

CARDINIA ROAD PRECINCT STRUCTURE PLAN

September 2008

Development is much more than just the subdivision of land



It is about the development of new neighbourhoods and communities where people will live and interact



Cardinia Road Precinct Structure Plan

- Draft endorsed by Council 16 July 2007
- Revision 1.1 - November 2007 (minor editorial changes - exhibited version)
- Revision 1.2 July 2008 (Response to Referral for Advice from the Minister for Planning in relation to Cardinia Road Precinct Structure Plan and Development Contributions Plan (Amendment C92), Shire of Cardinia. Advice of the Priority Development Panel Reference PDP07-29, dated June 2008 - Appendix 4)
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01 INTRODUCTION

1.1 Role of the Precinct Structure Plan

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

A precinct structure plan (PSP) is a key document that:

- enables the transition of non-urban land to urban land;
- sets out 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;
- details the form and conditions that must be met by future land use and development;
- determines the use and development controls that will apply in the schedule to the zone; and,
- determines what permits may be granted under the zone¹.

The CRPSP is a long-term strategic plan that describes how the Cardinia Road Precinct will be developed. It is designed to:

- ensure that the key strategic planning issues in a precinct are considered when planning ahead for urban development;
- identify and address any opportunities and constraints that will affect future urban development;
- ensure communities in new urban areas have good access to services, transport, jobs, shops, open space and recreation facilities;
- give developers, investors and local communities greater certainty and confidence about future development in growth areas; and,
- provide the framework, conditions and requirements for the consideration of planning permits.

The precinct structure plan sets out objectives and development principles for 11 themes in relation to:

- land use (such as residential of varying densities, industrial, core business and peripheral commercial, open space, heritage, education facilities and community infrastructure);
- transport (such as the primary arterial and local arterial road network, collector roads & public transport);
- activity centres and employment areas; and,
- open space both unencumbered (passive & active) and encumbered (waterways, biodiversity areas and environmental sensitive areas).

Further Reference Material

Detailed baseline and other technical information documenting the preparation of this Precinct Structure Plan is listed in Section 5.2 - Supporting Information.

¹ Urban Growth Zone, VPP Practice Note, June 2008, p 1

1.2 How to use this Precinct Structure Plan

The Urban Growth Zone (UGZ) requires a precinct structure plan to be incorporated in the planning scheme before urban development can start.

Once a precinct structure plan applies to the land, Clauses 37.07-9 to 37.07-16 of the Urban Growth Zone apply. They are designed to:

- provide certainty about the nature of future development;
- reduce the number of development approvals needed once a precinct structure plan applies;
- remove notice requirements and third party review rights from planning permit applications; and,
- ensure that permits granted for urban development generally conform to the plan².

1.2.1 Document approval and revision

This precinct structure plan was approved by the Minister for Planning on (date to be inserted).

1.2.2 Monitoring and review

The Growth Areas Authority and the Cardinia Shire will jointly monitor the implementation of this precinct structure plan.

The effectiveness of the CRPSP will be evaluated regularly, at least every five years.

It is expected that this CRPSP will be revised and updated from time to time as required.

² Urban Growth Zone, VPP Practice Note, June 2008, p 6

1.3 Area to which the Precinct Structure Plan applies

The Cardinia Road Precinct comprises approximately 1051 hectares³ of land within the Urban Growth Boundary (UGB) and is defined by:

- The major electricity transmission line easement to the north.
- Toomuc Creek to the east.
- The Pakenham Bypass to the south.
- Gum Scrub Creek to the west.

The land affected by the Cardinia Road Precinct is shown in Plan 1.

The northern (north of Princes Highway) and southern (south of Princes Highway) sections of the Cardinia Road Precinct have quite distinct features and characteristics.

3 The 1051 ha excludes an existing industrial area of 39.8 ha which is located north of Princes highway adjacent to Toomuc Creek. This industrial area has also been excluded from the Total Area calculations used in the land use budget in Section 2 and the DCP calculations.

Plan 1: Cardinia Road Precinct Structure Plan Area



1.4 Metropolitan and Regional context

1.4.1 Growth Area Framework Plan

The Casey-Cardinia Growth Area includes land within the City of Casey and the Shire of Cardinia.

The Cardinia Road Precinct is a significant land area located central to Cardinia's portion of the Casey-Cardinia Growth Area.

The Growth Area Framework Plan (DSE) 2006 predicts that the Casey-Cardinia growth area is expected to:

- Grow by 135,000 – 170,000 people; and,
- Provide for employment in local businesses and industries to grow to between 100,000 and 140,000 jobs⁴.

Regional components of the Growth Area Framework Plan of particular importance to the Cardinia Road Precinct are:

- The site falls within an area identified as a 'strategic development area' (which requires further examination in relation to salinity, groundwater and environmental values).

- 3 major components of the Strategic Road Network:
 - Princes Highway (Arterial Road) runs east – west through the centre of the Precinct and is a Principal Public Transport Network (PPTN) for a Bus Route.
 - Pakenham Bypass (Freeway) is the southern boundary of the Precinct.
 - Cardinia Road (Arterial Road) runs north – south through the centre of the southern section of the Precinct and is a strategically important link between the Pakenham Bypass and Princes Highway.
- Major components of the Principal Public Transport Network (PPTN) include:
 - A railway line that runs through the southern section of the precinct with a 'committed' station.
 - A PPTN Bus Route along Princes Highway.
- A significant Regional Open Space area is identified at Toomuc Recreation Reserve.
- Significant waterways are identified at the eastern and western boundary of the precinct (Toomuc and Gum Scrub Creeks).
- Two large Neighbourhood Activity Centres (NACs). These sites are located at Lakeside Boulevard / Toomuc Reserve, and Cardinia Road (immediately south of the railway line).

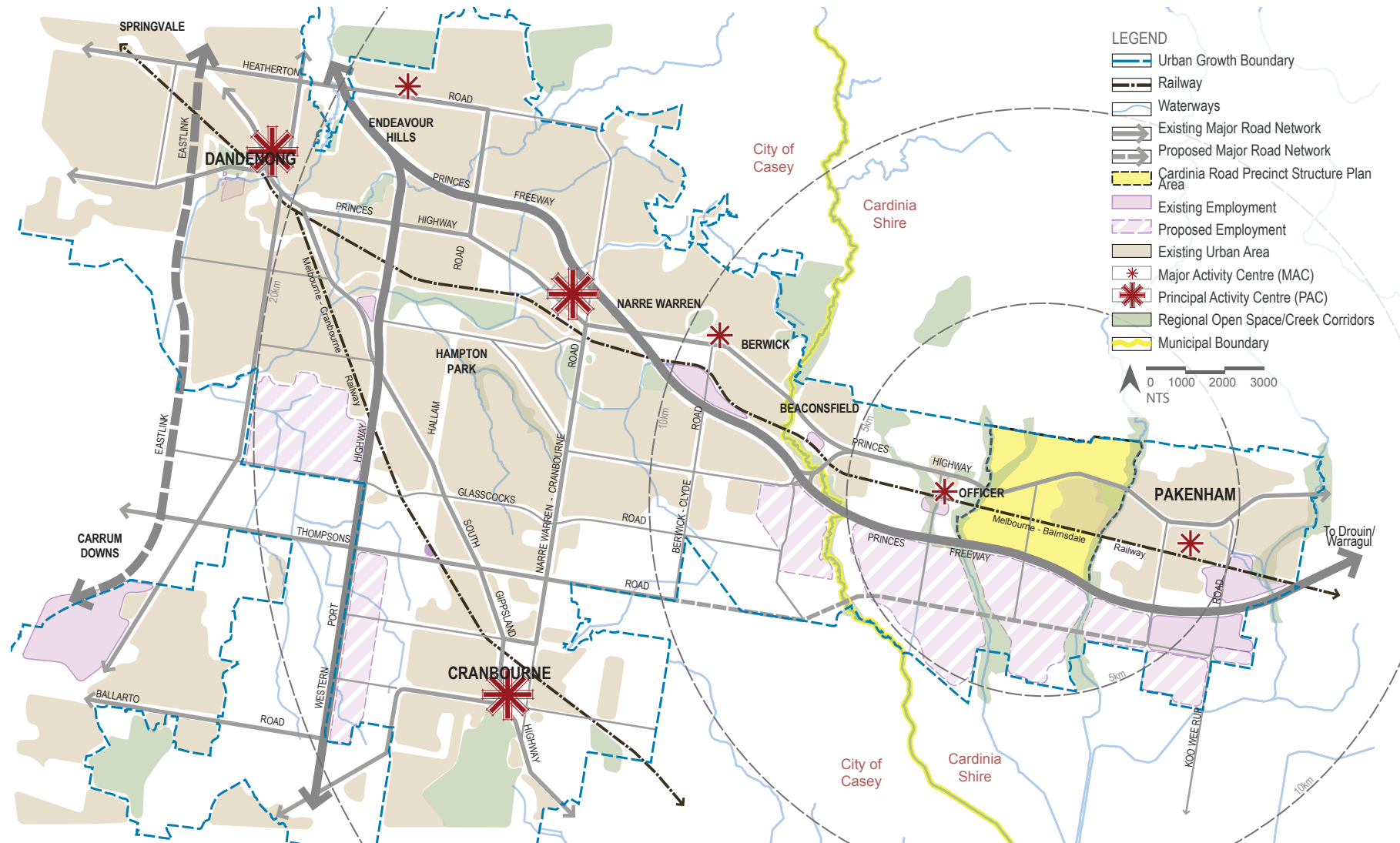
The following regional components outside of the CRPSP area can ultimately be accessed via the PPTN bus route or rail line, or along the strategic road network:

- A Principal Activity Centres (PAC) west of the precinct at Fountain Gate (within the City of Casey).
- 2 Major Activity Centres (MACs), one at Pakenham, and another proposed MAC at Officer.
- Existing employment areas at Pakenham.
- Proposed employment areas south of the proposed Freeway (Pakenham Bypass).
- A proposed Mixed Use Employment node at Berwick (within the City of Casey).

Plan 2 depicts the metropolitan and regional context of the Cardinia Road Precinct.

⁴ Growth Area Framework Plans, DSE, 2006. p7

Plan 2: Metropolitan and Regional Context Plan



1.5 Local context

Plan 3 depicts the local context of Cardinia Road Precinct.

1.5.1 Lot size and ownership pattern

The precinct is predominately made up of land currently being used for rural/farming purposes. Around 20% of the PSP area is developed as part of the Delfin Lakeside Estate (located south of the Princes Highway).

Excluding the Delfin Lakeside Estate approximately:

- 19% of the properties are less than 2 ha;
- 33% of properties are within a 2 to 8 ha lot range;
- 48% of the lots are greater than 8 ha (and of this large lot range close to 50% of the lots are greater than 20 ha); and,
- around 70% of the PSP area is within in the ownership of developers such as Delfin Lend Lease, AV Jennings, Metricon, Babcock and Brown and VicUrban.

1.5.2 Surrounding land use and pattern

The northern boundary of the Cardinia Road Precinct is defined by the Urban Growth Boundary (UGB). The Cardinia Road Precinct is located along the southern fringe of the foothills to the Dandenong Ranges.

Recommendations in Melbourne 2030 Final Report: Casey-Cardinia Committee for Smart Growth, June 2005 make specific reference to recognising and protecting:

- visual amenity and view lines to the significant green ridges;
- the visual backdrop to the southern foothills of the Dandenong Ranges; and,
- the significant hilltops⁵.

Melbourne 2030 Final Report: Casey-Cardinia Committee for Smart Growth, June 2005 designates land south of the proposed Pakenham Freeway (Pakenham Bypass) as 'Possible Long Term Employment'.

This land has been reserved for employment land in the long term, as development in the South Dandenong area fills available space⁶.

Land east of the Toomuc Creek predominately comprises of an established urban environment.

Land west of the precinct is located within the 'Officer Precinct' which is identified for future urban development and is subject to a separate Precinct Structure Plan process.

1.5.3 Facilities and services in and within the proximity of the precinct

Road Network

- Princes Highway is an arterial road which runs east – west through the centre of the PSP area. The Princes Highway is designated as a Principal Public Transport Network (PPTN) route.
- The Pakenham Bypass runs south of the existing Princes Highway route and provides full freeway conditions with two lanes each way between Beaconsfield and Nar Nar Goon. An interchange is located at Cardinia Road.
- Cardinia Road is an arterial road that is planned to be a key transit route which runs north-south through the centre of the Cardinia Road Precinct, linking Princes Highway to the Pakenham Bypass.

⁵ Melbourne 2030 Final Report: Casey-Cardinia Committee for Smart Growth, June 2005, p 37

⁶ Melbourne 2030 Final Report: Casey-Cardinia Committee for Smart Growth, June 2005, p 95

Public Transport

- Within the Cardinia Road Precinct, the Principal Public Transport Network (PPTN) includes the Princes Highway and the Gippsland Railway line / 'Pakenham' railway line.
- An inter-regional bus service currently serves the Princes Highway. The PPTN is supplemented by a local bus services that provides connections to and within Delfin Lakeside Estate to Pakenham Town Centre / railway station and Fountain Gate Shopping Centre.
- The Cardinia Road Precinct is traversed by the Gippsland Railway line which provides suburban rail services and V-line services along the Pakenham railway line. Currently the nearest existing train station is located at Officer to the west of the PSP, with the Pakenham railway station located to the east of the PSP.
- A new station is proposed in the Cardinia Road Precinct immediately east of Cardinia Road. The Victorian Government's transport blueprint Meeting Our Transport Challenges⁷ commits to the delivery of the station commencing in 2012.

Activity Centres

- A Neighbourhood Activity Centre is located within the Delfin Lakeside Estate and is already partially developed. The activity centre contains a supermarket, petrol station, restaurants and speciality shops. A major complex containing a police station, the Country Fire Authority and State Emergency Services is also located within proximity to this activity centre.
- Residents in the Cardinia Road Precinct will have access to higher order centres within Cardinia Shire, such as the Major Activity Centres at the Pakenham Town Centre (to the east of the PSP) and the future Officer Town Centre (to the west of the PSP).
- Centres located within the neighbouring municipality of the City of Casey include the Major Activity Centre in Berwick, and the Principal Activity Centres at Fountain Gate / Narre Warren.

Social and Community Infrastructure

- The following facilities/services are located within the Delfin Lakeside Estate:
 - A Community Centre which is a Council operated facility (a double unit kindergarten, maternal and child health centre, plus other community programs).
 - A private primary / secondary school (anticipated intake of a total of 1,000 students by 2011);
 - the Cardinia Cultural Centre; and,
 - a new state primary school is proposed to be opened in 2009.

Parkland and Open Space

Within the Cardinia Road Precinct, there are a number of existing areas of open space including:

- Toomuc Reserve which is a regional / district sports reserve including an indoor sports and aquatic centre, 2 ovals, an athletics track, and 2 baseball diamonds.
- Lake Reserve (Delfin Lakeside Estate) which is a 8 ha district park with a 6.5 ha lake including a short rowing course, surrounding passive recreation areas and a pathway constructed around the lake.
- Toomuc Creek which is a linear park along the creek with significant areas of revegetation undertaken through community involvement.
- A number of local parks have been established in the Delfin Lakeside Estate with open grassed areas, landscaping and playground facilities.

⁷ Meeting Our Transport Challenges: Connecting Victorian Communities, Victorian Government, May 2006.

Physical and service infrastructure

Water services

- South East Water is responsible for the provision of reticulated water services within the Cardinia Road Precinct.

Sewerage

- South East Water is responsible for the provision of reticulated sewerage services within the Cardinia Road Precinct.
- The Precinct will be serviced by three trunk sewers which service different catchments:
 - Toomuc Creek Branch Sewer;
 - Cardinia Road Branch Sewer; and,
 - Gum Scrub Creek Branch Sewer.

Drainage

- Melbourne Water is responsible for the provision of the main drainage network.
- Cardinia Shire Council is responsible for the provision of the local drainage network.
- Melbourne Water has prepared three drainage schemes which cover the Cardinia Road Precinct and that set out the infrastructure requirements for the main drainage network as follows:
 - Pakenham West Drainage Scheme;
 - Cardinia Road Drainage Scheme; and,
 - Officer Drainage Scheme.

- The drainage schemes set out the infrastructure required for the safe passage of stormwater to avoid damage to property from flooding and measures to manage the quantity and quality of stormwater discharged downstream in order to minimise impacts on the downstream environment.

Electricity

- SPI AusNet is responsible for the provision of the electricity supply system to service development in the Cardinia Road Precinct.
- The existing electricity supply system can be extended to accommodate the proposed development.

Gas

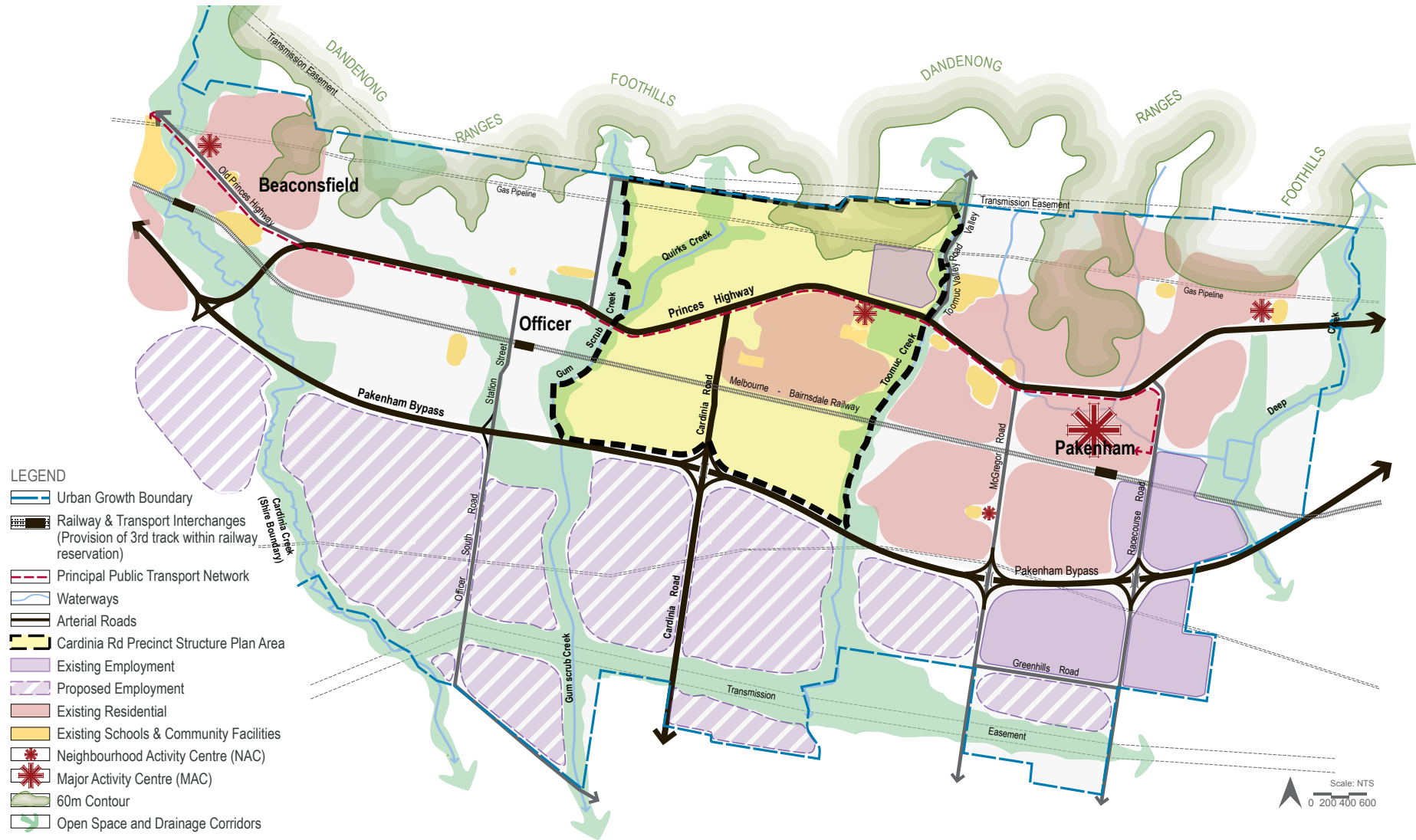
- Origin Energy is responsible for the provision of the gas supply network to service development in the Cardinia Road Precinct.
- The existing gas supply network can be extended to accommodate the proposed development.
- The Longford to Dandenong gas transmission pipeline passes through the northern part of the Cardinia Road Precinct in a 24 metre wide easement.
- GasNet is responsible for the operation and management of the pipeline. Restrictions exist in relation to building structures and undertaking works within the easement.

