section 4; and
- a north-south Residential Access Street – Level 1 must be delivered from Western Arterial to Lecky Road on the western side of Cardinia Road Open Space Corridor, generally in accordance with Plan 14 and Figure 14: Section 10.

Lecky Road must be sealed prior to development of abutting land. Permits for subdivision, use or buildings and works not related to pre-existing uses (whichever is first) will trigger this requirement. The road is to be delivered to the satisfaction of the relevant road authority.

Where Lecky Road is to be delivered to the standard of a Commercial Access Street – Level 2 (refer Figure 13: Section 7):

- 1.5 metres is to be provided for road widening from properties on both sides of the existing road reserve.
- If the ultimate road reserve width is not available at the time Lecky Road is constructed, then the construction of the second footpath will be the responsibility of the abutting landowner at the time of development.

Eastern Arterial

The subdivision of Lot 1, TP99673 requires the following infrastructure to be delivered to the satisfaction of the relevant road authority:

- Eastern Arterial between Cardinia Road and the roundabout must be constructed to the standard of a four-lane divided arterial road, generally in accordance with Plan 14 and Figure 11: Section 2;
- a two lane roundabout at the end of the first section of Eastern Arterial is to be constructed, generally in accordance with Plan 14;
- a north-south access street must be constructed to Enterprise Road generally in accordance with Plan 14 and Figure 12: Section 6; and
- access to Enterprise Road from Cardinia Road must be closed at this time. After alternative access routes to Cardinia Road from Enterprise Road have been constructed, Cardinia Road works must be completed, including provision of kerb and channel, nature strip, shared paths and appropriate line marking. Associated works terminating Enterprise Road must be carried out concurrently.

Enterprise Road

Enterprise Road must be sealed prior to the development of abutting land. Permits for subdivision, use or buildings and works not related to pre-existing uses (whichever is first) will trigger this requirement. The road is to be delivered to the satisfaction of the relevant road authority.

Where Enterprise Road is to be delivered to the standard of a Commercial Access Street – Level 2 (refer Figure 13: Section 7):

- 1.5 metres is to be provided for road widening from properties on both sides of the existing road reserve.
- If the ultimate road reserve width is not available at the time Enterprise Road is constructed, then the construction of the second footpath will be the responsibility of the abutting landowner at the time of development.

Where Enterprise Road is to be delivered to the standard of an Industrial Access Street – Level 2 (refer Figure 13: Section 8):

- 1.5 metres is to be provided for road widening from properties on both sides of the existing road reserve.
- The 2.5 metre shared path is to be provided along the northern edge of the road reserve, to accommodate existing services.
- If the ultimate road reserve width is not available at the time Enterprise Road is constructed, then the construction of the second path will be the responsibility of the abutting landowner at the time of development.

Commercial Access Street

The issue of permits for subdivision, use or buildings and works not related to pre-existing uses (whichever is first) on Lot 1 TP 102981, will require the following infrastructure to be delivered to the satisfaction of the relevant road authority:

- a north-south Connector Street – Commercial & Residential (refer Figure 12: Section 4) is to be delivered from Lecky Road to the northern drainage line crossing on the eastern side of Cardinia Road Open Space Corridor, generally in accordance with Plan 14.

Industrial Access Street

The issue of permits for subdivision, use or buildings and works not related to pre-existing uses (whichever is first) for properties north of Lecky Road, west of the Cardinia Road Open Space Corridor, the following infrastructure must be delivered to the satisfaction of the relevant road authority:

- the culvert crossing over Cardinia Drain, north of Lecky Road; and
- a section of Connector Street – Commercial & Residential (refer Figure 12: Section 4) to connect either side of the drainage corridor.

07 OTHER INFORMATION

7.1 Glossary

Active Open Space

Land set aside for the specific purpose of formal outdoor sports by the community.

Activity Centre

Focus for business, shopping, working and leisure, and usually community facilities. Well served by public transport and containing higher density development. Growth areas include Principal Activity Centres, Major Activity Centres, Specialised Activity Centres, Neighbourhood Activity Centres and Local Centres.

Allotment (or Lot)

A part (consisting of one or more pieces) of any land (except a road, a reserve, or common property) shown on a plan, which can be disposed of separately and includes a unit or accessory unit on a registered plan of strata subdivision and a lot or accessory lot on a registered cluster plan.

Arterial Road

A higher order road providing for moderate to high volumes at relatively high speed typically used for inter-suburban journeys and linking to freeways, and identified under the Road Management Act 2004. All arterials are managed by the State Government.

Capital Expenditure

A payment made, or to be made for one-off long term infrastructure in terms of the Precinct Infrastructure Plan or Development Contributions Plan.

Connector Street

A lower order street providing for low to moderate volumes and moderate speeds linking local streets to the arterial network. Managed by the relevant local council.

Co-location

Adjoining land uses to enable complementary programs, activities and services and shared use of resources. For example, the co-location of schools and active open space.

Commercial

Land used for office, administration and other commercial/business activities, such as finance, telecommunications and corporate headquarters.

Community Facilities see Community Infrastructure

Community Infrastructure

Public and private, State, Council and non-council facilities which accommodate community support services, programs and activities (e.g. preschool, child care, youth services, aged services, community meetings, sporting competition, arts, performing arts, informal recreation, cultural activities, health programs, education activities, emergency services, civic, community support).

Core Retail

Land used for a shop (i.e. a Supermarket) and other retail uses where a product is sold. For example a food store, bakery, clothing store, hairdresser etc.

Open Space Corridor

Mainly along river and creek valleys, the coast, disused railways lines and aqueducts, that link together to form a network and provide active transport connections in the community to key destinations and facilities.

Development Contributions Plan (DCP)

Sets out the contributions expected from each individual landowner to fund infrastructure and services. Refer to Part 3B of the Planning and Environment Act 1987.

Freeway

A high speed and high volume road with the highest level of access control and typically used for longer distance journeys across the metropolitan area and country Victoria. All freeways are managed by VicRoads.

Frontage

The road alignment at the front of a lot. If a lot abuts two or more roads, the one to which the building, or proposed building, faces.

Gross Developable Area

Total area bounded by the precinct boundary.

Growth Area

Areas on the fringe of metropolitan Melbourne designated for large-scale growth. The following municipal councils: Cardinia Shire; Casey City; Hume City; Melton Shire; Whittlesea City; Wyndham City.

Growth Area Framework Plan (GAFP)

Government document that set long-term strategic planning direction to guide the creation of a more sustainable community in the growth areas.

Growth Areas Authority (GAA)

A statutory authority established by the Victorian Government to work in partnership with councils and government agencies, and provide advice to government on the coordination of land development, infrastructure and service provision in the growth areas.

Housing Density (Gross)

Housing yield divided by gross developable area.

Housing Density (Net)

Housing yield divided by net developable area.

Housing yield

Number of dwellings.

Industrial

Land used for heavy industry, manufacturing, engineering works, warehousing, distribution and supporting industry.

Integration

Either shared use or co-location.

Joint Use see Shared Use

Local Arterial Road

Similar to an arterial road, but generally more modest in terms of speed and volume. Supplements the declared arterial network and managed by the relevant local council.

Major Activity Centre (MAC)

Defined in Melbourne 2030, page 48.

Native Vegetation

Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses.

Native Vegetation Precinct Plan (NVPP)

Sets out requirements for the protection and removal of native vegetation for a defined area or precinct.

Neighbourhood Activity Centre (NAC)

Defined in Melbourne 2030, page 49. In growth areas, retail element to be anchored by a 2,500m² supermarket, with a broad range of supporting retail goods and services.

Net Developable Area (NDA)

Area of precinct available for development for housing or employment. Includes lots, local and connector streets. Excludes schools, open space, conservation areas, drainage, arterial and sub-arterial roads.

Office

Refer to the Land Use Terms at Clause 74 of the Cardinia Planning Scheme.

Operational Expenditure

An ongoing cost for infrastructure in terms of the Precinct Structure Plan or Development Contributions Plan (PSP Guidelines, 2008, Section 8).