Telecommunications

Telstra is the principal authority responsible for the provision of telecommunications services for the Cardinia Road Precinct.

Plan 3 depicts the local context of the Cardinia Road Precinct.

Plan 3: Local Context Plan



1.6 Site Features

Plan 4 shows the key site features of the Cardinia Road Precinct.

1.6.1 Topography, landscape and landform

The land to the north of the Princes Highway is known as 'Foothill Ranges' and is characterised by undulating topography with significant east-west ridgelines. The ridgelines define the south-western extent of the Eastern Victorian Uplands, the southern formation of the Great Dividing Range. There are also a number of hilltops associated with this Upland formation.

Land on the ridgelines and hilltops, north of Princes Highway (particularly above the 60 metre contour), are a 'visually prominent landscape element' within the region. This area is the general elevation at which the 'flatlands' rise noticeably to form the ridges and these 'high points' are very visible from many locations within the PSP. The ridgelines and hilltops provide a distinct and familiar point of reference in the landscape.

The land to the south of the Princes Highway is generally flat with few landscape features.

Lines of vegetation along creeks, roads and paddock boundaries provide a sense of local visual containment. The Toomuc and Gum Scrub Creek corridors provide the opportunity to define a strong landscape character and sense of place for the precinct.

Some stands of remnant vegetation both within the precinct and on the hills to the north provide a significant contribution to the visual character and quality of the area.

1.6.2 Biodiversity

Flora

The broad vegetation types existing prior to European settlement in the precinct is as follows:

- Grassy Forest (generally on the higher land north of the Princes Highway);
- Damp Heathy Woodland (generally along Thewlis Road and Cardinia Road corridors);
- Plains Grassy Woodland (generally in the southern part and eastern part of the precinct around the Purton Road industrial area and Toomuc Reserve);
- Swampy Riparian Complex (generally south of Princes Highway and along Gum Scrub Creek corridor); and,
- Swampy Riparian Woodland (along Toomuc Creek Corridor).

Land in the Cardinia Road Precinct has largely been cleared of indigenous vegetation as part of the previous use of the land for grazing purposes.

Very little remnant native vegetation remains, although small patches of remnant vegetation occur primarily along roadsides, railways, Toomuc Creek, Gum Scrub Creek, at the corner of Thewlis and Peck Roads, and north of Mulcahy Road.

Of the broad vegetation types identified in Victoria's Native Vegetation Management Framework, only isolated remnants exist in the following locations:

- Grassy Forest-north of Mulcahy Road to the east of Thewlis Road;
- Grassy Forest and Damp Heathy Woodland-the south west corner of Thewlis Road and Peck Road;
- Swampy Riparian Woodland and Swampy Woodland-along the Toomuc Creek (generally north of the railway line); and,
- Swamp Scrub – patches located along the Gum Scrub Creek.

Fauna

The overall value of most habitats within the study area for fauna is low as the study area had been highly modified and dominated by exotic pasture grasses of low ecological value.

Remnant vegetation, roadside vegetation and planted vegetation provides habitat for many species (primarily birds). Roadside vegetation in the study area also provides linkages to larger areas of woodland and forest to the north of the study area. Overall, a small number of common and introduced birds are likely to use habitats within the study area, while ground dwelling fauna are expected to be depleted.

No fauna species of national or state significance were recorded within the study area, however one nationally threatened fauna species (Growling Grass Frog) is known to reside in the study area.

The nationally endangered Growling Grass Frog (GGF) has been recorded south of the Princes Highway.

Ecological advice prepared as part of the development of the CRPSP confirmed that it is important that as many occupied and adjacent unoccupied waterbodies are conserved as possible to assist in GGF conservation.

In relation to the CRPSP area:

- Likely frog movement corridors are located south of the railway line reservation and within Gum Scrub Creek.
- Habitat protection/connectivity and investigation areas for habitat creation/augmentation are located within the proposed Melbourne Water stormwater treatment wetland, Gum Scrub Creek and Toomuc Creek⁸.

In addition to this, a small localised cluster of occupied sites, including breeding sites is located within the constructed wetlands of the Delfin housing estate. This small cluster represents an area of high conservation significance due to the large population size. However, the report identifies that the future viability of some of these sites is uncertain, given the lack of movement corridors to occupied sites to the south.

A focus of development in the Cardinia Road Precinct is on the restoration of habitat, particularly along the Toomuc and Gum Scrub Creek corridors and within the stormwater treatment wetlands.

1.6.3 Groundwater / salinity

Land within the urban growth area has high salinity risk based on groundwater depths of 0m – 2.0m and 2.0m – 5.0m.

The high groundwater table is partly caused by the loss of vegetation in the foothills area to the north, particularly geology of Silurian Sedimentary origin.

Sinclair Knight Merz (SKM) undertook a comprehensive review of the available hydrogeological technical documents.

A review of the SKM work⁹ was undertaken by Coomes Consulting Group, in consultation with SKM. The Coomes Report concluded that design and construction techniques are available to address and manage watertable issues to ensure that urban development is not impacted by existing watertable constraints.

1.6.4 Waterways

The Cardinia Road Precinct is within the catchment of Western Port.

Western Port is recognised as a site of international importance in terms of its wetlands and as a site for migratory shorebirds. The wellbeing of this ecosystem is directly related to the health of its catchment.

A major threat to the Western Port environment including seagrass beds is the deposition of sediment and pollutants from upstream catchments.

The two major waterways within the precinct are the Toomuc Creek and Gum Scrub Creek.

These waterways have been substantially altered from their natural state and the index of stream conditions show a high proportion of the waterways in the Westernport catchment as being in a poor or degraded condition. The management of the quantity and quality of water discharged from the Precinct (and the Growth Area as a whole) is critical to protecting the environment of the Western Port, and in controlling erosion.

⁸ Targeted Survey and Conservation Management Plan for the Growling Grass Frog *Litoria raniformis*: Pakenham Urban Growth Corridor, Pakenham, Victoria, Ecology Partners Pty. Ltd., September 2006, Figure 3a

⁹ The review was restricted to the areas indicated as most severely affected in the Growth Area.

1.6.5 Heritage

Aboriginal Cultural Heritage

Recent archaeological studies within the Shire of Cardinia have revealed evidence of the use of the region by indigenous people. It is apparent that remains of indigenous campsites are likely to occur across the entire Koo Wee Rup floodplain.

Indigenous archaeological sites are associated not only with existing stream channels, but with landform elements such as prior stream channels, levees, sandy alluvium and hills on and to the north of the Koo Wee Rup Plain.

The Aboriginal heritage study for the urban growth corridor, has suggested that:

- intact and deeply buried indigenous archaeological sites, are more likely to survive in sand and sandy alluvium on the Koo Wee Rup Plain and on the floodplains of the upper reaches of Cardinia, Toomuc, Deep and Ararat Creeks and the Bunyip River; and,
- on the shallow alluvial and clay soils, essentially eroded surfaces, which have formed on the Silurian bedrock of the hills in the north of the Urban Growth Corridor, indigenous archaeological sites are more likely to be found within 200mm-300mm from the surface.

In this context, they are more likely to have been disturbed by land use since European settlement and land clearance.

Indigenous archaeological sites are most likely to be located by conducting heritage assessments using a combination of surface archaeological surveys and sub-surface testing.

European Heritage

No sites of European heritage significance are located within the Cardinia Road Precinct Structure Plan area.

However, the Pakenham Cemetery (Thewlis Road) has been identified as requiring further research as to whether a citation should be made.

Plan 4: Site Features Plan



LEGEND

- Structure Plan Area
- Existing Creeks
- Drainage Lines
- Lakes/Waterbodies
- Areas of Elevation & Significant Slope
- Hill Tops
- Land above the 60m Contour
- 5m Contours
- Existing Long Views
- Existing Short Views
- Hill Tops
- Land Subject to Inundation (LSIO)
- Floodway Overlay (FO)
- Slope greater than 20%
- Existing Major Easements
- Existing Vegetation (approx. location)

02 PRECINCT STRUCTURE PLAN

Development is much more than just the subdivision of land. It is about the development of new neighbourhoods and communities where people will live and interact.

2.1 Vision

The vision for the Cardinia Road Precinct is to create a new community that is structured to:

- **Reduce greenhouse gas emissions and promote a healthy, active way of life** by reducing car dependency by taking full advantage of the proposed Cardinia Road rail station, with well designed higher density housing, activity centres, and subdivision design to maximise walking and cycling to the station. This will also be achieved by planning for local employment and supporting activity centres along the SmartBus serviced Princes Highway corridor supported by local bus services.
- **Develop a broad social-economic mix** through provision of a range of housing and lifestyle opportunities from higher density housing near the services and amenity of the station, activity centres and landscape responsive open space and lower densities around the northern ridges.
- **Create good transport and community links to surrounding precincts** in the west, east and south, both in terms of road and trail links, and in terms of planning for access to a hierarchy of retailing, employment, open space, community and education facilities.
- **Create well designed development that embraces sustainable urban development practices** such as treed roads and streets, well designed higher density housing and activity centres and provision of recycled water to each home and business.
- **Provide positive environmental outcomes through the provision of a range of open space opportunities**, including natural open space for the conservation of environmental features such as remnant vegetation, prominent hill tops and open corridors along the Toomuc Creek and Gum Scrub Creek for stormwater management, habitat restoration, passive recreation and as a landscape feature.

2.2 New Community Structure

The Cardinia Road Precinct Structure Plan is provided in Plan 5.

The components of the Cardinia Road Precinct Structure are as follows:

- **A range in housing densities** that will lead to the creation of a variety of housing types across various levels of affordability, catering for people in different stages of their lives.

Housing densities will be **responsive** to the character of the natural environment and site characteristics.

Medium density housing will be provided in **strategic locations** within close proximity to activity centres, public transport and 'higher' amenity areas, such as open space.

- **Neighbourhood Activity Centres** and / or **Neighbourhood Convenience Centres** within walking or cycling distance of each dwelling, and/or located along a legible and safe road network.

The **Activity Centres will be a community focus**, which includes a cluster of community facilities such as community buildings, open space and education purposes.

- **A clear road hierarchy and layout** that includes a local arterial road network that provides a strong and attractive urban environment through landscaping.

- A **grade separated crossing** of Cardinia Road and the railway line is a significant element of the road network to allow safe and efficient north / south bound traffic movement to / from the Pakenham Bypass.
- Direct and accessible **bus routes** will be within 400m of 95% of homes via a PPTN network (Princes Highway) and / or the main / local road network.
- A **train station** located on the Gippsland Railway Line that is an integral part of the adjoining Neighbourhood Activity Centre.
- **Safe walking and cycling paths** are provided via the road network and the open space trail network, which includes pedestrian bridges over the creek network and pedestrian underpasses of the rail network (to be funded by the Development Contributions Plan).
- A **number of open space areas** are provided ranging from local open space, passive open space (conservation/restoration areas and linear open space) and active open space (district sport reserves) to cater for the variety of interest and ages within the community.
- The **protection and enhancement of habitat** of the Growling Grass Frog via the drainage network.
- The **protection of the visually prominent landscape** element north of the Princes Highway by encompassing the land within public open space and limiting the type / density of development.

Plan 5: Precinct Structure Plan



LEGEND

- | | | | |
|--|-----------------------------------------------------------------------------------------------|--|---------------------------------------|
| | Structure Plan Area | | Public open space (unencumbered) |
| | Primary Arterial Road (VicRoads) | | Public open space (encumbered) |
| | Local Arterial Road (divided) | | District sports reserves (8ha+) |
| | Local Arterial Road (undivided) | | District Parks |
| | Collector Road | | Existing pedestrian crossings |
| | Local Streets | | Proposed pedestrian crossings |
| | Signalised intersections | | Existing creeks |
| | Other traffic control devices | | Drainage Lines |
| | Cardinia Road under rail | | Lakes/waterbodies |
| | Railway Line, Proposed Station and Car Parking | | Ecological Vegetation Classes (EVC's) |
| | PPTN - Principal Public Transport Network | | Areas requiring sensitive design |
| | Residential Land | | Ridgelines |
| | Low density residential land (1000 - 2000sqm lots) | | 60m contour (landscape significance) |
| | Industrial land | | Potential future road link |
| | Core Business | | Existing Major Easements |
| | Large Neighbourhood Activity Centre (NAC) | | |
| | Small Neighbourhood Activity Centre (NAC) | | |
| | Neighbourhood Convenience Centre (NCC) | | |
| | Peripheral Commercial | | |
| | Community facilities and public uses (CC = Community Centre) | | |
| | Educational facilities (PS = Primary School, PPS = Post Primary School, PrS = Private School) | | |

2.3 Land Use Budget

The Structure Plan area has been divided into six neighbourhoods or “cells”, as shown in Plan 6.

The Cardinia Road Precinct covers an area of approximately 1051 ha¹⁰. The Precinct Structure Plan comprises a range of different land use components.

The following land use components have been deducted to determine the Net Developable Area for each Cell within the PSP.

- Encumbered Open Space includes:
 - Toomuc, Gum Scrub & Quirks Creek
 - drainage easements / stormwater management
 - EVCs
 - Aboriginal Cultural Heritage
 - Growling Grass Frog Habitat Corridor.
- District Open Space includes:
 - District Parkland
 - District Sports Reserves
 - Neighbourhood Sports Reserve
- Major easements
 - Gas pipeline

- Local Arterial Roads includes Local Arterial Roads (Divided and Undivided).
- Community Facilities includes:
 - Railway Station Land
 - State Primary School
 - State Post Primary School
 - Regional Community Facilities (Cardinia Cultural Centre)
 - Local Community Facilities
 - Pakenham Cemetery
 - Emergency Services

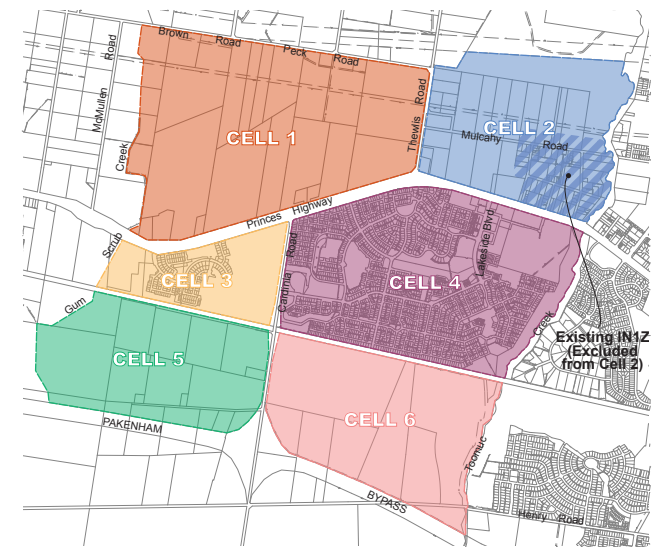
In order to calculate the Residential Net Developable Area for each Cell within the PSP commercial land components were deducted.

- Commercial Land includes:
 - Neighbourhood Activity Centres/Core Business
 - Peripheral commercial
 - Pakenham Homemaker Precinct
 - Neighbourhood Convenience Centres

A local public open space contribution of 8% has also been excluded from each cell within the PSP to determine the Net Residential Developable Area.

The Land Use Budget is outlined in Table 1: Land Use Budget and depicted in Plan 7: Land Use Budget Plan.

Plan 6: Neighbourhood (Cell Plan)



¹⁰ This excludes the industrial area adjacent to Cell 2, the railway reservation, Princes Highway & Cardinia Road (including land required for road widening).

Table 1: Land Use Budget

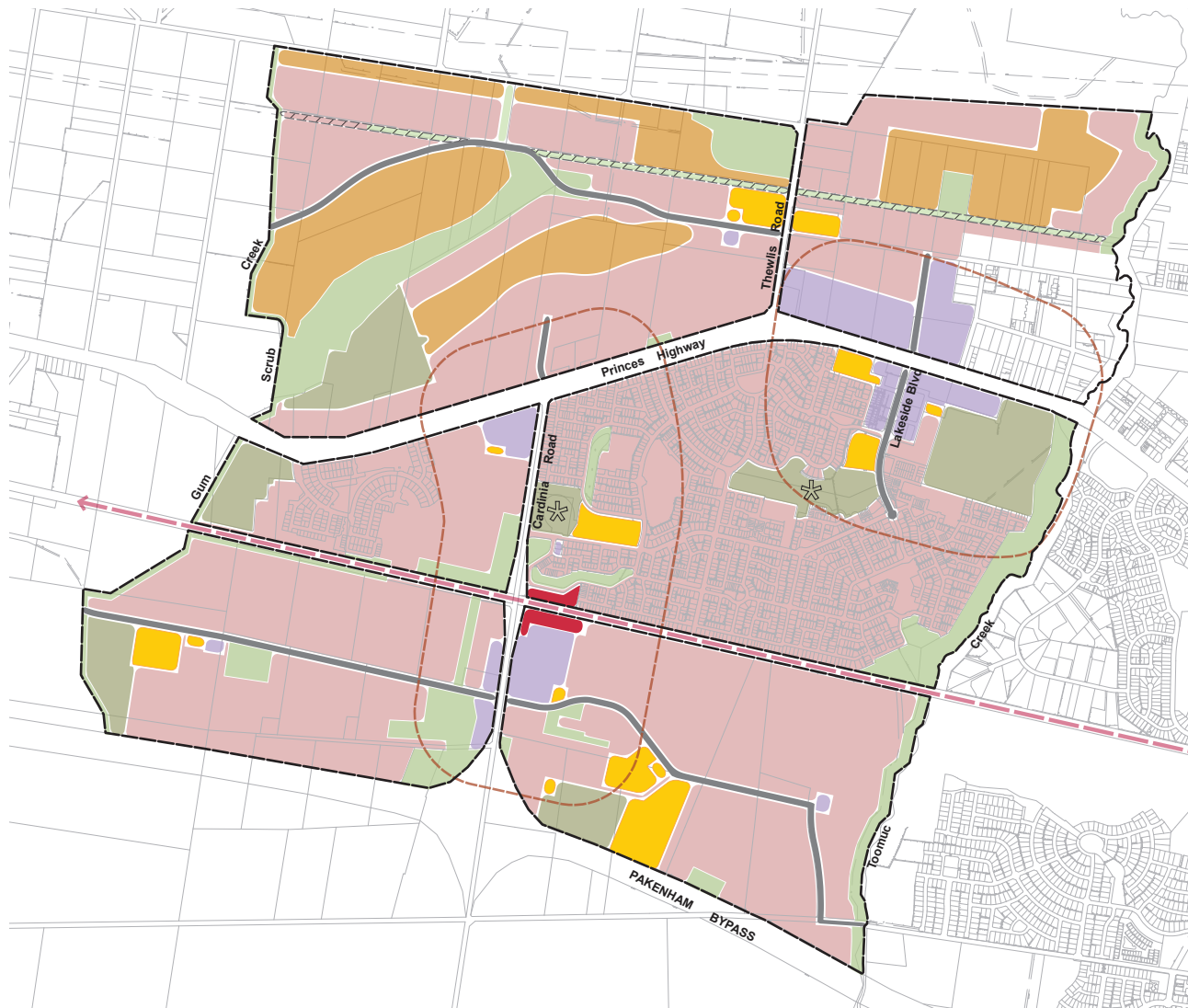
Land Use	Cell 1	Cell 2	Cell 3	Cell 4 ⁽¹⁾	Cell 5	Cell 6	Total
Total Area (ha) ⁽²⁾	284.4	121.3	68.8	257.1	147.4	171.8	1050.8
Deductions ⁽³⁾							
Encumbered Open Space (ha)	39.0	6.4	6.4	21.6	18.4	9.7	101.5
District Open Space (ha)	16.2	0.0	8.0	34.4	8.0	8.0	74.6
Major Easements	4.5	3.3	0.0	0.0	0.0	0.0	7.8
Local Arterial Roads (ha)	8.8	1.5	0.0	2.1	6.0	7.0	25.4
Community Facilities (ha)	3.9	2.2	0.3	9.4	3.9	13.9	33.6
Net Developable Area (ha)	212.0	107.9	54.1	189.6	111.1	133.2	807.9
Breakdown of Net Developable Area (ha)	Cell 1	Cell 2	Cell 3	Cell 4 ⁽¹⁾	Cell 5	Cell 6	Total
Core Retail & Peripheral Commercial (ha)	0.5	19.2	3.8	9.8	3.7	8.1	45.1
Residential land (ha)	211.5	88.7	50.3	179.8	107.4	125.1	762.8
Net Residential Developable Area (ha)	Cell 1	Cell 2	Cell 3	Cell 4 ⁽¹⁾	Cell 5	Cell 6	Total
8% Local Public Open Space of Residential land (ha)	16.9	7.1	4.0	14.4	8.6	10.0	61.0
Total Net Residential Developable Area	194.6	81.6	46.3	165.4	98.8	115.1	701.8

(1) Existing Urban Area

(2) Excludes the industrial land adjacent to cell 2, the railway reserve, Princes Highway and Cardinia Road (Including land required for road widening)

(3) Further detail in relation to the deductions is outlined in the Cardinia Road Precinct Development Contributions Plan, September 2008

Plan 7: Land Use Budget Plan



LEGEND

- Structure Plan Area
- Local Arterial Road
- Railway Line
- Proposed Rail Station Land
- Residential Land
- Low Density Residential Land
- Core Business and Peripheral Commercial
- Community Facilities
- District Open Space
- Open Space (encumbered)
- Major Easements
- Medium Density Residential (400m Walkable Distance)

NOTES

- Part encumbered and part unencumbered open space. (For the purpose of Table 1: Land Budget, this has been classified as 'District Open Space')

2.4 Demographic Projections

In line with the Community Profile undertaken by ID Consulting, an average household size for calculating the future population in the Cardinia Road Precinct is 2.8 people per dwelling.