Passive Open Space

Parks, gardens, linear corridors, conservation bushlands and reserves that are made available for passive recreation, play and relatively low levels of physical activity including walking, cycling, hiking, revitalisation, contemplation and enjoying nature.

Peripheral Commercial

Land used for non-retail uses such as restaurants, cafes, hairdressers, and medical centres.

Precinct Infrastructure Plan (PIP)

Summarises how infrastructure and services necessary for the precinct will be delivered.

Precinct Structure Plan (PSP)

A statutory document that describes how a precinct or series of sites within a growth area will be developed over time. A PSP sets out the broad environmental, social and economic parameters for the use and development of land within the precinct.

Principal Activity Centre (PAC)

Defined in Melbourne 2030, page 47.

Principal Public Transport Network (PPTN)

A high-quality public transport network that connects Principal and Major Activity Centres, and comprises the existing radial fixed-rail network, extensions to this radial network and new cross-town bus routes.

Public Open Space

Land set aside in a plan or land in a plan zoned or reserved under a planning scheme for public recreation or public resort; or as parklands; or for similar purposes. Incorporates active and passive open space.

Public Transport Interchange

Places where people can access or change between multiple public transport routes, for example, between train and bus or a multi-route bus station at a major activity centre.

Road

Includes highway, street, lane, footway, square, court, alley or right of way, whether a thoroughfare or not and whether accessible to the public generally or not.

Service Business

Land used for combined office/warehouse (sales/admin/warehouse/ distribution) and outlets servicing local needs including trade supplies, equipment hire, motor repairs, motor vehicle sales, boat or caravan sales.

Shared Use

When schools, councils and community organisations come together to plan, build and in some cases jointly manage a single facility to be used by multiple service providers, e.g. the concept of using a school as a community facility is about enabling the school to provide for wider community utilisation.

Social Infrastructure

Community Infrastructure and public open space.

Specialised Activity Centre

Defined in Melbourne 2030, page 49.

Urban Growth Boundary (UGB)

A management tool to contain urban areas and limit their expansion. It divides land that is urban – to be used for housing, shops, factories – from land that is non-urban and to be used for purposes such as conservation, agriculture, mineral extraction, airports and the like.

Urban Growth Zone (UGZ)

Applies to land identified for future urban development to manage transition of non-urban land into urban land; to encourage development of well-planned and well-serviced new urban communities in accordance with an overall plan; to reduce the number of development approvals needed in areas where an agreed plan is in place; and to safeguard non-urban land from use and development that could prejudice its future urban development.

Water Sensitive Urban Design (WSUD)

Aims to provide water-quality treatment as well as flood management and to reduce the pollution carried to our waterways. Key principles include minimising water resistant areas; recharging natural groundwater aquifers (where appropriate) by increasing the amount of rain absorbed into the ground; encouraging onsite reuse of rain; encouraging onsite treatment to improve water quality and remove pollution; using temporary rainfall storage (retarding basins/wetlands) to reduce the load on drains.

7.2 Acronyms

ABS	Australian Bureau of Statistics
AMP	Access Management Policy (VicRoads)
CAD	Central Activity District
CHMP	Cultural Heritage Management Plan
CIL	Community Infrastructure Levy
CBD	Central Business District
CREP	Cardinia Road Employment Precinct
DEECD	Department of Education and Early Childhood Development
DIL	Development Infrastructure Levy
DPCD	Department of Planning and Community Development
DoT	Department of Transport
DSE	Department of Sustainability and Environment
EPBC	Environmental Protection and Biodiversity Control Act 1999
EVC	Ecological Vegetation Class
FTE	Full Time Equivalent
GAA	Growth Areas Authority
GDA	Gross Developable Area
GLA	Gross Leasable Area
GWZ	Green Wedge Zone
HO	Heritage Overlay
MAC	Major Activity Centre
MSS	Municipal Strategic Statement
NAC	Neighbourhood Activity Centre

NDA	Net Developable Area
NVPP	Native Vegetation Precinct Plan
MOTC	Meeting our Transport Challenges
OMR	Outer Metropolitan Ring
OS	Outer Separator
PAC	Principal Activity Centre
PIP	Precinct Infrastructure Plan
PPTN	Principle Public Transport Network
SLA	Statistical Local Area
TOD	Transit Oriented Development
UGB	Urban Growth Boundary
UGZ	Urban Growth Zone
VPD	Vehicles per Day
WSUD	Water Sensitive Urban Design