A snapshot of the anticipated community for the Cardinia Road Precinct Structure Plan is provided in:

- Table 2: Estimated Future Population in the Cardinia Road Precinct.
- Figure 1: Likely population distribution in the Cardinia Road Precinct.
- Figure 2: Likely proportion of household types with the Cardinia Road Precinct.

Table 2: Estimated Future Population in the Cardinia Road Precinct

Cells within PSP	Dwellings⁽⁴⁾	Population⁽⁵⁾
Cell 1 ^{(1) (3)}	2,321	6,499
Cell 2 ⁽²⁾	979	2,741
Cell 3 ⁽³⁾	685	1,918
Cell 4	2,409	6,745
Cell 5	1,556	4,357
Cell 6	1,888	5,286
Total	9,838	27,546

(1) Includes 38% Low Density Residential Development

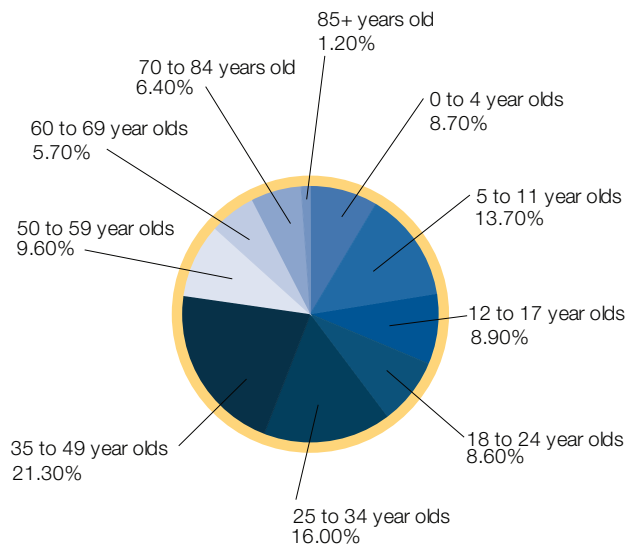
(2) Includes 36% Low Density Residential Development

(3) Based on the Approved Development Plan

(4) Based on the minimum estimate of existing urban development, proposed subdivision layout and estimated development proposed on integrated development sites for Cell 4, 5 dw/ha for low density residential development within Cell 1 and 2, an average 20 dw/ha for medium density locations where an approved Development Plan does not exist, and an average of 15 dw/ha for the balance of the residential land.

(5) 2.8 people per dwelling is based on Community Profile, 2001 and 1996 Census Information for Growth Area Region, Profile I.D (2006)

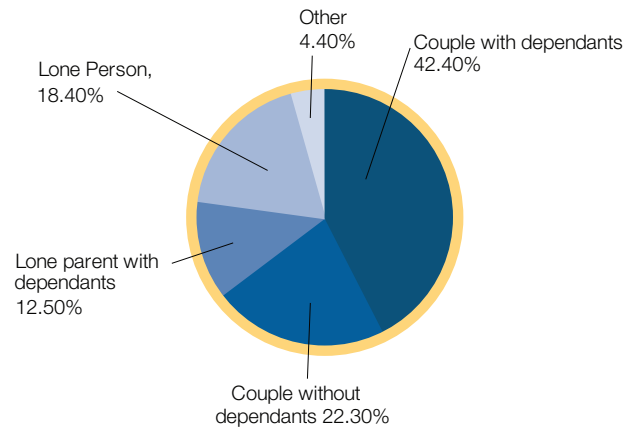
Figure 1: Likely Population Distribution in Cardinia Road Precinct ¹¹



- Children aged from newborn to preschool age will make up 8.7% of the community within the precinct;
- 22.6% will be of school age (ranging from 5 years old to 17 years old); and,
- around 13% of the community will be within the 60+ age bracket.

¹¹ Source: Based on Community Profile, 2001 and 1996 Census Information for Growth Area Region, Profile.i.d (2006).

Figure 2: Likely Household Type in Cardinia Road Precinct



It is anticipated that at the completion of residential development of the Cardinia Road Precinct (Year 2021):

- the majority of household types will be made up of 'couples with dependants' (42%); and,
- smaller households (made up from combining figure of 'couples without dependants and 'lone person' households) are to make up 41% of the households within the community.

03 THEMES

This chapter sets out objectives and development principles for the following themes:

- Transport
- Housing & Lot Size Diversity
- Activity centres
- Employment areas
- Community infrastructure
- Open space
- Biodiversity
- Image, character and unique features
- Heritage
- Physical services
- Development staging

Figure 3 sets out how the themes are to be implemented.

Each theme includes:

- **Objectives** – that must be achieved;
- **Development Principles** - that must or should be met.

Alternative approaches to the Development Principles, that achieve the objectives, can also be considered to the satisfaction of the Responsible Authority.

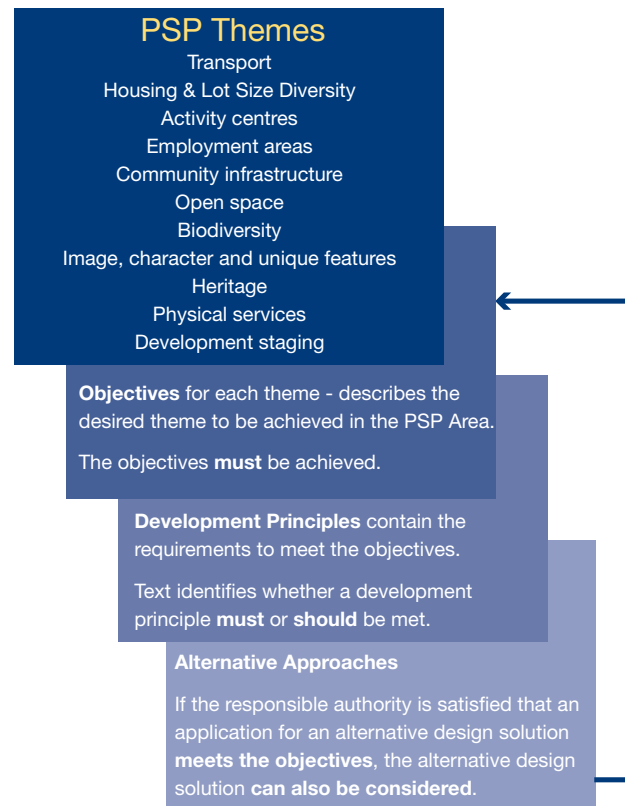


Figure 3: Implementation of Themes

3.1 Transport

3.1.1 Objectives

- To provide a sustainable transport network that reduces dependence of car use and encourages walking and cycling within neighbourhoods.
 - To provide an efficient, legible and safe local road network that:
 - complements the role and function of the arterial road and highway networks; and,
 - provides good internal movement within and between neighbourhoods and good access to external destinations.
 - To provide a well planned public transport network that connects to the new railway station, and provides for the safe and efficient operation of bus movements.
 - To provide for safe and efficient pedestrian and bicycle movements to connect the station, activity centres and major community facilities.
 - To ensure that the new railway station forms the key focus of a new activity centre, and is supported by park and ride facilities.
 - To provide for landscaping of roads and streets to create key public spaces, landscape corridors and provide a contribution to the creation of an attractive urban environment.
- To create an attractive and safe interface with major arterial roads and encourage the provision of services roads along arterial roads
 - To plan for the future grade separation of Cardinia Road at the Gippsland Railway line
 - To mitigate impacts of traffic noise from the Pakenham Bypass to an acceptable level

3.1.2 Development Principles

3.1.2.a Transport Network

The development of the transport network should meet the requirements of:

- Plan 8: Road Network Plan;
- Plan 9: Public Transport Network Plan;
- Plan 10: Walking and Trails Network Plan;
- Table 3: Road Hierarchy; and,
- Figure 4: Cardinia Shire Urban Road Standards (August 2006).

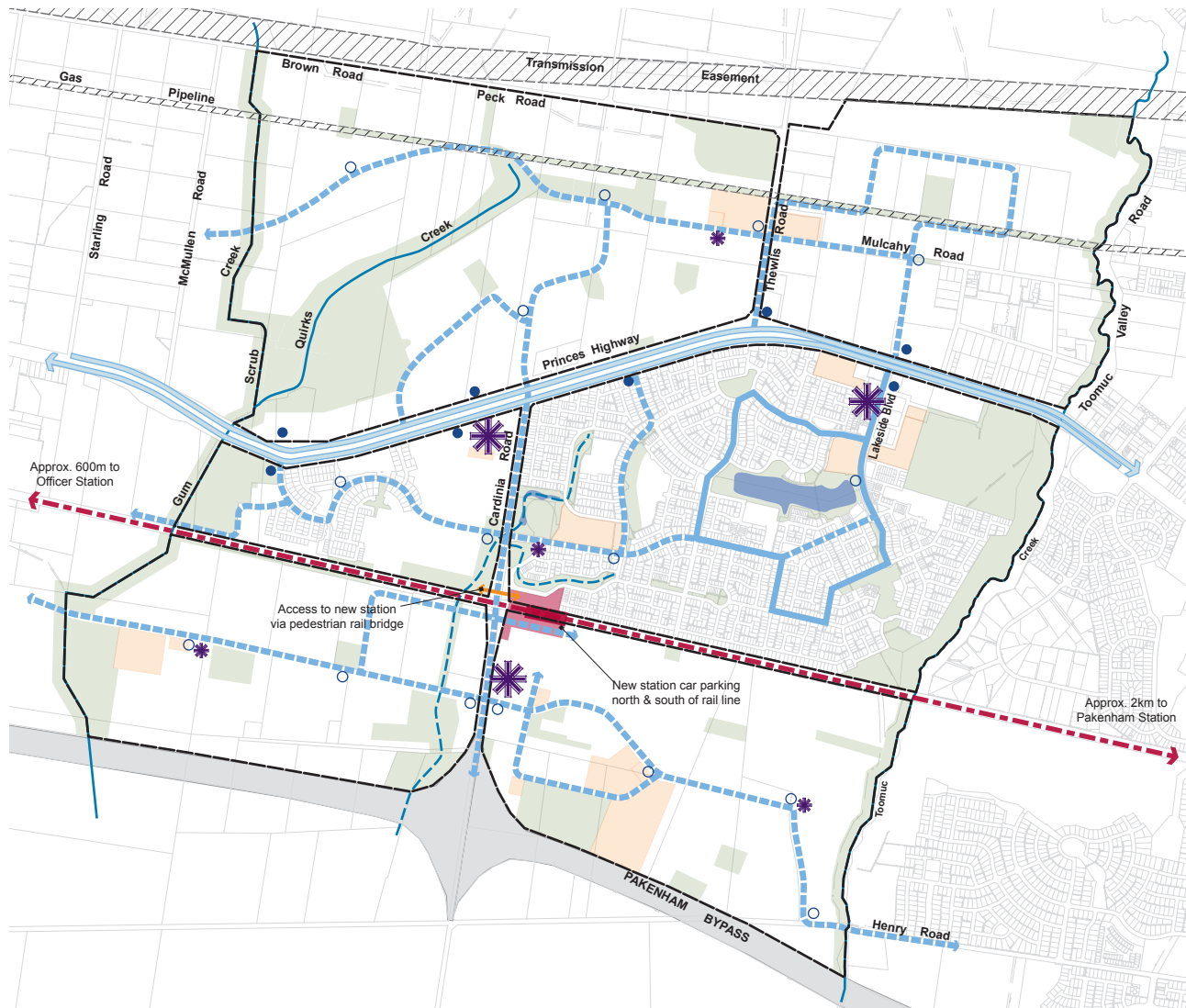
Plan 8: Road Network Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Cardinia Road under rail
- Signalised intersections
- Other traffic control devices
- Railway Line, Proposed Station & car park
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)
- Community & Educational facilities
- Public open space
- Existing Major Easements
- Existing creeks
- Drainage lines
- Lakes/waterbodies
- Pedestrian Crossing to Proposed Station

Plan 9: Public Transport Plan



LEGEND

- Structure Plan Area
- Railway Line, Proposed Station & car park
- PPTN - Principal Public Transport Network
- Potential Local Bus Routes
- Existing Local Bus Routes
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)
- Community & Education Facilities
- Public Open Space
- Major Easements
- Existing creeks
- Drainage lines
- Lakes/waterbodies
- Pedestrian Crossing to Proposed Station
- Approximate location of PPTN Bus Stop
- Approximate location of Local Bus Stop

NOTE:
Public Transport routes may vary depending on the delivery of Public Transport Services

Plan 10: Walking and Trails Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Signalised intersections
- Other traffic control devices
- Railway Line, Proposed Station & Car Park
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)
- Shared Pathway
- Key Local Footpath
- Trail Network
- Existing pedestrian crossings
- Proposed pedestrian crossings
- Open Space
- Existing Major Easements
- Existing Creeks
- Drainage Lines

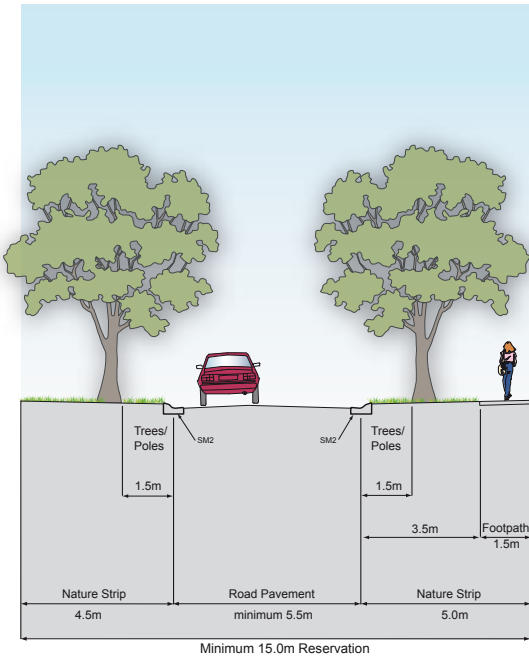
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Table 3: Road Hierarchy

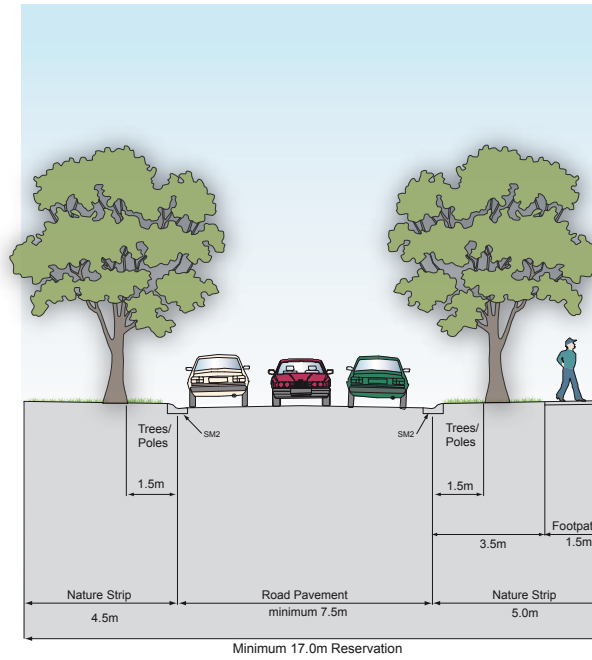
Road/Street Type	Indicative VPD ⁽¹⁾	Road Reservation	Function & Configuration
Primary Arterial Road (Vic Roads) Princes Highway	45,000 vpd	Existing 66m to 96m reservation	<ul style="list-style-type: none"> • 6 lane divided road • 2 x 11m carriageways • 35m median narrowing to 10m at Gum Scrub Creek and Lakeside Boulevard • No direct property access • PPTN bus route
Primary Arterial Road (Vic Roads) Cardinia Road	20,000 – 25,000 vpd north of Local Arterial Road 50,000 vpd south of Local Arterial Road	40m reservation 20m widening required for road reservation additional widening required for future grade separated crossing of the railway line	<ul style="list-style-type: none"> • 4 lane divided road north of the Local Arterial Road, 6 lane divided road south of the Local Arterial Road • 2 x 8m carriageways, 2 x 11m carriageways • 6m median strip • No direct property access • Grade separated at the railway line (underpass preferred option) • Potential local bus route
Local Arterial Road Divided	5,000 – 15,000 vpd	33m reservation	<ul style="list-style-type: none"> • 4 lane divided road • 2 x 7.5m carriageways • 6m median • Direct property access limited • Potential local bus route • Accommodate mature canopy trees in median strips (where provided) and roadside nature strips
Local Arterial Road Undivided	5,000 – 10,000 vpd	24m reservation	<ul style="list-style-type: none"> • 1 x 11m carriageway • Direct property access limited • Potential local bus route • Accommodate mature canopy trees in median strips (where provided) and roadside nature strips
Collector Street	< 5,000 vpd	18.5m reservation	<ul style="list-style-type: none"> • 1 x 7.5m carriageway • Direct property access • Potential local bus route
Local Street	< 2,000 vpd	17m reservation	<ul style="list-style-type: none"> • 1 x 7.5m carriageway • Direct property access
Court	150 vpd	15m reservation	<ul style="list-style-type: none"> • 1 x 5.5m carriageway

(1) VPD = Vehicles per day

Court



Local Street



Collector Road

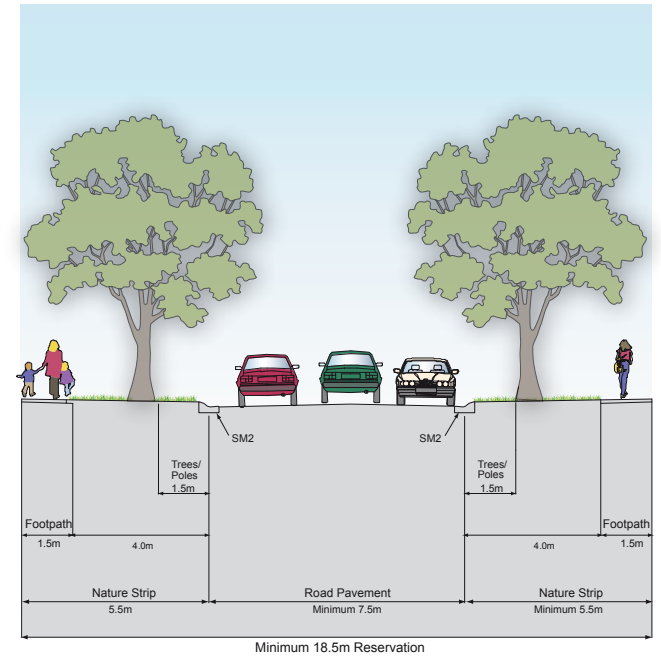
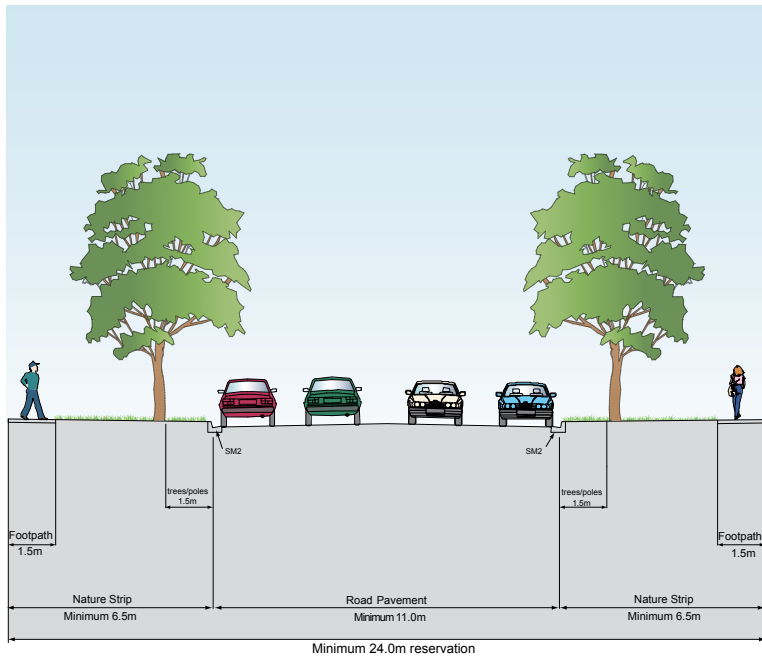


Figure 4: Cardinia Shire Urban Road Standards (August 2006)

Local Arterial Road (Undivided)



Local Arterial Road (Divided)

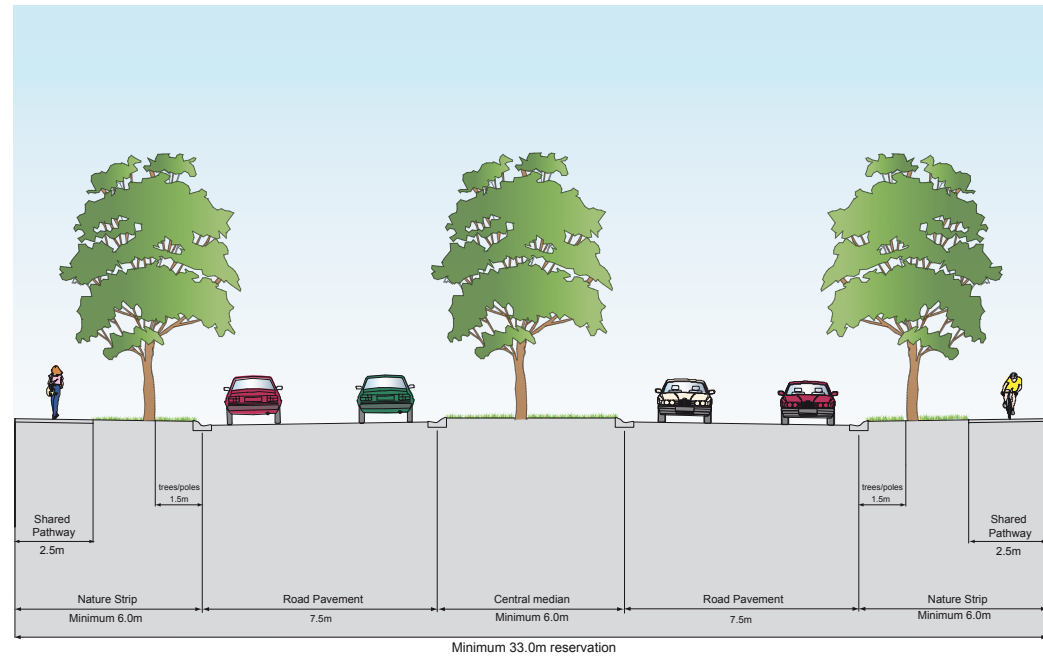


Figure 4: Cardinia Shire Urban Road Standards (August 2006) (Continued)

3.1.2.b Arterial Roads

Arterial Roads and Service Roads

A combination of design treatments should be used along arterial roads to add visual interest.

Long sections of rear fencing along arterial roads will not be supported.

Provision is to be made for points of pedestrian permeability between the arterial and local arterial roads, with landscape treatment.

The design of service roads may include the following design solutions:

- Short sections of side or rear fencing incorporated in the overall design layout.
- Housing separated from, but still addressing the arterial road.
- A reserve that allows for dense tree plantations.
- Open-ended courts, with associated landscape treatment.
- Limited access points to arterial roads to key points where traffic can be managed.
- Links and connections into the local road networks within residential development.

Have regard to:

- Figure 5: Typical cross-section of a service road;
- Figure 6: Landscape treatment of open ended courts; and,
- Figure 7: Use of Service Roads and Tree Reserves along arterial road.

Signalised Intersections

Signalised intersections should be:

- provided where there is an intersection of a primary arterial road with another primary arterial road, local arterial road or an access point to a high traffic generating use (eg: industrial precinct, activity centre).
- provide a direct and safe crossing point of the primary arterial road for pedestrians and cyclists.

Freeway Noise Attenuation

The developer will be required to attenuate traffic noise from the Freeway to a level of 63 dB (or level determined in consultation with Council and Vic Roads) to the satisfaction of Vic Roads.

Noise attenuation measures should be designed and constructed (at the cost of developers) to the standards outlined in the Noise Mitigation Report undertaken by Marshall Day Acoustics and LandDesign in consultation with VicRoads and Council¹².

Cardinia Road Grade Separation

The Cardinia Road Grade Separation¹³ must be designed to ensure:

- efficient north and south bound traffic movement to and from the Pakenham Bypass;
- an appropriate interface with surrounding commercial or retail development;
- physical and visual connectivity between the Station, Activity centre, and surrounding development;
- provision is made for a bridge for a collector road which runs parallel to the railway line reservation, on the south side; and,
- provision is made for a bridge for a pedestrian / cycle link across Cardinia Road on the north side.

The preferred urban design outcome for the Cardinia Road Grade Separation is for an underpass.

¹² The Noise Mitigation Report is to be funded by the Cardinia Road Precinct Development Contributions Plan, September 2008

¹³ The grade separation of Cardinia Road and the Gippsland Railway line is partly funded by the Cardinia Road Precinct Development Contributions Plan, September 2008

3.1.2.c Public Transport

Cardinia Road Railway Station

Cardinia Road Railway Station must be designed to:

- be integrated with the Neighbourhood Activity Centre on the south side of the railway line;
- provide for bus access, taxi facilities and include pedestrian and bicycle access;
- incorporate features to help to identify the station as key facility in the area;
- provide a park and ride role for the Cardinia Road Precinct and wider region;
- incorporate significant car parking spaces, including 1.4ha on the north and 1.6ha south side of the railway line; and,
- provide options for multi deck parking to meet potential future car parking demand.

Bus Network

Roads designated as potential bus routes should be designed to:

- accommodate bus movements;
- provide bus stop facilities at strategic locations along the Princes Highway PPTN bus route and local bus route¹⁴; and,
- provide controlled means of pedestrian access across the Princes Highway.

Bus stops facilities should:

- be located as close as possible to Activity Centres and activity generating land uses;
- have an average stop spacing of 300 metres between each stop;
- be provided with direct and safe pedestrian access connected to an existing pedestrian/shared path.
- include a bus bay, shelter, sealed pathway access and lighting for bus stops along the PPTN and a bus bay, shelter and sealed pathway access for the local bus network¹⁵; and,
- be to the satisfaction of the Public Transport Division of the Department of Transport.

¹⁴ 8 bus stop facilities along the PPTN and 16 bus stop facilities along the local bus network are funded by the Cardinia Road Precinct Development Contributions Plan, September 2008

¹⁵ Detail of works required, timing of provision and allocated cost is outlined in the Cardinia Road Precinct Development Contributions Plan, September 2008

3.1.2.d Walking and Trails

Shared pathways¹⁶ should be provided:

- along primary arterial and local arterial roads;
- along Toomuc Creek and Gum Scrub Creek (which includes an underpass of the railway line); and,
- adjacent to the Pakenham Bypass.

Shared pathways should be designed and located to maximise passive surveillance and provided in wide road verges with safe crossing points at key locations.

The local street network should be designed to provide permeable and safe routes for walking and cycling to activity centres, community facilities, parks and open space, major trail networks and public transport.

A pedestrian underpass of the railway line for pedestrians and cyclists should be provided approximately midway between Cardinia Road and Toomuc Creek, and as part of the Toomuc Creek and Gum Scrub Creek trail networks¹⁷.

Bicycle Parking Facilities

Bicycle parking facilities should be provided in activity centres, at the railway station and at other appropriate locations in accordance with the requirements contained in the planning scheme.

¹⁶ Funded by the Cardinia Road Precinct Development Contributions Plan, September 2008

¹⁷ Funded by the Cardinia Road Precinct Development Contributions Plan September 2008

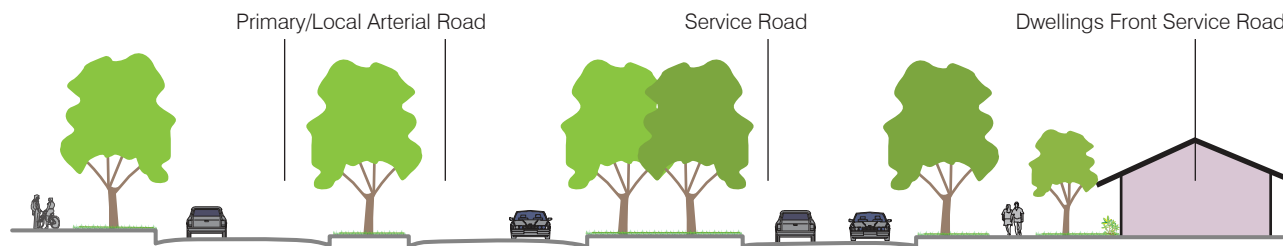


Figure 5: Typical cross section of a Service Road



Figure 6: Landscape treatment of open ended courts

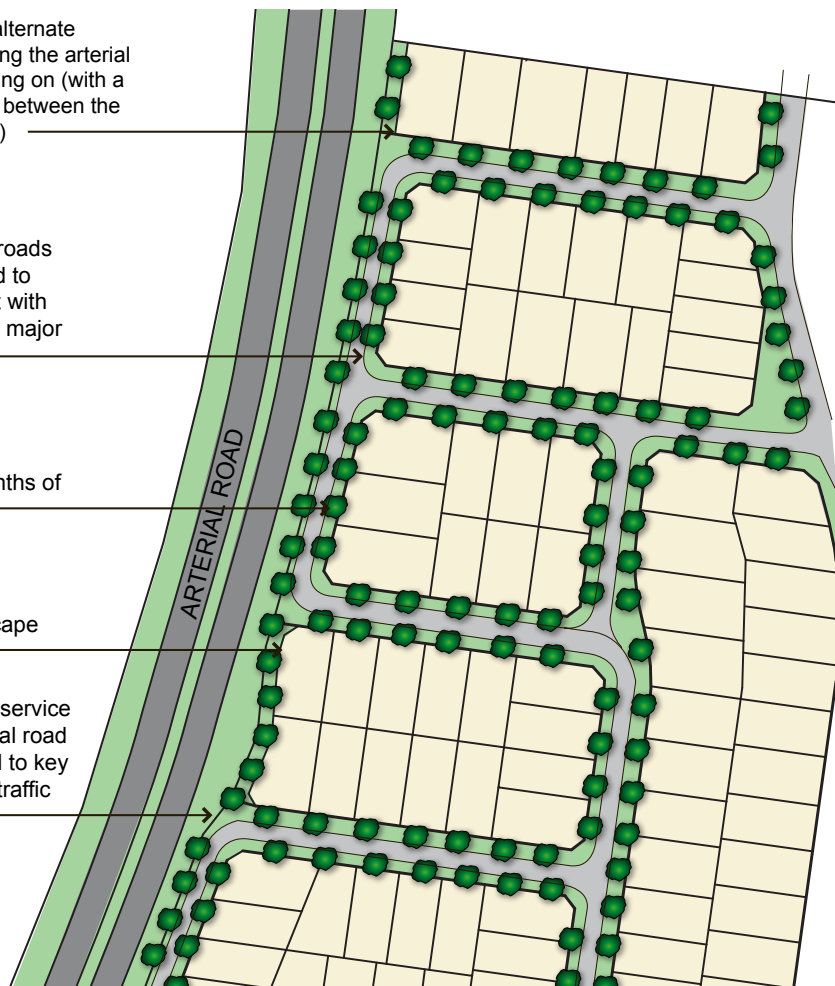
To add interest, alternate between lots facing the arterial road and lots siding on (with a landscape buffer between the lots and the road)

Internal service roads with lots oriented to front arterial, but with separation from major traffic route

Avoid long uninterrupted lengths of service road

Side fences with space for landscape treatment

Direct access to service roads from arterial road should be limited to key points for better traffic management



Arterial road interface principles - service roads



Natural features (ie. existing trees) can be integrated into service road design to provide interest along interface with arterial roads.



Rear fence interface with arterial roads creates an unattractive and unfriendly interface, and promotes disconnected communities. Alternative solutions (such as service roads) are preferred.

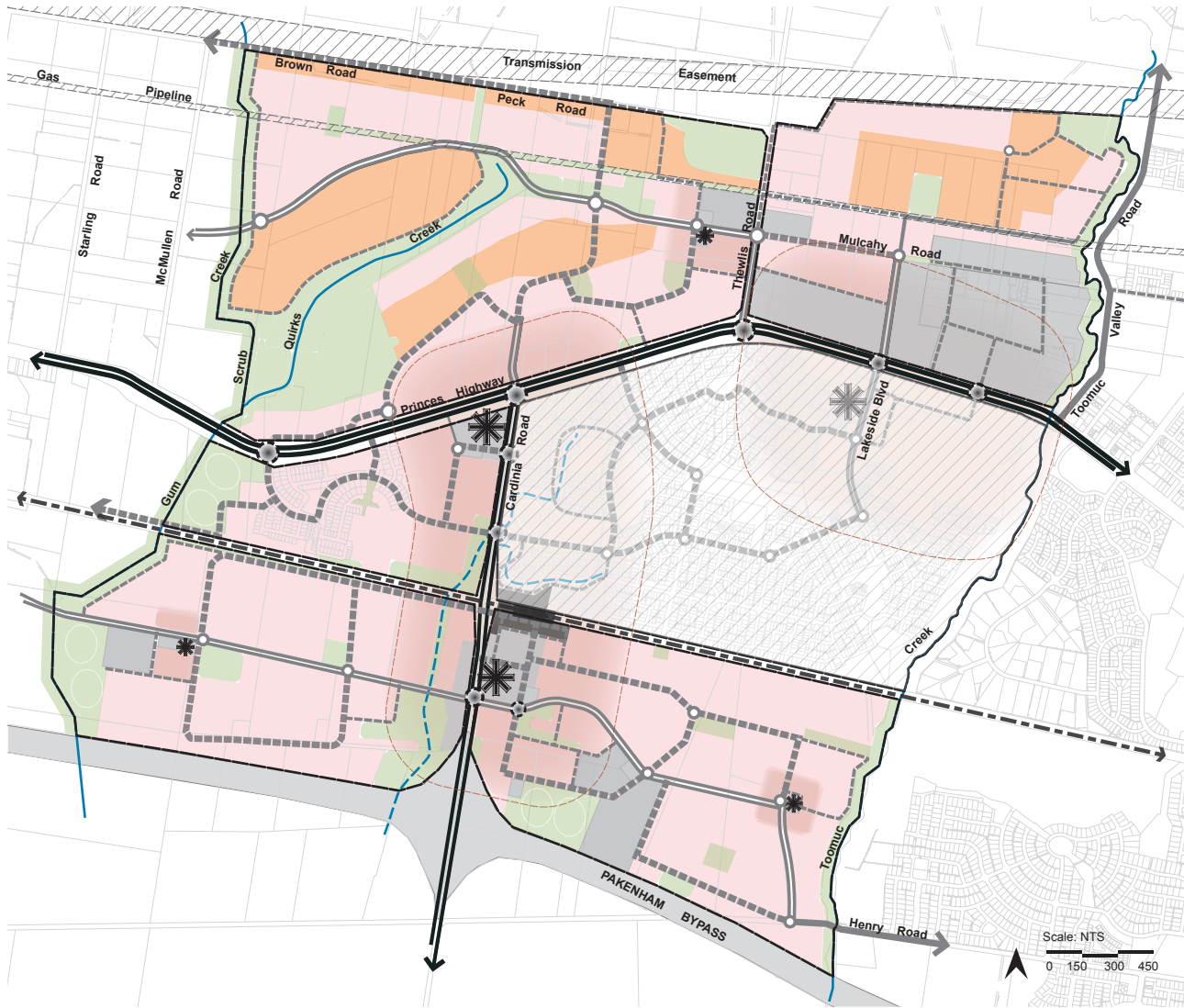
Figure 7: Use of Service Roads and Tree Reserves along Arterial Roads

3.2 Housing & Lot Size Diversity

3.2.1 Objectives

- To ensure greater housing choice, diversity and affordability and provide a range of lot sizes, housing types and lifestyle opportunities to satisfy the needs and aspirations of the community and provide for changing needs overtime.
- To provide a range of residential densities across the precinct to respond to local circumstances and housing market conditions, and to support the efficient provision of infrastructure and services.
- To ensure an increase in housing density occurs in the context of a commensurate increase in the standard of urban design and infrastructure delivery.
- To provide residential neighbourhoods with attractive streetscapes and a high quality urban design and distinct urban character.
- To ensure that the dwelling, rather than the garage, is the dominant feature of the streetscape.
- To provide lot sizes and housing types that are responsive to the character of the natural and built environment in the area and respond to principles of environmental sustainability.
- To provide for lower density development in areas with significant slope; significant vegetation; the prominent ridgelines; and/or at the interface with green wedge areas.
- To ensure that, on lower density lots, building envelopes are provided on lower density lots that are located to protect vegetation and visual prominence of ridgelines, maintaining the natural skyline of the ridge.
- To encourage medium density housing within 400m walking distance of an activity centre and/or the proposed railway station.
- To provide integrated housing sites within or at the interface of activity centres, and overlooking local and linear open space.
- To achieve an appropriate interface with open space and between areas of different densities.

Plan 11: Lot Size and Housing Diversity Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Local Street
- Signalised Intersections
- Other traffic control devices
- Railway Line, Proposed Station & Car Park
- Low Density Residential
- Standard Density Residential
- Medium Density Residential
- Existing Urban Area
- Non-residential
- Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)
- Public Open Space
- Existing Waterway
- Drainage Lines
- Existing Major Easements
- 400m Walkable Catchment from Neighbourhood Activity Centre

NOTE

Medium density housing is also encouraged within close proximity of public open spaces.

3.2.2 Development Principles

3.2.2.a Distribution of densities

Development should achieve a distribution of densities consistent with that set out in Table 4: Distribution of densities across the Cardinia Road Precinct; and identified in Plan 11: Lot size and Housing Diversity Plan.

Table 4: Distribution of densities across the Cardinia Road

Density Range	Cell 1	Cell 2	Cell 3	Cell 4 ⁽³⁾	Cell 5	Cell 6
Residential Net Developable Area ⁽¹⁾	194.6 ha	81.6 ha	46.3 ha	165.4 ha	98.8 ha	115.1 ha
Low Density Residential ⁽²⁾	38%	36%	0%	N/A	0%	0%
Standard Residential (avg 15 dw per ha)	48%	52%	54%	N/A	89%	77%
Medium Density (avg 20 dw per ha)	14%	12%	46%	N/A	11%	23%

(1) Includes an 8% deduction for local public open space

(2) Low Density Residential development is confined to Cell 1 and Cell 2, north of Princes Highway

(3) Existing Urban area

3.2.2.b Residential Development

Residential Development includes both 'standard' density residential lots and 'medium' density residential lots and 'low density' residential lots in constrained areas.