7.3 Supporting Documents

Agreement under Section 173 of the Planning and Environment Act 1987, Cardinia Road Employment Precinct, Development Contributions, September 2010, Maddocks Lawyers

Biodiversity Management Plan, Cardinia Road Employment Precinct, Officer, Victoria July 2008, Ecology Partners Pty Ltd

Cardinia Employment Corridor Groundwater and Salinity Investigation, 15 February 2008, Sinclair Knight Merz

Cardinia Employment Lands, Stage 2 Assessment, December 2007, MacroPlan Australia Pty Ltd

Cardinia Road Employment Precinct, Stage 1 Opportunities and Constraints Paper, 19 December 2007, MacroPlan Australia Pty Ltd

Cardinia Road Employment Precinct, Service and Utility Infrastructure Engineering Report, 27 November 2007, WBCM Pty Ltd

Cardinia Employment Precinct Stormwater Management Plan (Revision A), September 2008, Stormy Water Solutions

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Cardinia Road Employment Precinct Net Gain Strategy, August 2010, Ecology Partners Pty Ltd

Cardinia Road Employment Precinct Cultural Heritage Opportunities and Constraints, November 2007, Tardis Enterprises Pty Ltd

Cardinia Road Employment Precinct Traffic & Transport Review, November 2007, John Piper Traffic Pty Ltd

Cardinia Employment Precinct, Water Management Plan Strategic Options, Issues and Constraints, 28 November 2007, Stormy Water Solutions

Cardinia Road Employment Precinct, Precinct Infrastructure Costs Report, 26 May 2009, MacroPlan Australia Pty Ltd

Cardinia Road Employment Precinct Strategic Review of Road Infrastructure, 11 November 2008, MacroPlan Australia Pty Ltd

Cardinia Road Employment Precinct, Development Contributions Plan, Infrastructure Costs for Road, Trail and Public Transport, August 2010, CPG Australia Pty Ltd

Cardinia Road Employment Precinct, Costs of Land Acquisition and Community Facilities, Cardinia Shire Council, August 2010

Cardinia Road Employment Precinct, Development Infrastructure, Parks, Open Space, Streetscape, Draft Costings, May 2009, Land Design Partnership Pty Ltd

Cardinia Road Employment PSP Local Access Delivery Plan, August 2008, MacroPlan Australia Pty Ltd

Cardinia Shire Regional Employment Strategy, October 2008, MacroPlan Australia

Flora and Fauna Assessment of the Cardinia Employment Corridor (West), Officer, Victoria, February 2008, Ecology Partners Pty Ltd

Future Traffic Estimates, August 2009, CPG Australia Pty Ltd

Growling Grass Frog *Litoria raniformis* Conservation Management Plan for Cardinia Road Employment Precinct, Cardinia Road, Officer, Victoria, September 2010, Ecology Partners Pty Ltd

Investigation of Possible Wetland / Drainage Configurations to address Gas Main Implications, Cardinia Industrial Development Services Scheme, Stormy Water Solutions, 13 May 2009

Sustainable Design Guidelines for Cardinia Road Employment Precinct, August 2008, Ark Resources

Targeted Growling Grass Frog *Litoria raniformis* Survey within Cardinia Road Employment Precinct, Pakenham, Victoria, March 2009, Ecology Partners Pty Ltd

APPENDIX A: INDUSTRIAL USE BUFFER DISTANCES

LEGEND

- Precinct Structure Plan Area
- Urban Growth Boundary
- 100m Buffer distance from Residential and Activity Centre

Movement Network

- State Freeway
- Arterial Road
- Connector Street
- Access Street
- Controlled Intersections

Land Use within PSP

- Activity Centre
- Residential
- Employment

Open Space and Environment

- Unencumbered Open Space
- Encumbered open Space
- Existing Creeks
- Drainage Lines

Other Land

- Existing Major Easements
- Future Urban Land
- Existing Urban Land