Standard Density

Standard density residential includes lots with sizes generally within the range of 350 sq m to 750 sq m.

Lot sizes across 'standard' density areas should achieve an overall average density of 15 dwellings per hectare with the preferred distribution of lot sizes outlined on Table 5.

Table 5: Preferred Distribution of lot sizes for standard density lots

Lot size range	Distribution
350 sq m to 500 sq m	35% - 40%
500 sq m to 600 sq m	20% - 30%
600 sq m to 750 sq m	35% - 40%

Medium density

Medium density residential development should include a mix of smaller lots ranging in size from 300 sq m to 450 sq m, as well as integrated housing sites.

Medium density residential development should:

- be provided in areas identified in Plan 11: Lot size and Housing Diversity Plan.
- be an average of 20 dwellings per hectare (Net Residential Development Area) in areas within 400m walking distance of an activity centre and / or the proposed railway station¹⁸;
- overlook, abut or be within close proximity of open space; and,
- be provided in a variety of forms – terrace / townhouse development, cottage lots, shared driveway housing, integrated development sites as well as retirement villages / aged care facilities.

Additional sites allocated for medium density and/or sites that propose a higher density may be considered provided that sites are in strategic locations that satisfy the objectives and development principles for medium density development as outlined in this Precinct Structure Plan.

Low Density

Low density residential development should:

- be provided in areas identified in Plan 11: Lot size and Housing Diversity Plan.
- comprise lots of 1,000 sq m to 2,000 sq m which have proportionally wider frontages to maximise side setbacks and create openness between dwellings; and
- should be provided in locations constrained by significant slope; significant vegetation; the prominent ridgelines; and/or the interface with green wedge areas.

¹⁸ The 400 m criteria does not apply to Neighbourhood Convenience Centres (NCCs).

3.2.2.c Subdivision Lot Design

All densities

Lots should be:

- generally rectangular in shape on streets aligned on a north – south or east – west axis to maximise building and energy efficiency; and,
- designed so as to ensure garages are not the dominate front façade element of the house and/ or the streetscape. This provision also applies to integrated development sites.

Public open space design should ensure that an appropriate interface with surrounding development is achieved.

Standard Density

Lots should be designed to:

- Create a sense of street address and streetscape character;
- Ensure garages are not the dominant front façade element across the width of the lot;
- Maximise the opportunity for more useable private open space.
- Enable rear accessed garages on narrow fronted lots.

Medium Density

A variety of styles and types of medium density development are encouraged to further enhance lot diversity.

Integrated housing sites / lots of less than 300 sq m should be:

- developed by one builder as an integrated development project; and,
- be provided within or at the interface of activity centres, or overlooking local and linear open space.

Lots with shared driveway access should be designed to ensure:

- housing fronts out to both streets and / or parkland;
- that a shared driveway or 'garage court' provides access to garages sited off street to minimise the visual impact of garages on the streetscape; and,
- private open space is maximised through careful design of the dwelling

Lots with direct park frontage or road /park frontage with rear access are encouraged and should be designed to ensure:

- the rear lane access to garages lessens the visual impact on the streetscape;
- strong building form along the park edge provides a backdrop and interface to open space; and,
- wide footpaths are provided along the frontage to ensure an 'address' for dwellings.

Avoid rear lanes that:

- provide concealment opportunities; and,
- Are curved, have T-intersections or are longer than 150m.

Low Density

Lots in low density areas must be designed to include building envelopes that:

- maximise vegetation retention and ensures the protection of existing vegetation and/or areas requiring revegetation;
- are located on the flatter part of sites, to limit any cut and fill on the sites; and,
- are located away from the tops of significant ridgelines to retain the prominence of ridgelines, and provide for the revegetation of ridgelines.

Lots should be designed to be proportionally wider than deep, to maximise side setbacks and create openness between dwellings.

Low density residential areas should include the provision to include the use of colours and material that are reflective of the natural surrounds.

Design suggestions for siting of building envelopes:

- The building roof line sits below the ridgeline and the top of the ridge is revegetated.



Figure 8. Building envelope sits below the ridgeline: Typical Cross Section

- The building envelope sits below the ridgeline and the existing vegetation is retained.

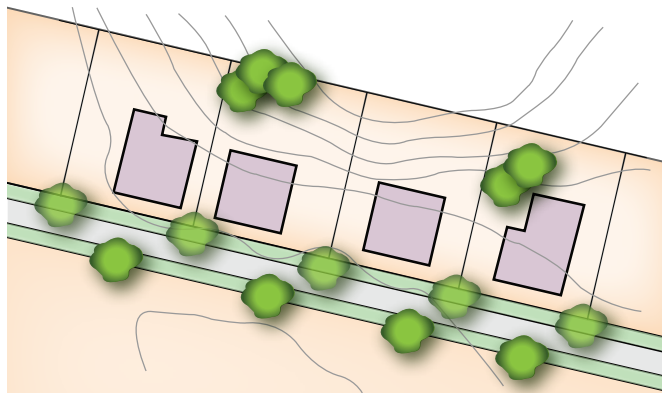


Figure 9. Building envelope sits below the ridgeline: Contour Plan

Design Suggestions for Streetscapes

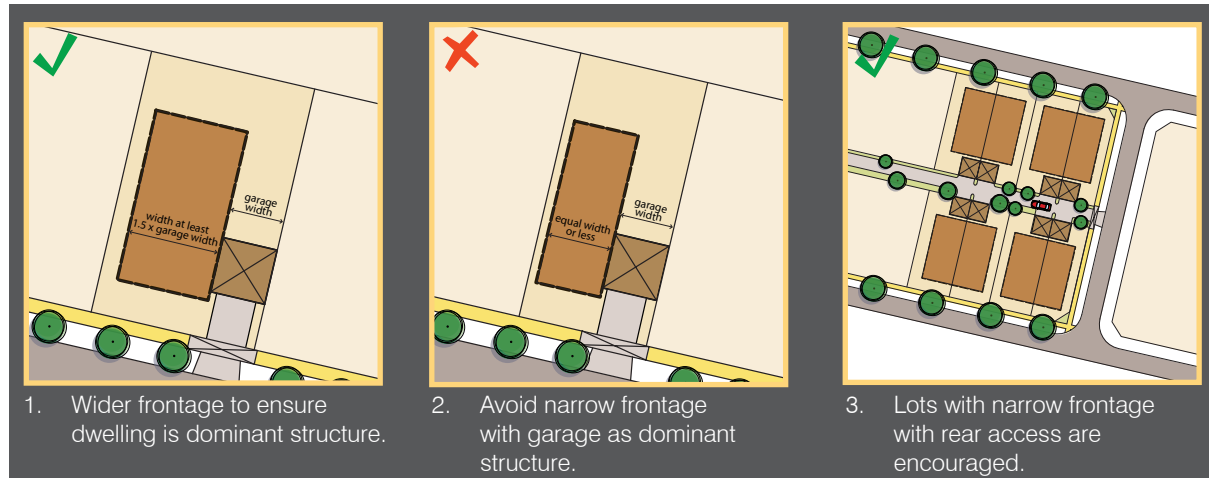


Figure 10: Design suggestions for varied lot frontages

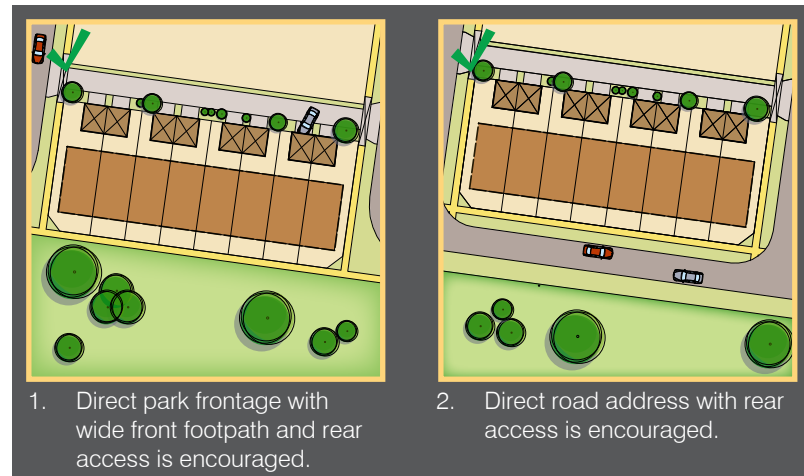


Figure 11: Design suggestions for lots fronting open space

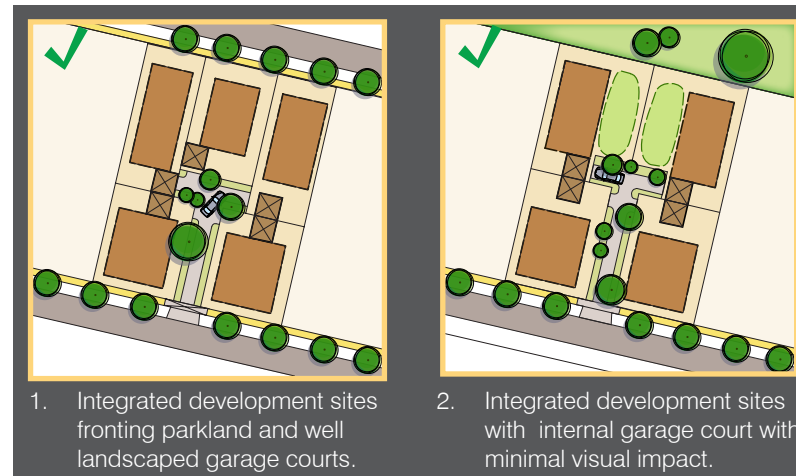


Figure 12: Design suggestions for integrated development site

Interface treatments

Interface with Public Open Space

Lots with an interface with public open space should:

- take advantage of views / aspect over open space by orienting lots to face towards the open space area;
- ensure lots overlook open space to increase the sense of safety / surveillance;
- recognise opportunities for smaller lots to have an alternative outdoor space readily available; and,
- ensure that where lots have direct frontage to parkland that a footpath access is provided along the front boundary to provide for surveillance and a sense of 'address'.



Figure 13: An example of lots with an interface with public open space

Interface between densities

When creating a transition between densities, development should be designed to:

- Limit any negative impact between lots, particularly where interfacing with lower density development.
- Avoid larger lots (with wide frontages) on one side of a road, facing small lots (with narrow frontages) on the other side.
- Use rear fence lines as the transition from lower densities (1000+ sq m lots) to standard density lots.
- Use standard density lots to create a transition from medium density development to larger, low density lots.

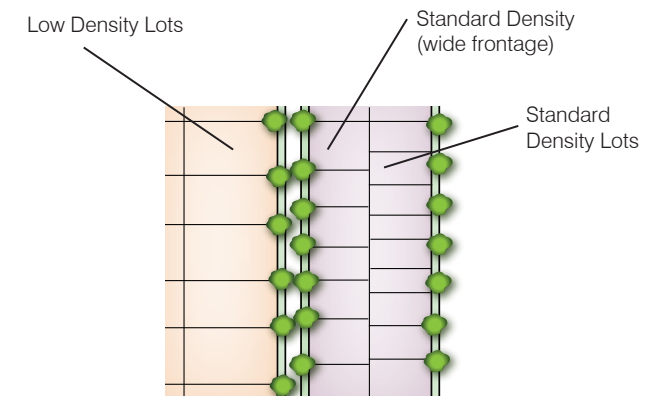


Figure 14: An example of the interface between low density and standard density lots

3.3 Activity Centres

3.3.1 Objectives

- To develop a network of vibrant, well serviced and accessible Neighbourhood Activity Centres and Neighbourhood Convenience Centres that form the focus of a new community.
- To ensure that activity centres provide a mix of retail, commercial, entertainment, and community activities to meet the needs of the local community.
- To achieve well designed, safe, attractive, and street based activity centres as expressed in the design objectives for each activity centre.
- To ensure all activity centres are accessible by public transport and that activity centres are designed to facilitate the use of public transport, connected to the pedestrian and bicycle network, and that all residents within the precinct live within a walkable distance of an activity centre.
- To provide for future retail, commercial or residential redevelopment opportunities within activity centres.
- To encourage higher density residential development within 400 metres of a neighbourhood activity centre.

3.3.2 Development Principles

The development of the Activity Centres within the Cardinia Road Precinct should be based on:

- Plan 12: Activity Centres in the Cardinia Road Precinct; and,
- Table 6: The role, function and indicative floor space of the Activity Centres in the Cardinia Road Precinct.
- Table 7: Activity Centre Design Objectives and Design Principles.

Detailed Urban Design Framework Plans must to be prepared for the Activity Centres subsequent to the Cardinia Road Precinct Structure Plan.

Specific requirements for these are set out with Draft Urban Design Frameworks that provide an indicative design solution in:

- Figure 15: Draft Urban Design Framework – Cardinia Rd/Railway Station Neighbourhood Activity Centre
- Figure 16: Draft Urban Design Framework – Cardinia Rd/Princes Hwy Neighbourhood Activity Centre
- Figure 17: Draft Urban Design Framework – Lakeside Blvd/Princes Hwy Neighbourhood Activity Centre
- Figure 18: Draft Urban Design Framework – Neighbourhood Convenience Centre

Plan 12: Activity Centres within Cardinia Road Precinct Plan

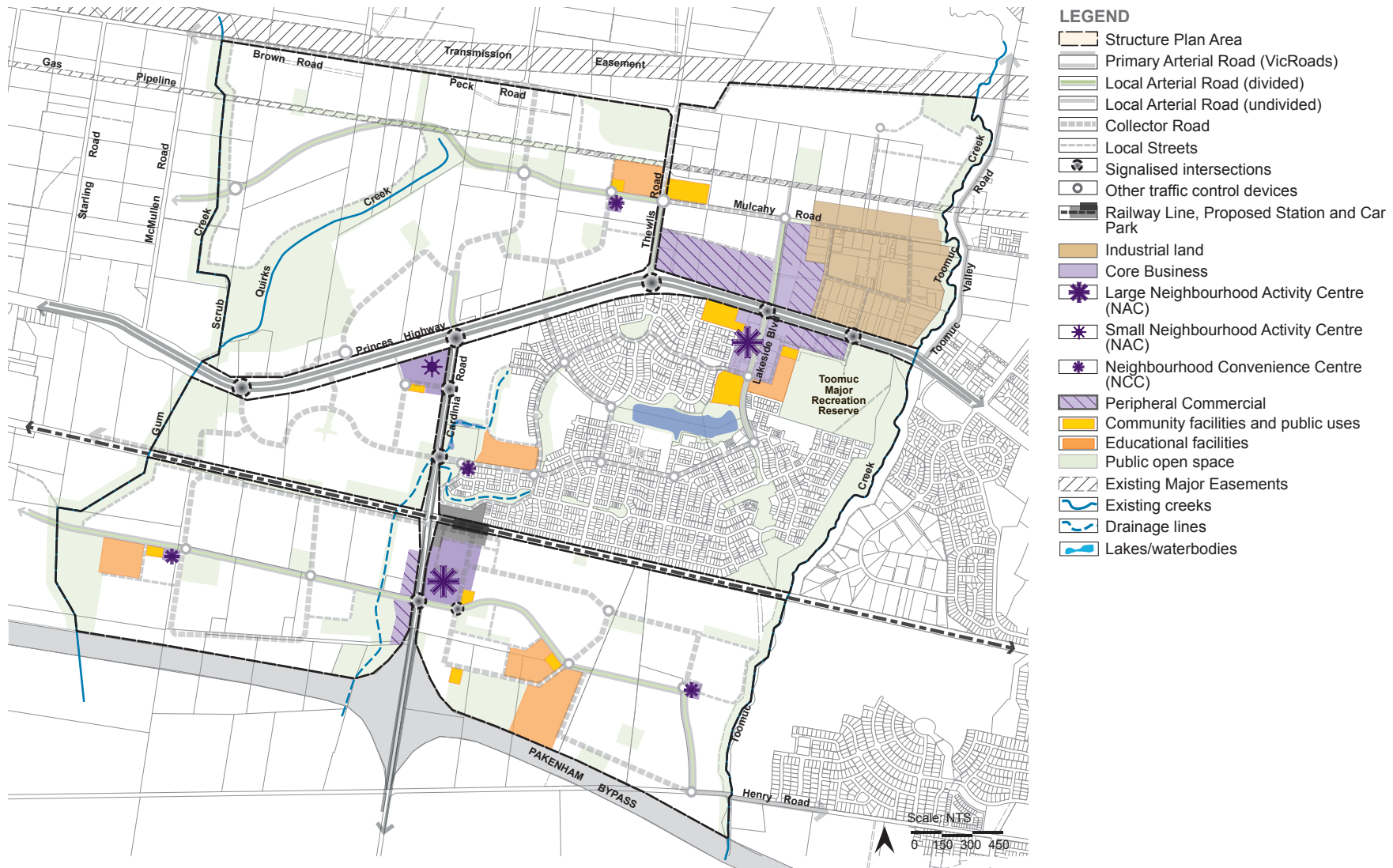


Table 6: The role, function and indicative floor space of the Activity Centres in the Cardinia Road Precinct

Activity Centre	Indicative floor areas*	Role
Neighbourhood Activity Centre Lakeside Boulevard / Toomuc	10,000 sq m core retail floor space 25,000 sq m peripheral commercial	<ul style="list-style-type: none"> • Neighbourhood core retail and peripheral commercial role comprising a supermarket and associated shops and services. • Possible future upgrade from Neighbourhood Activity Centre (Neighbourhood Activity Centre) to Major Activity Centre (MAC)¹. • Regional peripheral commercial / bulky goods retailing role associated with the Pakenham Homemaker Precinct. • Regional recreation and community services role based on the Cardinia Cultural Centre, the indoor sports and aquatic centre ("Cardinia Life"), and Police and Emergency Services Complex. • Public transport access via Principal Public Transport Network (PPTN) route along the Princes Highway and local bus route along Lakeside Boulevard.
Neighbourhood Activity Centre Cardinia Road North	5,000 sq m core retail floor space	<ul style="list-style-type: none"> • Neighbourhood core retail and peripheral commercial role comprising a supermarket and associated shops and services. • Public transport access via Principal Public Transport Network (PPTN) route along the Princes Highway and local bus route along Cardinia Road.
Neighbourhood Activity Centre Cardinia Road South	10,000 sq m core retail floor space	<ul style="list-style-type: none"> • Neighbourhood core retail and peripheral commercial role comprising a supermarket and associated shops and services. • Restricted retail services along Cardinia Road. • Neighbourhood community services including primary school and community centre. • Support the development of a new railway station and park and ride facility on the east side of Cardinia Road. • Public transport access via a new railway station and local bus routes along a new east-west local road² connection across Cardinia Road (Henry Road extension) (which is to form part of the grade separated crossing of the railway line and Cardinia Road). • Safe and accessible pedestrian links via an east – west pedestrian bridge³ (which is to form part of the grade separated crossing of the railway line and Cardinia Road).
Neighbourhood Convenience Centres	500 sq m core retail floor space	<ul style="list-style-type: none"> • Neighbourhood core retail role comprising convenience shop / general store.

* Note: The floor areas are indicative of the size of the centre, based on the retail assessment undertaken as part of the preparation of the PSP. Variations from the indicative floor area may be permitted provided it does not change the role of the Activity Centre.

¹ Melbourne 2030 Final Report: Casey – Cardinia Committee for Smart Growth, 2005, p 70.

² To be funded by the Cardinia Road Precinct Development Contributions Plan (September 2008)

³ To be funded by the Cardinia Road Precinct Development Contributions Plan (September 2008)

Table 7: Activity Centre Design Objectives and Development Principles

Design Issue	Objectives	Development Principles
Activity Centre Typology	<ul style="list-style-type: none"> To provide active 'main street' based activity centres which: <ul style="list-style-type: none"> - provide an attractive focus for community activity and interaction; - create a strong urban character and sense of place; - establish a pedestrian oriented environment that is visually interesting, well connected and safe; and, - demonstrate an attractive built form and landscape character. 	<ul style="list-style-type: none"> All activity centres should be designed as 'main street' centres. The 'main street' should be an undivided road without a central median and provide for on-street parking. Sites in prominent locations should be identified for significant buildings or landmark structures. All activity centres should be designed to: <ul style="list-style-type: none"> - include an integrated stormwater and servicing solution; and, - maximise accessible and safe pedestrian linkages to, from and within the activity centre. Two storey built form elements are required as a general principle in the 'main street'. The built form is to be aligned with the property boundary of the 'main street'. Façade articulation is to be present, with fine grained scale shop fronts with access provided from the 'main street'. 'Big box' elements, such as supermarkets shall be provided behind this fine grained frontage. A continuous built form along the 'main street' is required. However minimised breaks in the frontage of the 'main street' may be permitted to allow: <ul style="list-style-type: none"> - access to car parking; and, - a well located 'town square' that addresses the retail uses.
Public Domain	<ul style="list-style-type: none"> To provide public spaces (including a Town Square) which encourage community interaction in a safe and attractive environment that connects to the open space network 	<ul style="list-style-type: none"> A central 'town square' is to be provided at each activity centre. The 'town square' must be well located and in scale with the activity centre. The 'town square' is required to have good solar orientation and be directly accessed by shop frontages to encourage outdoor dining.
Visual Character	<ul style="list-style-type: none"> To ensure that key view lines / sight lines into and out of the activity centre are incorporated in the overall design. 	<ul style="list-style-type: none"> Exposure to long built facades / continuous concrete walls, with minimal visual interest are not acceptable. Visual interest may be provided through the introduction of windows, display areas and/ or other treatments. Shops with two entries, to both the 'main street' and either the car park or an internalised mall are not permitted, except on corner locations. Ensure that plant structures on the roof are included within roof lines or otherwise hidden.

Table 7: Activity Centre Design Objectives and Development Principles (continued)

Design Issue	Objectives	Development Principles
Interface with Activity Centre & Road Network	<ul style="list-style-type: none"> To ensure a high standard of interface between activity centres, arterial roads and local roads 	<ul style="list-style-type: none"> Landscaping of the interface is to be of a high standard and is considered to be an important element to compliment the built form design. Areas of blank façades visible from arterial and/or local roads are to be minimised. Good built form design is considered to be the best solution to providing satisfactory interface design between the activity centre and the surrounding land uses. Corner sites, where the 'main street' meets an arterial road: <ul style="list-style-type: none"> will be designed to provide built form that anchors the 'main street' to the arterial road, this could be achieved through the use of a substantial multi-storey building located at the corner; are considered to be critical development sites and are not suitable sites for standard single storey fast food outlets or service stations; and, Are not required to include a retail component.
Supermarket and other 'large box uses'	<ul style="list-style-type: none"> To avoid internalised retail developments which present a blank facade and extensive car parking areas to the street. 	<ul style="list-style-type: none"> Supermarkets and other 'large box uses' should not present a façade to the 'main street' The preferred supermarket / other 'large box uses' entry is to be via a small entry mall from the 'main street' rather than directly from the car park. A secondary entry via a mall entry from the car park is acceptable, provided the primary entry is from the 'main street'. Small access malls that address a supermarket / other 'large box uses' can form part of the overall design. Such access malls may have a limited number of internalised shops. The primary access to these malls must be from the 'main street'.
Main street traffic	<ul style="list-style-type: none"> To ensure that traffic is to be managed to ensure pedestrian safety. 	<ul style="list-style-type: none"> The use of pedestrian crossings, slow zones, pedestrian priority areas and clearly indicated mixed mode areas should be used to deliver a pedestrian friendly environment. The use of roundabouts to manage traffic is discouraged.

Table 7: Activity Centre Design Objectives and Development Principles (continued)

Design Issue	Objectives	Development Principles
Parking	<ul style="list-style-type: none"> To ensure that adequate provision is made for on street parking within the 'main street' To ensure that the access and design of off street parking addresses vehicle and pedestrian movement and provides for appropriate landscaping. 	<ul style="list-style-type: none"> The 'main street' should include on street parking. Access for off-street parking shall be designed in such a way to minimise the entry area frontage to the 'main street'. The design of off-street car parking should ensure: <ul style="list-style-type: none"> - the car park is accessible for 'main street' traffic; - the integration of a pedestrian friendly path network to, from and within the car park; and, - that appropriate detail has been considered such as the incorporation of clean trunked deciduous shade trees and protection from prevailing winds.
Public Transport	<ul style="list-style-type: none"> To integrate the provision of public transport services into the design and layout of the activity centre. 	<ul style="list-style-type: none"> The activity centre will be designed to incorporate the proposed public transport network. Provision will be made to locate public transport infrastructure / facilities at commuter friendly / convenient locations within the activity centre.
Signage	<ul style="list-style-type: none"> To provide for activity centre identification 	<ul style="list-style-type: none"> A maximum of one central, freestanding 'centre – identifying' sign is to be provided. All other signage should be within the built form of the activity centre structures.
Service Areas	<ul style="list-style-type: none"> To minimise the visual and physical impact of services areas on the main street and public domain. 	<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, they must present a well designed and secure façade to public areas.

3.3.3 Urban Design Framework Requirements

Cardinia Road / Railway Station Neighbourhood Activity Centre

The Urban Design Framework must show:

- A 'main street' running parallel to Cardinia Road (north-south).
- Traffic signals at the intersection of the 'main street' with the east-west local arterial road.
- Provision for temporary access for south bound traffic travelling along Cardinia Road.
- Options for providing permanent access for south bound traffic on Cardinia Road if the grade separation proceeds as an underpass.
- The railway station designed to be integrated within the activity centre, ensuring that:
 - views to the station along the 'main street' are an important feature of the centre's design;
 - the built form of the railway station provides an opportunity for the development of a superior public domain environment;
 - the design outcome invites and engenders civic pride, while offering a safe and enjoyable place to use; and,
 - bus access, taxi facilities and pedestrian and bicycle access is included in the design.
- Provision for safe and efficient pedestrian / bicycle and vehicular north – south access along Cardinia Road to the new railway station and the activity centre pending the construction of the grade separation of Cardinia Road and the railway line.
- How at grade car parking provides opportunities to be used for future redevelopment of multi-level carparking, and potential residential apartments / additional commercial/retail activity.
- How the proposed activity centre provides for a substantial residential component and can accommodate future access and servicing needs to these sites.
- The draft urban design framework provided in Figure 15, is an indicative design solution. Alternative approaches may be considered, that meet the objectives for activity centre design, to the satisfaction of the Responsible Authority.



Figure 15: Draft Urban Design Framework - Cardinia Rd/Railway Station Neighbourhood Activity Centre



Cardinia Road / Railway Station Neighbourhood Activity Centre

The Urban Design Framework must show:

- How development of the corner site at the Cardinia Road /Princes Highway intersection can be considered for 'second stage' of development.
- How options for meeting future access and servicing needs for the future development of the site are protected
- The draft urban design framework, provided in Figure 16, is an indicative design solution. Alternative approaches may be considered, that meet the objectives for activity centre design, to the satisfaction of the Responsible Authority.

Figure 16: Draft Urban Design Framework - Cardinia Rd/Princes Hwy Neighbourhood Activity Centre



Figure 17: Draft Urban Design Framework - Lakeside Blvd/Princes Hwy Neighbourhood Activity Centre

Lakeside Boulevard/Princes Highway Neighbourhood Activity Centre

The Urban Design Framework must show

- Development on the north side of Princes Highway that is generally consistent with the Pakenham Homemaker Precinct Urban Design Framework (2004).
- Development on the south side of the Princes Highway that is generally consistent with the Toomuc Sports Precinct Urban Design Study (2006).
- The draft urban design framework, provided in Figure 17, is an indicative design solution. Alternative approaches may be considered, that meet the objectives for activity centre design, to the satisfaction of the Responsible Authority



Figure 18: Draft Urban Design Framework - Neighbourhood Convenience Centres

Neighbourhood Convenience Centres

The urban design framework must show:

- How the overall design and location of the neighbourhood activity centre has had regard to the adjoining public uses.
- How parking solutions integrated with adjoining public uses are achieved.
- The draft urban design framework, provided in Figure 18, is an indicative design solution. Alternative approaches may be considered, that meet the objectives for activity centre design, to the satisfaction of the Responsible Authority.

3.4 Employment and Economic Activity

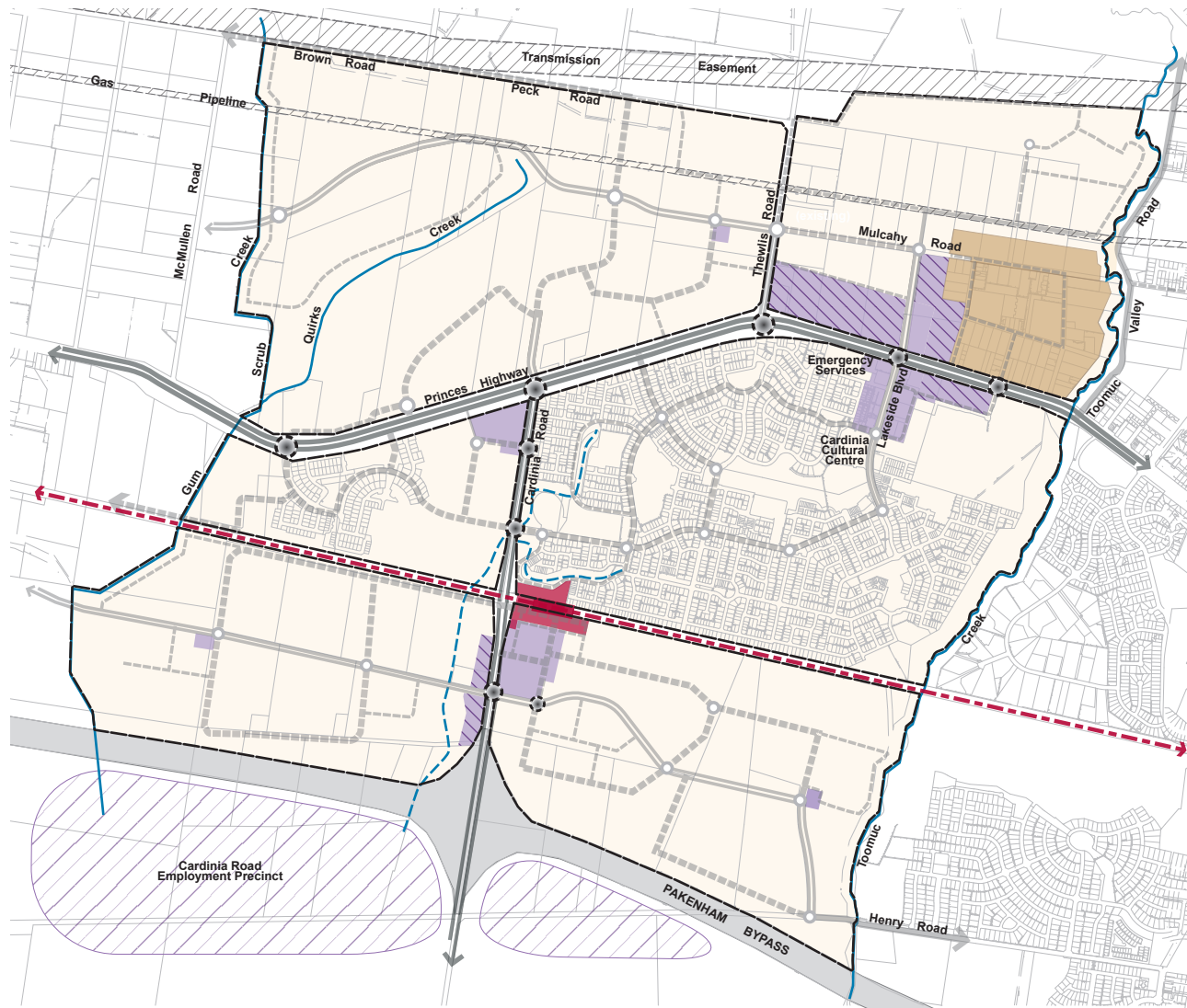
3.4.1 Objectives

- To provide opportunities for local employment through the integration of economic activities into the development of the precinct; such as;
 - the provision of a network of activity centres with a mix of retail, commercial, leisure and community services activities; and,
 - the establishment of community services (public and private) and other activities (such as childcare centres and nursing homes) which provide employment as well as services to the local community.
- To maximise accessibility to and within employment opportunity areas, particularly by public transport, cycling and walking to ensure an improved quality of life of residents, as well as reducing the demands for travel.
- To provide for a mix of retail, commercial, leisure and other services to support the needs of workers of nearby business and industry.
- To minimise potential amenity impacts between existing industrial activity and residential development.

3.4.2 Development Principles

- The development of the employment areas should meet the requirements of Plan 13: Employment and Commercial Activity.
- Design and development of activity centres should provide for a mix of retail, commercial, leisure and community services activities; and demonstrate the capacity for future expansion.
- Education and community services (public and private) and other activities (such as childcare centres and nursing homes) should be encouraged:
 - within community hubs;
 - within/or on the edge of activity centres;
 - on either collector roads or local arterial roads; and/or,
 - within walking distance of public transport.
- Restricted retailing should be encouraged along the Princes Highway frontage and within the Pakenham Homemaker Centre within land shown as peripheral commercial.
- Potential amenity impacts at interface between the existing industrial precinct and residential development should be minimised through the provision of an acoustic fence and landscaping buffer.

Plan 13: Employment & Commercial Activity Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Local Streets
- Signalised intersections
- Other traffic control devices
- Railway Line, Proposed Station & Car Parking
- Industrial land
- Core Business
- Peripheral Commercial
- Cardinia Road Employment Precinct
- Existing Major Easements
- Existing Creeks
- Drainage Lines

3.5 Community Infrastructure

3.5.1 Objectives

- To provide a network of community hubs across the precinct as focal points for community activity and interaction.
- To provide a range of community facilities, cultural venues and services to meet the varying needs of local residents.
- To promote high quality architecture and flexible design and use of community facilities to accommodate changing community needs over time
- To provide for community facilities and services delivered by government and non-government education, health and community service providers.
- To encourage the co-location of community facilities with activity centres, open space, and transport facilities.
- To maximise access to community facilities especially by public transport, walking and cycling.

3.5.2 Development Principles

The development of the community infrastructure should meet the requirements outlined in:

- Table 8: Network of Community Hubs; and,
- Plan 14: Community Facilities within the Cardinia Road Precinct.

Design of community facilities

All community facilities should be designed to:

- provide for the multi-use of facilities by different groups within the community;
- facilitate the efficient and shared use of resources and facilities; and,
- provide for disability access, and incorporate Crime Prevention Through Environmental Design (CPTED) Safe Design Principles where appropriate.

Location of non-government schools

Non-government schools are encouraged to co-locate with open space and other schools and community facilities.

Non-government schools should be located within walking distance to the principal public transport network.

Plan 14: Community Facilities Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Local Street
- Signalised Intersections
- Other Traffic Control Devices
- Cardinia Road Under Rail (Grade Separation)
- Railway Line, Proposed Station and Car Park
- Neighbourhood Activity Centre (NAC)
- Small Neighbourhood Activity Centre (NAC)
- Neighbourhood Convenience Centre (NCC)
- Community Facilities & Public Uses (CC = Community Centre)
- Educational Facilities (PS = Primary School, PPS = Post Primary School, PrS = Private School)
- Public Open Space
- Major Easements
- Existing Creeks
- Drainage lines
- Urban Community Hub
- District Community Hub

Table 8: Network of Community Hubs

Hub / Catchment	Location and land allocation	Core facilities	Potential additional facilities
Neighbourhood Hub			
Catchment of approximately 1,000 people	1 ha within 500 m of every dwelling	Local open space/local park	Community Meeting Space Public Transport stop
Urban Hub			
Catchment of approximately 5,000 – 9,000 people	Total site area of 5 ha Located on public transport routes and within 1,000 m of most dwellings Urban Hubs provided at: <ul style="list-style-type: none"> • Cell 1 • Cell 3 • Cell 4 • Cell 5 	Local open space/local park Community centre (Kindergarten and Community Meeting Space) Primary school Public Transport Stop	Within Community Centre: <ul style="list-style-type: none"> • Maternal and Child Health Centre • Space for sessional and outreach services Medical centre Childcare centre After school care
District Hub			
Catchment of approximately 30,000 people	Total site 6 – 8 ha Joint Urban Hub/District Hub provided in Cell 6 located within proximity of Cardinia Station and in Cell 4 Lakeside Boulevard.	Local open space/local park Community centre (Kindergarten and Community Meeting Space) Primary school Additional purpose built Meeting Space Public Transport Stop	Within Community Centre: <ul style="list-style-type: none"> • Maternal and Child Health Centre • Meeting Place • Youth Specific Building / Services Secondary School

3.6 Open space

3.6.1 Objectives

- To provide and develop a range of open space types to meet the active and passive needs of the community and protect and restore environmental values and features.
- To provide a range of appropriately sized and well distributed open spaces to meet local and district open space needs.
- To provide for the protection and enhancement of areas of environmental significance and to integrate these areas with open space systems.
- To create an attractive urban environment with a strong sense of place through the provision and landscaping of open space.
- To ensure that open space development standards provide for a sustainable future maintenance regime.
- To encourage and promote the early development of open space through subdivisional works, the development contribution plan; and/or Council's Capital Works Programs.

3.6.2 Development Principles

The open space network must meet the requirements outlined in the following:

- Table 9a: Open Space Contributions;
- Table 9b: Open Space Categories; and,
- Plan 15: Open Space Network¹⁹.

Public Open Space Contribution

A minimum public open space contribution of 8% of the land to be subdivided must be provided as part of the subdivision of land for residential purposes.

The 8% public open space contribution must comprise land **unencumbered** by other constraints (eg: land required by Melbourne Water for drainage purposes, land within service easements) to allow its full use for recreation purposes.

Any **encumbered** public open space should be provided in addition to the 8% unencumbered public open space contribution.

Where the size and location of a parcel of land being subdivided is unable to provide open space within the framework set out the structure plan, a cash contribution in lieu of the provision of land for open space should be provided.

Funds collected through these contributions should be used to offset the provision of land for open space on a parcel of land being subdivided where the amount of open space to be provided exceeds the 8% public open space contribution.

¹⁹ Note: The configuration of the shape of the open space area may be modified to the satisfaction of the Responsible Authority.

Plan 15: Open Space Network Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Local Streets
- Signalised intersections
- Other traffic control devices
- Railway Line, Proposed Station and Car Park
- Public open space (unencumbered)
- Public open space (encumbered)
- District sports reserves (8ha+)
- District Parks
- Existing Major Easements
- Existing creeks
- Drainage Lines
- Lakes/waterbodies

NOTES

- Part encumbered and part unencumbered open space. (For the purpose of Table 1: Land Budget, this has been classified as 'District Open Space')

Scale: NTS
0 150 300 450

Table 9a: Open Space Contributions

Cell	Cell 1	Cell 2	Cell 3	Cell 4⁽¹⁾	Cell 5	Cell 6
Net Residential Developable Area (ha)	211.5	88.7	50.3	179.8	107.4	125.1
District Sports Reserves*	0.0	0.0	8.0	N/A	8.0	8.0
District Parkland*	16.2	0.0	0.0	N/A	0.0	0.0
Neighbourhood Sports Reserve*	0.0	0.0	0.0	N/A	0.0	0.0
Local Open Space (8% of Net Residential Developable Area)	16.9	7.1	4.0	N/A	8.6	10.0

* Further information in relation to the Land Use Budget for each Cell is provided in Section 2 of this Structure Plan

(1) Existing Urban Area

Table 9b: Open Space Categories

Role	Location	Development Principles
<p>District Park</p> <p>To serve the regional recreation needs of the community, serving a catchment area of 15,000 to 25,000 people.</p>	<p>District Parks are to be provided:</p> <ul style="list-style-type: none"> • Lake Reserve (already exists in Cell 4) • Hilltop Parklands* north of the Princes Highway (located within Cell 1). <p>Must be accessible by public transport.</p>	<ul style="list-style-type: none"> • Should be from 4 ha - 10 ha plus. • Should provide extensive informal recreation park, including mown grassland • Should be associated with a linear feature such as a waterway or ridgeline, • Should be integrated with adjacent sports facilities, where these exist • Should provide a diversity of recreation facilities eg. Barbeques, walking and cycling trails, and play facilities
<p>District Sports Ground</p> <p>To provide for junior and senior training and competition</p>	<p>District sports reserves are to be provided:</p> <ul style="list-style-type: none"> • Princes Highway & Gum Scrub Creek** (Cell 3); • Henry Road (west of Cardinia Road) adjoining Gum Scrub Creek* (Cell 5); and, • Henry Road (east of Cardinia Road)* (Cell 6) • Toomuc Rerve (existing) (Cell 4). <p>Must be accessible from a primary or local arterial road and must be accessible by public transport</p>	<ul style="list-style-type: none"> • Should have a total area of at least 8 ha for each park. • Should incorporate provide for irrigated grass sportsgrounds • Are provided with at least a pavilion that includes change rooms, toilets and canteen. Training lights are usually provided. • Should be located adjacent to a secondary college or adjoining a linear park. • Should contain two playing fields or ovals with a buffer space.
<p>Neighbourhood Sports Reserves</p> <p>To provide for junior training and competition and as informal recreation space by local residents.</p>	<p>One Neighbourhood Sports Reserve** is to be provided on the north east corner of Cardinia Road and Shearwater Drive (Cell 4).</p>	<ul style="list-style-type: none"> • Usually about 2 - 3 ha in size • Should be located adjacent to a primary school • Should be provided with pavilions, toilet facilities and training lights, depending on local demands.

* Land and embellishment work to be funded by the Cardinia Road Precinct Development Contribution Plan. (September 2008)

** Embellishment work to be funded by the Cardinia Road Precinct Development Contribution Plan (September 2008) (part Community Infrastructure Levy and part Development Infrastructure Levy)

Table 9b: Open Space Network Categories (continued)

Role	Location	Development Principles
<p>Conservation Reserve</p> <p>To provide for the protection of flora and fauna habitat.</p> <p>To provide for community groups such as Landcare or park "Friends" groups to be actively involved in the management of these areas.</p>	<p>Conservation Reserves are located:</p> <ul style="list-style-type: none"> • North of Mulcahy Road, located east of Thewlis Road containing Grassy Forest EVC. • The Hilltop Reserve on the south west corner of Thewlis Road and Peck Road containing Grassy Forest and Damp Heathy Woodland EVC. 	<ul style="list-style-type: none"> • Identified EVC areas should be incorporated • Formal recreation use should be limited.
<p>Local Open Space</p> <p>Town Square</p> <p>To provide a attractive focus and gathering point within activity centres</p>	<p>Located within an Activity Centre.</p>	<ul style="list-style-type: none"> • Provide a formal park, managed to a high standard usually with mown and irrigated lawns, paving, sculpture, shrub or flower beds.
<p>Local Park</p> <p>To meet the local recreation needs of residents and provide usable and functional local open spaces</p>	<p>Located throughout the Structure Plan Area so that all dwellings are within 500m of a local park.</p>	<ul style="list-style-type: none"> • Should have a minimum area of 1ha • Provide grassed areas and simple play facilities • Consider the need to minimise ongoing maintenance requirements
<p>Linear Park</p> <p>To serve a variety of purposes including drainage / water management, wildlife corridors, visual buffers, and movement corridors (for pedestrians, cyclists, and potentially horses where appropriate).</p>	<p>Linear open space corridors are located along:</p> <ul style="list-style-type: none"> • Toomuc Creek corridor • Gum Scrub Creek corridor 	<ul style="list-style-type: none"> • Corridors should have a minimum width of 100m (50m either side of centre line of creek) with significantly wider nodes. • Corridors should create long, relatively narrow, interconnected open space areas • Wider nodes should created by locating adjoining open space (eg: District Park or Sports Reserve). • Should accommodate shared pathways.

Local Open Space Landscape Plan

A detailed landscape plan must be prepared for local open space as part of the overall landscape concept plan for the development. The local landscape plan must show where relevant:

- how significant view corridors have been considered;
- significant vegetation, including remnant vegetation and provide details for protection and retention;
- incorporation of stormwater management and techniques to improve stormwater quality, particularly along drainage lines;
- open space landscaped to at least a base improvements standard as part of subdivision construction works;
- ensure walking and cycling routes are provided with good surveillance; and,
- the parks and open space objectives set out in the Safer Design Guidelines for Victoria (2005).

The landscape plan and associated works, including the future maintenance regime, must be in accordance with Council's adopted standards as set out in the Council's Landscape Development Guidelines²⁰.

All landscaping and improvement works for public open space should be undertaken in accordance with Table 10.

²⁰ Landscape Development Guidelines, Cardinia Shire Council (June 2007)

Table 10: Landscaping and Improvement Standards

Standard of works	Description	Means of provision
Base improvements	Earthworks and drainage to create the final form of the parkland. Seeding of grass on all exposed surfaces. Planting of trees and shrubs Local pathway construction	As part of subdivision construction works.
Community improvements	Additional landscaping Playgrounds Sporting facilities Infrastructure (carparking, BBQ's, etc)	As part of development contributions.**
Marketing improvements*	Feature landscaping (including walls, paving and furniture) Additional landscaping.	As part of developer works.

* Marketing improvements will be undertaken wholly at the developer's cost and only where Council agrees that the improvements will not impose an unreasonable additional cost for the future maintenance of the improvements by Council

** Will be funded in accordance with the detailed project sheets outlined in the Cardinia Road Precinct Development Contribution Plan (September 2008) Biodiversity

3.7 Biodiversity

3.7.1 Objectives

- To protect and restore key areas of native habitat and create new waterway corridor and habitat links.
- To provide for the long term conservation management of areas of significant native vegetation and fauna habitat
- To create open space corridors which incorporate stormwater treatment wetlands along the Toomuc Creek and Gum Scrub Creek
- To protect and restore habitat for the Growling Grass Frog in accordance with the management plan for the urban growth area.
- To effectively manage stormwater and to improve downstream water quality flows into Western Port.
- To encourage the collocation of public recreation and open spaces to assist in buffering of reserves and waterways.

3.7.2 Development Principles

Biodiversity management should meet the requirements outlined in Plan 16: Biodiversity Management Plan.

Growling Grass Frog Habitat

Frog movement corridors are located south of the railway line reservation and within Gum Scrub Creek. Movement corridors should be a minimum width of 20m wide. Collocation of open space, pathways or road and rail reserves adjacent to the movement corridor is encouraged.

Habitat protection and creation opportunities exist along the Toomuc and Gum Scrub Creek corridors and within the stormwater treatment wetlands.

The status of the Growling Grass frog in the northern portion of the study area (north of Princes Highway) is not known, and requires further assessment.

Habitat and movement corridors should be designed and constructed in accordance with the Conservation Management Plan for the Growling Grass Frog.

Waterway buffers, Rehabilitation and Conservation Works

The open space corridors along the Toomuc Creek and Gum Scrub Creek should have a minimum width of 100m (50 m each side of the centre line of the creek) to provide for vegetation buffers and the protection and enhancement of the creek system in addition to other uses.

Rehabilitation and conservation works are provided for in the open space corridors through both drainage plan requirements and, for the balance of the required land, through the Development Contributions Plan.

The Development Contributions Plan also provides for rehabilitation and conservation works at the District Park.

Ecological Vegetation Classes (EVC)

Where practical and sustainable, identified areas of EVC's should be incorporated in to the design of open space reserves.

Plan 16: Biodiversity Management Plan



LEGEND

- Structure Plan Area
- Railway Line, Proposed Station & car park
- Public Open Space
- Existing creeks
- Drainage Lines
- Lakes/waterbodies
- Ecological Vegetation Classes (EVC's)
- 60m contour (landscape significance)
- Frog Habitat protection/connectivity
- Investigate Frog habitat creation / augmentation
- Existing Major Easements

Scale: NTS
0 150 300 450

Remnant Vegetation

Small patches of remnant vegetation exist along roadsides, railways and at the following locations:

- Grassy Forest north of Mulcahy Road to the east of Thewlis Road;
- Grassy Forest and Damp Heathy Woodland the south west corner of Thewlis Road and Peck Road;
- Swampy Riparian Woodland and Swampy Woodland along the Toomuc Creek (generally north of the railway line); and,
- Patches of Swamp Scrub along the Gum Scrub Creek.

Where practical and sustainable, remnant vegetation should be retained in road reserves, large lots or incorporated into the design of public open spaces.

Native Vegetation Precinct Plan

A Native Vegetation Precinct Plan is not warranted for the Cardinia Road Precinct Structure Plan due to:

- the limited amount of remnant vegetation in the study area (as determined by a Regional Indigenous Vegetation Survey, January 2004);
- the requirement to undertake Flora and Fauna Assessments and Vegetation Management Plans; and,
- the overall design of the Structure Plan which identifies EVCs within open space reserves.

Flora and Fauna Assessment

A detailed flora and fauna assessment is required to be undertaken to identify flora and fauna values and must be submitted with an application for subdivision.

Vegetation Management Plan

A vegetation management plan is required for locations of remnant vegetation.

The vegetation management plan must:

- identify areas of flora and fauna habitat to be retained, protected or removed, lopped or destroyed;
- set out measures for retention and protection of significant vegetation, both short term (i.e during construction) and long term; and,
- set out management measures for protection and enhancement of threatened species habitat.

Landscape Concept Plan

A landscape concept plan is required to be undertaken and must respond to biodiversity values by:

- identifying any proposals to enhance biodiversity in the region and enhance planting opportunities within urban areas;
- retaining mature isolated trees through their incorporation into open space, road reserves and larger lots; and,
- maximising opportunities for revegetation in urban areas, particularly on ridgelines.

3.8 Image, Character and Unique Features

3.8.1 Objectives

- To create a strong sense of place that emphasises the landscape character and topographical features of the precinct.
- To preserve view corridors to and from significant landscape features, and ensure development does not detract from visual amenity.
- To recognise the strong contribution that open corridors along the Toomuc Creek and Gum Scrub Creek make as a landscape feature.
- To recognise the strong contribution that the ridgelines and valleys make to the landscape character of the region.
- To ensure a sustainable response to topography in terms of managing erosion, overland flow and water quality; addressing revegetation (on slopes in particular) and ensuring development does not detract from visual amenity.

3.8.2 Development Principles

Use, development and subdivision should respond to the image, character and unique features as depicted in Plan 17: Image, Character and Unique Features Plan.

Ridgelines and vegetation

- Lots should be designed so that dwellings can be built below the top of ridgelines and either vegetation is retained or the hilltops are revegetated.

Open Space Corridors

- Open space corridors should contribute to the preservation of drainage lines, including the existing valley and creek systems, and the need to provide drainage across the floodplain.
- Open space corridors along the Toomuc Creek and Gum Scrub Creek should have a minimum width of 100 metres, with significantly wider sections though the location of adjoining open space such as hilltops and sporting reserves.
- Design of open space should respond to view corridors.

Topographical assessment plan requirements

A topographical assessment plan will be required that shows how:

- existing view corridors to landmarks are protected;
- opportunities for new or enhanced view corridors in open space, along roadways etc are created;
- the urban structure and road and allotment layout responds to topography and will assist in terms of managing erosion and overland flow; and,
- opportunities for revegetation are provided along ridgelines and within larger lots.

Plan 17: Landscape Character and Topographical Features Plan



LEGEND

- Structure Plan Area
- Railway Line, Proposed Station and Car Park
- Creek Corridors
- Hill Tops
- 5m Contours
- Existing Long Views
- Existing Short Views
- Major Easements
- Existing Creeks
- Drainage Lines

3.9 Heritage

3.9.1 Objectives

- To acknowledge that the Shire of Cardinia is the traditional land of indigenous clans.
- To ensure indigenous archaeological sites are identified and managed in accordance with statutory requirements.

3.9.2 Development Principles

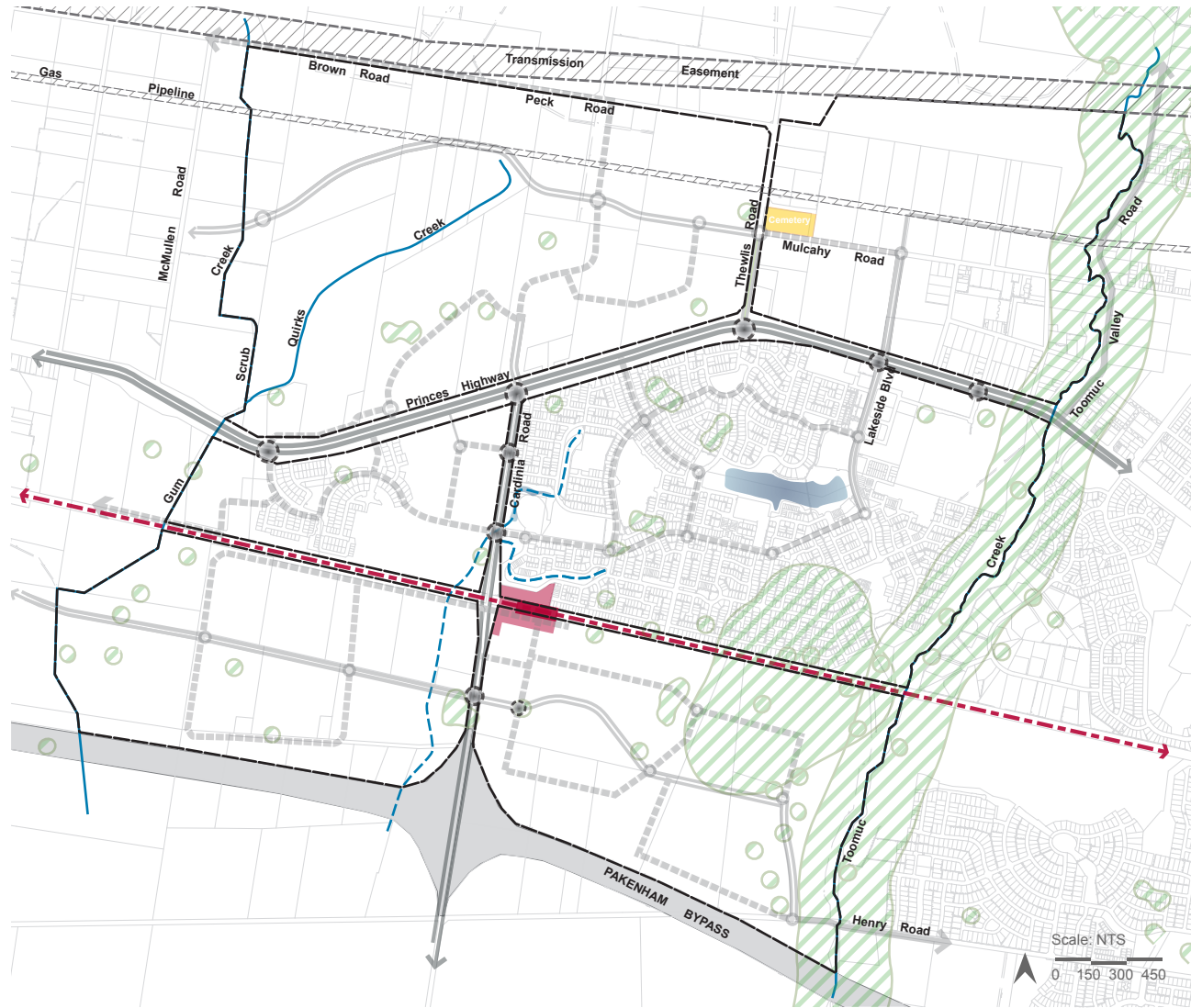
Aboriginal Cultural Heritage

- Individual planning permit applications will need to comply with regulatory requirements in relation to preparation of an Aboriginal Cultural Heritage Management Plan. These areas are shown on Plan 18: Heritage as areas of Cultural Heritage Sensitivity.

European Heritage

- With the exception of the locally significant Pakenham Cemetery, there are no sites of European heritage significance within the Precinct Structure Plan.

Plan 18: Heritage Plan



LEGEND

- Structure Plan Area
- Primary Arterial Road (VicRoads)
- Local Arterial Road (divided)
- Local Arterial Road (undivided)
- Collector Road
- Local Street
- Signalised intersections
- Other traffic control devices
- Railway Line, Proposed Station and Car Park
- Areas of Cultural Heritage Sensitivity. Source: AAV (Aboriginal Heritage Act 2006)
- Existing creeks
- Drainage Lines
- Existing Major Easements
- Lakes/waterbodies
- Existing Pakenham Cemetery

Scale: NTS
0 150 300 450

3.10 Physical Services

3.10.1 Objectives

- To integrate use of all water resources including rainwater, reused water, recycled water and stormwater.
 - To provide all developed lots in the Cardinia Road Precinct with:
 - a potable water service;
 - electricity;
 - a reticulated sewerage service;
 - drainage;
 - gas; and,
 - telecommunications.
 - To provide recycled water to be used for purposes such as toilet flushing and garden watering on individual residential properties and the watering of public open space in order to reduce the level of consumption of potable water.
 - To ensure that if lots are not able to be serviced by a reticulated recycled water supply system, new dwellings and / or commercial buildings be provided with a rainwater tanks purposes such as toilet flushing and garden watering.
- To ensure that Water Sensitive Urban Design treatment measures (eg: wetlands) are provided in both the main and local drainage network.
 - To ensure that the the community in the Cardinia Road Precinct have access to the Broadband network.

3.10.2 Development Principles

The physical services requirements will be implemented through the planning permit process, through the requirements of service authorities put in place through a combination of regulation and planning permit referral conditions and requirements.

Water

- The reticulated potable water supply must be designed and constructed in accordance with the requirements of South East Water to provide a potable water service to the boundary of all developed lots in the Cardinia Road Precinct.
- The reticulated recycled water supply must be designed and constructed in accordance with the requirements of South East Water to provide a recycled water service to the boundary of all developed lots in Cells 1, 3, 5 & 6 in the Cardinia Road Precinct.
- If lots are not able to be serviced by a reticulated recycled water supply system, then as an alternative to reduce potable water use, new dwellings and or commercial buildings must be provided with a rainwater tank to collect roof runoff for purposes such as toilet flushing and garden watering.

Sewerage

- The reticulated sewerage system must be designed and constructed in accordance with the requirements of South East Water to provide a reticulated sewerage service to the boundary of all developed lots in the Cardinia Road Precinct.

Drainage

- Water quality objectives are set out in the Urban Stormwater – Best Practice Environmental Management Guidelines 1999. They are achieved through the main drainage network and must be designed and constructed in accordance with the requirements of relevant drainage scheme and Melbourne Water.
- The local drainage network must be designed and constructed in accordance with the requirements of the Cardinia Shire Council.
- Water Sensitive Urban Design treatment measures (eg: wetlands) should be implemented in both the main and local drainage network.

Electricity

- The electricity supply system must be designed in accordance with the requirements of SPI AusNet and be provided to the boundary of all lots in the Cardinia Road Precinct.
- All new electricity supply infrastructure must be provided by underground means (excluding substations) and all existing above ground electricity lines in the local road network must be removed and placed underground as part of development.

Gas

- The gas supply network must be designed in accordance with the requirements of Origin Energy and be provided to the boundary of all lots in the Cardinia Road Precinct.

Telecommunications

- It is required that the community in the Cardinia Road Precinct have access to the Broadband network and developers must allow flexibility for future technology such as fibre optic cabling.

Gas Transmission Pipeline Easement

- It is preferred that the Gas Transmission pipeline easement be used as a road.
- The location of the Gas Transmission pipeline easement within a long linear reserve bordered by rear fences should be avoided.

3.11 Development Staging

3.11.1 Objective

To ensure that the staging of development is integrated with existing development and infrastructure.

3.11.2 Development Principles

- Staging will be principally driven by the development program of developers within the precinct, market demand, and the economic availability of infrastructure services.
- Development should proceed from the interface with existing development.
- Development should not create circumstances in which residents will be unreasonably isolated from commercial and community facilities or public transport.
- Access to a development must be via a sealed road.
- Development should, to the maximum extent practicable, be integrated with adjoining developments, including the timely provision of connecting roads and walking / cycling paths.
- If the above staging principles are not met, the developer will be required to bring forward infrastructure (i.e. fund up front) to the extent necessary to meet the principles outlined above.

04 INFRASTRUCTURE INVESTMENT

4.1 Plan Introduction

The Infrastructure Investment Plan (IIP) sets out the need and requirements for infrastructure and services to meet the needs of development the precinct.

This initial IIP is being further developed and by the Growth Areas Authority and the Cardinia Shire Council and will be updated when its development is complete.

The Structure Plan identifies a range of physical and social infrastructure required as part of the development of the Cardinia Road Precinct.

This infrastructure is to be provided through a number of mechanisms including:

- subdivision construction works by developers;
- development contributions (community infrastructure levy and development infrastructure levy);
- utility service provider contributions; and,
- capital works projects by Council, state government agencies and community groups.

Subdivision construction works

As part of subdivision construction works, new development in the Cardinia Road Precinct is required to meet the cost of delivering the following infrastructure:

- Local Arterial Roads (undivided), collector roads and local streets.
- Landscaping of local arterial roads (undivided), collector roads and local streets.
- Intersection works and traffic management measures along local arterial roads (undivided), collector roads and local streets.
- Uncontrolled intersection works providing access from an arterial road (primary and local) to a collector road or local street.
- Council approved fencing and landscaping (where required) along arterial roads.
- Local pedestrian and bicycle paths along local arterial roads (undivided), collector roads and local streets and within local parks.
- Basic improvements to local parks / open space including levelling, grassing, tree planting and local paths.
- Local drainage systems.
- Infrastructure as required by utility services providers including water, sewerage, drainage, electricity, gas, and telecommunications.

Development Contributions Plan

A development contributions plan has been prepared for the Cardinia Road Precinct in conjunction with this Structure Plan. The Development Contributions Plan is an incorporated document of the Cardinia Planning Scheme.

The key infrastructure and services items to be included in the development contributions plan are outlined in this section. These items are either fully funded or partly funded by the Cardinia Road Precinct DCP.

Community Infrastructure Levy (CIL)

The Development Contributions Plan requires that new development in the Cardinia Road Precinct meets the cost of delivering the following community infrastructure items funded through the Community Infrastructure Levy (CIL):

- Improvements to district sports grounds (pavilions, floodlighting, etc).
- Community centre (Community Meeting Place).
- Library facilities.

Development Infrastructure Levy (DIL)

The Development Contributions Plan requires that new development in the Cardinia Road Precinct meets the cost (in whole or part) of delivering the following development infrastructure funded through the Development Infrastructure Levy (DIL):

- Land acquisition and construction costs for road widening along Cardinia Road (declared Main Road).
- Land acquisition and construction costs for upgrading the Local Arterial Road network from an 'Undivided' to a 'Divided' road design.
- Controlled intersection works along Princes Highway (Arterial Roads), Cardinia Road (Main Road) and Henry Road east (adjacent to an Activity Centre).
- Land acquisition and construction costs for a grade separated crossing of Cardinia Road and the railway line.
- Land required for a railway station.
- Bus stop facilities (regional and local bus network).
- Land for District Parkland and District Sports Reserves.
- Development of District Parkland and District Sports Reserves.
- Higher order pedestrian and cycle trail network (including pedestrian bridges over the creek network and pedestrian underpasses of railway line).
- A pedestrian and road bridge adjacent to the railway line bridge (grade separated crossing).
- Land acquisition and construction costs for community centres providing children's services.
- Land acquisition for library facilities.
- Construction of community centres (Maternal Child Health / Kindergarten & Youth)
- Construction of roundabouts within the local arterial road network.
- Local park improvements including playground equipment.
- A Noise Mitigation Report undertaken by Marshall Day Acoustics and LandDesign in consultation with VicRoads and Council to address the Noise Attenuation Issues generated by the Pakenham Bypass.

4.2 Infrastructure & Services

Table 11 sets out the initial list of infrastructure and services required within the precinct to support its development, including details of:

- Infrastructure Group
- Infrastructure Category
- Project Title
- Project Description
- Co-ordinating Agency. (The agency responsible for the coordination and approval of the project. Other agencies and / or developers may have an involvement in the project)
- Timing
- Indicative Capital Cost (\$2008)²¹

²¹ \$2007 for items costed as part of the Cardinia Road Precinct Development Contributions Plan (September 2008)

4.3 Project Co-ordination

The following projects have been grouped, as it has been identified that if delivered 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.

Project group 1: Road widening of Cardinia Road, grade separation of railway line, local road adjacent to bridge and construction of new railway station. (In order to provide minimal disruption to the rail service and prevent a point of congestion at the railway line crossing, Cardinia Council believes that the grade separation of Cardinia Road should be construction at the time of the Railway Station construction.)

Project group 2: New railway station and bus interchange at station.

Project group 3: Community Facilities, Primary Schools and District Sport Reserves.

Project group 4: Trail network with rehabilitation and conservation works within creek corridor.

Project group 5: Bus stops on PPTN, street lighting and trail network along Princes Highway.

Project group 6: Community facilities (Youth), District Sport Reserve and Secondary College.

4.4 Delivery and Monitoring

This initial IIP is being further developed by Cardinia Shire and the Growth Areas Authority. The final IIP will be incorporated into the Cardinia Planning Scheme once complete.

The Growth Areas Authority is developing a consistent process to manage the implementation and co-ordination of key projects in IIPs throughout the growth areas. This process will include an approach to manage the monitoring of growth area IIPs.

Table 11: Infrastructure and Service Projects

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
Roads						
	Primary Arterial Road	Cardinia Road Upgrading	Upgrading of Cardinia Road between the Princes Highway and the Pakenham Bypass to a 4 or 6 lane divided road including a grade separated crossing of the Gippsland Railway Line and signalised intersections at the intersections with the Princes Highway, Shearwater Drive and the Henry Road extension.	Vic Roads	Medium	\$46.7m
	Primary Arterial Road	Cardinia Road Interchange	Upgrading of the Cardinia Road Interchange with the Pakenham Bypass including duplication of the Cardinia Road bridge over the Pakenham Bypass and signalised intersections at the intersection of the Pakenham Bypass ramps with Cardinia Road.	Vic Roads	Medium	Being developed.
	Primary Arterial Road	Princes Highway Street lighting	Upgrading street lighting along the Princes Highway to an urban standard between Gum Scrub Creek and Lakeside Boulevard	Vic Roads / Council	Medium	\$1.1 million
	Primary Arterial Road	Pakenham Bypass Noise Attenuation	Construction of noise attenuation measures within freeway reservation to reduce noise impacts on nearby residents	Vic Roads	In stages as development proceeds	Being developed
	Local Arterial Road	Henry Road Extension	Construction of the extension of Henry Road between the Toomuc Creek and Cardinia Road to a 4 lane divided road standard including a signalised intersection at the main street for the southern neighbourhood activity centre and a bridge over Toomuc Creek.	Council	Short	\$11.8 million
	Local Arterial Road	Henry Road Extension	Construction of the extension of Henry Road between Cardinia Road and the Gum Scrub Creek to a 4 lane divided road standard including a bridge over Gum Scrub Creek.	Council	Short	\$5.6 million

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing	Indicative Cost (\$2008)
					S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	
	Local Arterial Road	Lakeside Drive Extension	Construction of Lakeside Drive between the Princes Highway and Mulcahy Road to a four lane divided road standard.	Council	Short	\$2.2 million
	Local Arterial Road	Thewlis Road	Construction of Thewlis Road between the Princes Highway and Mulcahy Road to a four lane divided road standard including a signalised intersection at the intersection with the Princes Highway.	Council	Short	\$2.9 million
	Local Arterial Road	Mulcahy Road Extension	Construction of the extension of Mulcahy Road between Thewlis Road and the Gum Scrub Creek to a 4 lane divided road standard including a bridge over Gum Scrub Creek.	Council	Short to Long	\$6.6 million
	Local Arterial Road	Officer Town Centre Connection Road	Construction of a bridge over the Gum Scrub Creek parallel to the north side of the Gippsland Railway line for a connecting road between the Cardinia Road Precinct and Officer Town Centre.	Council	Long	\$0.9 million
Public Transport						
	Public Transport	Cardinia Road Railway Station	Construction of the Cardinia Road Railway Station and associated car parking and bus interchange facilities.	Department of Transport	Short to Medium	\$25.0-\$35.0 million
	Public Transport	Bus stop facilities	Provision of bus stops along bus routes including bus shelters, paths and lighting.	Council	In stages as development proceeds	\$0.4 million
	Public Transport	Bus route expansion	Expand bus service coverage (bus route extensions and new routes) to provide a bus service to all residents within the Cardinia Road Precinct.	Department of Transport	In stages as development proceeds	Being developed

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
Trails						
	Trails	Princes Highway Trail	Construction of a 2.5m wide path along both sides of the Princes Highway between Lakeside Boulevard and Gum Scrub Creek	Council	Short to medium	\$1.5 million
	Trails	Toomuc Creek Trail	Construction of a 2.5m wide path along the Toomuc Creek including a rail underpass and two pedestrian bridges over the creek	Council	Medium	\$2.2 million
	Trails	Gum Scrub Creek Trail	Construction of a 2.5m wide path along the Gum Scrub Creek including a rail underpass.	Council	Medium	\$2.2 million
	Trails	Pakenham Bypass Trail	Construction of a 2.5m wide path along the Pakenham Bypass between Gum Scrub Creek and Toomuc Creek.	Council / Vic Roads	Medium	\$1.5 million
	Trails	Rail crossing east of Cardinia Road	Construction of a rail underpass east of Cardinia Road to improve pedestrian access.	Council	Medium	\$1.4 million
Open Space						
	Regional Open Space	Cardinia Creek Parklands	Acquisition and development of regional parklands along the Cardinia Creek for passive and environmental purposes to service the Casey Cardinia Growth Area.	Parks Victoria	Short to Long	Being developed
	District Park	Lakeside Reserve	Construction of an 8ha lake and adjoining passive recreation areas.	Council	Short	Complete
	District Park	Hilltop Park	Acquisition and development of a district park on the north side of the Princes Highway adjoining Gum Scrub Creek.	Council	Short/ Medium	\$8.4 million

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing	Indicative Cost (\$2008)
					S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	
	District Sports Reserve	Gum Scrub Creek / Princes Highway Reserve	Acquisition and development of a district sports reserve including two ovals, a regional playground, associated pavilion, carparking and infrastructure.	Council	Short	\$7.3 million
	District Sports Reserve	Gum Scrub Creek / Henry Road Extension Reserve	Acquisition and development of a district sports reserve including a playing field and lawn bowls greens, associated pavilions, carparking and infrastructure.	Council	Medium	\$7.6 million
	District Sports Reserve	Henry Road Extension (East of Cardinia Road)	Acquisition and development of a district sports reserve including two ovals, associated pavilion, carparking and infrastructure.	Council	Medium	\$7.3 million
	Neighbourhood Sports Reserve	Shearwater Drive	Construction of an oval and associated pavilion, car parking and infrastructure.	Council	Short	\$1.8 million
	Local Parks	Improvements to local parks	Provision of playground equipment in local parks in the Cardinia Road Precinct.	Council	Ongoing	\$1.5 million
Community						
	Early Childhood Centre	Thewlis Road (Worthington Estate)	Acquisition of land for and construction of an Early Childhood Centre and community meeting space.	Council	Medium	\$2.9 million
	Early Childhood Centre	Cardinia Road (Arena Estate)	Acquisition of land for and construction of an Early Childhood Centre and community meeting space.	Council	Long	\$2.2 million

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
	Early Childhood Centre	East of Cardinia Road (Delfin)	Acquisition of land for and construction of an Early Childhood Centre and community meeting space.	Council	Short /Medium	\$3.1 million
	Early Childhood Centre	West of Cardinia Road (Vic Urban)	Acquisition of land for and construction of an Early Childhood Centre and community meeting space.	Council	Medium	\$2.9 million
	Youth Centre	East of Cardinia Road (Delfin)	Construction of a youth centre in conjunction with secondary college and district sports reserve.	Council	Long	\$2.1 million
	Community Centre	East of Cardinia Road (Delfin)	Acquisition of land for and construction of a community centre to provide a community meeting space and services provision	Council	Medium	\$4.4 million
	Library	Officer Library	Acquisition of land for and construction of a library in the Officer Town Centre to service the Officer area.	Council	Long	\$7.7 million
	Indoor Sports Facility	Cardinia Life Upgrade	Upgrading of Cardinia Life to an 8 court stadium.	Council	Short	\$5.0 million
	Education	Thewlis Road Primary School (Worthington Estate)	Acquisition of land for and construction of a primary school.	Department of Education and Early Childhood Development	Medium	\$11.5 million

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
	Education	East of Cardinia Road	Acquisition of land for and construction of a primary school.	Department of Education and Early Childhood Development	Medium	\$11.5 million
	Education	West of Cardinia Road (Vic Urban)	Acquisition of land for and construction of a primary school.	Department of Education and Early Childhood Development	Medium	\$11.5 million
	Education	East of Cardinia Road	Acquisition of land for and construction of a secondary college.	Department of Education and Early Childhood Development	Medium / Long	Being developed
Utility Infrastructure						
	Water Supply	Princes Highway Distribution Main	Extension of an existing 300mm diameter distribution main along the Princes Highway to serve development in the precinct	South East Water	Short	Being developed
	Water Supply	Upgrading of recycled water capacity of Pakenham Sewerage Treatment Plant	Upgrading of the Pakenham Sewerage Treatment Plant to supply Class A recycled water and construction of a distribution main to service development in the precinct.	South East Water	Short	Being developed

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
	Sewerage	Toomuc Creek Branch Sewer	Construction of the Toomuc Creek Branch Sewer to service development in the Cardinia Road Drain Catchment.	South East Water	Short	Complete.
	Sewerage	Cardinia Road Branch Sewer and Mary Street Pumping Station	Construction of the Cardinia Road Branch Sewer and Mary Street Pumping Station and associated rising mains to service development in the Cardinia Road Drain Catchment.	South East Water	Short	Being developed.
	Sewerage	Gum Scrub Creek Branch Sewer and Officer South Road Pumping Station	Construction of the Gum Scrub Creek Branch Sewer and Officer South Road Pumping Station and associated rising mains to service development in the Gum Scrub Creek Catchment.	South East Water	Short	Being developed.
	Drainage	Pakenham West Drainage Scheme	Construction of outfall drainage works including a pipe network, channels, water retardation and water quality facilities.	Melbourne Water	In stages as development proceeds	Being developed
	Drainage	Cardinia Road Drainage Scheme	Construction of outfall drainage works including a pipe network, channels, water retardation and water quality facilities.	Melbourne Water	In stages as development proceeds	Being developed
	Drainage	Officer Drainage Scheme	Construction of outfall drainage works including a pipe network, channels, water retardation and water quality facilities.	Melbourne Water	In stages as development proceeds	Being developed

Table 11: Infrastructure and Service Projects (Continued)

Infrastructure Group	Infrastructure Category	Project Title	Project Description	Co-ordinating Agency	Timing S = 2008 - 2012 M = 2013 - 2017 L = 2018 +	Indicative Cost (\$2008)
Biodiversity						
	Landscaping and rehabilitation works	Gum Scrub Creek	Landscaping and rehabilitation of the Gum Scrub Creek corridor.	Council / Melbourne Water	In stages as development proceeds	\$4.4 million
	Landscaping and rehabilitation works	Toomuc Creek Corridor	Landscaping and rehabilitation of the Toomuc Creek corridor.	Council / Melbourne Water	In stages as development proceeds	\$1.3 million
	Landscaping and rehabilitation works	Quirks Creek Corridor and Retarding Basin	Landscaping and rehabilitation of the Quirks Creek corridor and retarding basin.	Council / Melbourne Water	In stages as development proceeds	\$6.0 million

05 OTHER INFORMATION

5.1 Glossary

Term	Definition
Activity Centres ⁱ	Provide the focus for services, employment and social interaction in cities and towns. They are where people shop, work, meet, relax and often live. Usually well-served by public transport, they range in size and intensity of use from local neighbourhood strip shopping centres to traditional universities and major regional malls
Affordable Housing ⁱ	Well-located housing, appropriate to the needs of a given household, where the cost (whether mortgage repayment or rent) is no more than 30 per cent of that household's income. Exceeding the mark places one under 'housing stress', particularly in the lower 40 per cent of the income distribution scale.
Broadband Services ⁱ	Communications that send several different channels of digital information down a wire at the same time, or use a wider range of frequencies to transmit a single data stream. Broadband is often referred to as 'high bandwidth' and is applied to technologies such as cable Internet, where it allows constant connection.
Catchment ⁱ	An area of land where run-off from rainfall goes into one river system.
Ecological Vegetation Classes (EVC) ^{iv}	The components of a vegetation classification system. They are groupings of vegetation communities based on floristic, structural and ecological features.
Fauna ^{iv}	A general term for animals (including birds, reptiles, marsupials, and fish).
Flora ^{iv}	A general term for plants of a particular area or time.
Fringe ⁱ	Areas of the city that border on non-urban areas or the 'edge' (loosely defined) of the built-up urban area.
Growth Areas ⁱ	Areas on the fringe of metropolitan Melbourne around major regional transport corridors that are designated for large-scale change, over many years, from rural to urban use. The new communities of the future will be located in growth areas, with housing, shopping, employment, parks and other features of urban life.
Growth Areas Authority	The Growth Areas Authority (GAA) is an independent statutory body established by the Victorian Government to guide sustainable development in Melbourne's five outer urban growth areas.
Heritage ⁱ	Aesthetic, historic, scientific or social value for past, present or future generations.
High Density Residential Development	25+ dwellings per hectare. (Net Residential Developable Area)
Higher Density Housing ⁱ	Housing units on a given area of land that are more numerous than the average in the surrounding locality.

Term	Definition
Incompatible Land Uses ⁱ	Land uses that have negative effects on adjacent land uses.
Linear Open Space Network ⁱ	Corridors of open space, mainly along river valleys, the coast, disused railways lines and aqueducts, that link together forming a network.
Low Density Residential Development	5 dwellings per hectare (Net Residential Developable Area).
Major Activities Centre (MAC) ⁱⁱ	Similar characteristics to Principal Activity Centres but serves a smaller catchment area Supplements the network of Principal Activity Centres Provides additional scope to accommodate ongoing investment and change in retail, office, service and residential markets.
Medium Density Residential Development	Average 20 dwellings per hectare (Net Residential Developable Area). Generally more than one dwelling on an ordinary house block, or any form of attached housing such as townhouses or apartments.
Municipal Strategic Statement (MSS) ⁱ	Part of the Local Planning Policy Framework, these contain the strategic planning land-use and development objectives of the relevant planning authority, the strategies for achieving these objectives, and the relationship to controls over the use and development of land in the planning scheme.
Neighbourhood Activity Centre (NAC) ⁱⁱ	Generally, a limited mix of uses meeting local convenience needs Generally less than 10,000 square metres of retail floor space Accessibility to a viable user population by walking/cycling Accessibility by local bus services and public transport links to one or more Principal or Major Activity Centre Important community focal point, ideally close to schools, libraries, child care, health services, police stations and other facilities that benefit from good public transport.
Net Residential Developable Land	Total area less encumbered open space (creeks; drainage easements / stormwater management; EVC areas; Aboriginal Cultural Heritage; and Growling Grass Frog Habitat Corridor); district open space (district parkland / sports reserves; and neighbourhood sports reserves); major easements (gas pipeline); local arterial roads (divided and undivided); community facilities (railway station land; State Primary / Post Primary Schools and regional / local community facilities); commercial land (Neighbourhood Activity Centres (core retail and peripheral commercial) and Neighbourhood Convenience Centres) as well as 8% for local public open space.
Potable Water ⁱ	Water suitable for humans to drink.

ⁱ DOI (2002) Melbourne 2030, Planning for sustainable growth

ⁱⁱ MacroPlan Aust (2007) Cardinia Urban Growth Area, Retail Review, Final Report

ⁱⁱⁱ DSE (2006) Precinct Structure Planning Guidelines

^{iv} DSE Glossary of Planning Terms

5.2 Supporting Information

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