



**ARMSTRONG CREEK  
HORSESHOE BEND**

Precinct  
Structure Plan

SEPTEMBER 2014



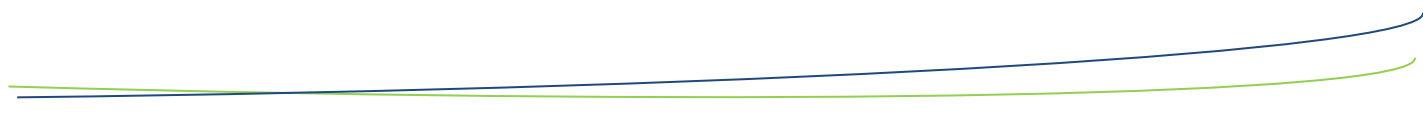


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# 1 INTRODUCTION

## 1.1 ROLE OF THE PRECINCT STRUCTURE PLAN

A Precinct Structure Plan (PSP) is the planning mechanism used to plan for major new urban development, together with the infrastructure and services required by its future community. It is the link between the State and Local Planning Policies and the planning permit for development and use of land.

The PSP therefore, is at a higher or broader level than the plans that form the required documents to accompany a planning permit application. It is a long-term plan to guide future urban development. It describes how the land is expected to be developed and how and where services are planned to support development.

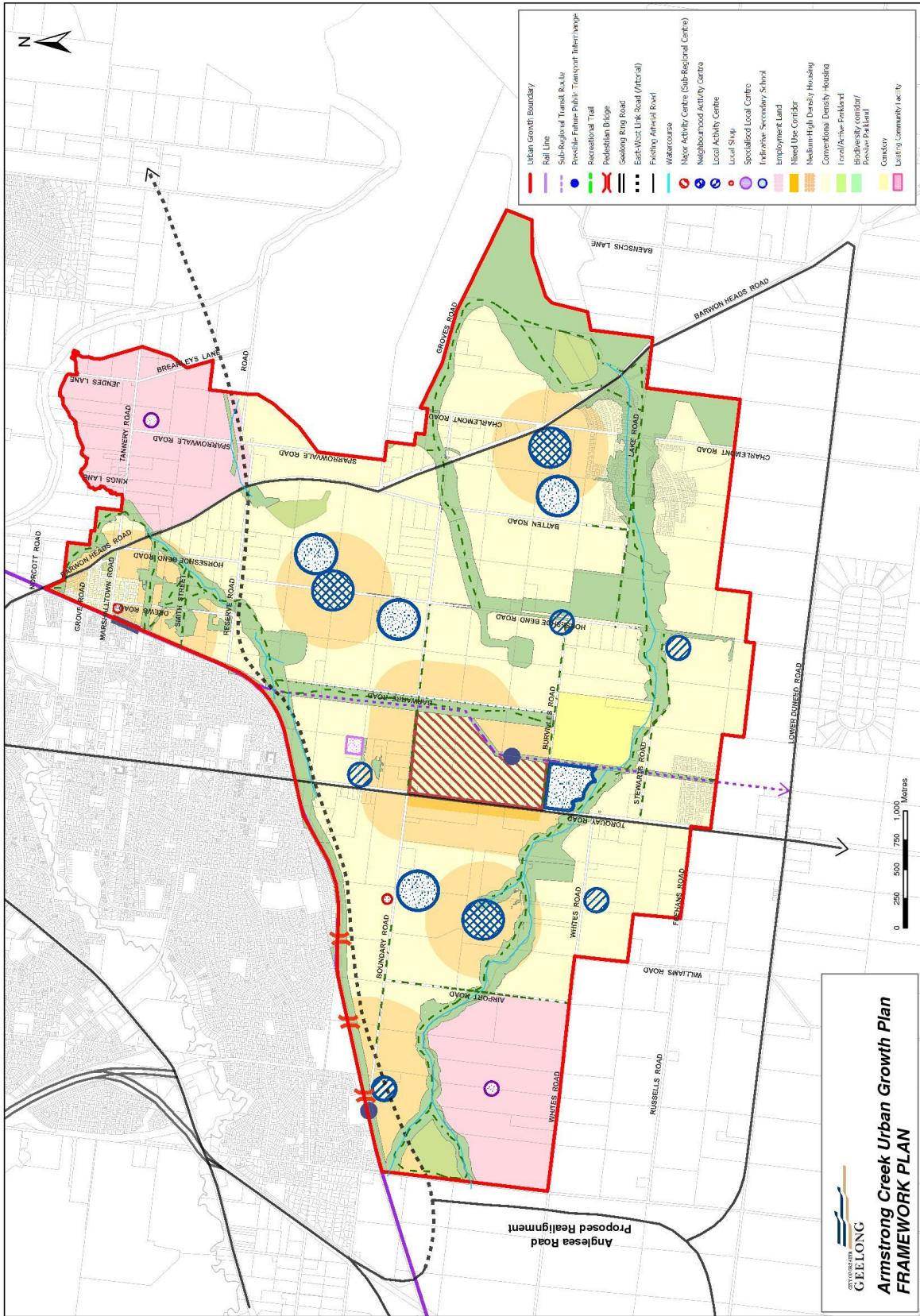
The PSP:

- is a strategic plan setting out the vision and structure for the creation of a new urban area that implements Victorian Government guidelines;
- provides the basis for planning controls that apply in the Schedule to the Urban Growth Zone in the relevant planning scheme;
- provides the framework for the consideration of planning permits that provide for urban development under the provisions of the relevant planning scheme;
- details requirements or conditions that must be met by future development and use;
- outlines projects required to ensure that the future community within the area is provided as early as possible with access to infrastructure and services to support a quality, affordable lifestyle;
- provides developers, investors and local communities with certainty regarding the nature of future development within the PSP area.

A PSP over land in the Armstrong Creek Urban Growth Area (ACUGA) must be generally in accordance with the incorporated (in the Greater Geelong Planning Scheme (the Scheme)) Armstrong Creek Urban Growth Plan - Framework Plan September 2012 (amended) (the Framework Plan).

The ACUGA establishes the strategic context and vision for urban development within Armstrong Creek.

Plan 1 (**Framework Plan**) contains the incorporated Framework Plan.



Prepared by City of Greater Geelong - Sept 2012

**PLAN 1**  
**FRAMEWORK PLAN**

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The Horseshoe Bend Precinct Structure Plan (HBPSP) sets objectives and provides for their implementation in relation to eight key elements:

- image and character;
- subdivision and housing;
- community facilities;
- public open space, natural systems and biodiversity;
- employment and activity centres;
- transport and movement;
- utilities and energy;
- drainage and floodplain management.

These are set out in detail in sections 4.1 to 4.8.

## **1.2 LAND TO WHICH THE PRECINCT STRUCTURE PLAN APPLIES AND ITS CONTEXT**

Plan 2 (**Context**) shows Horseshoe Bend Precinct (HBP) in its local context. It is about 8 kilometres south of the Geelong central activities area and makes up the central-eastern part of the ACUGA, the planned major extension of the Greater Geelong urban area. The ACUGA includes six other precincts: Armstrong Creek Town Centre; North East Industrial; Marshall; Armstrong Creek East; Armstrong Creek West and Western Industrial.

The HBSP covers the HBP which is approximately 640 hectares in gross area.

The HBP is defined generally by the Surf Coast Highway (west), the Armstrong Creek Town Centre (west), the Armstrong Creek East-West Link Road/ Reserve Road (north), the East Precinct (south) and 1:100 year flood line located just east of Barwon Heads Road (east).

### **1.2.1 Key Existing Roads**

HBP, located between Geelong and Torquay, is traversed by Surf Coast Highway and Barwon Heads Road, both in a generally north-south direction. These roads link the area north to Geelong and Melbourne and south to the Surf Coast and the Bellarine Peninsula. Other local roads of some significance include the north-south Horseshoe Bend Road and the east-west Boundary Road.

### **1.2.2 Existing Public Transport**

The public transport network for Geelong and Melbourne is accessed via the Melbourne-Geelong-Warrnambool rail line, which abuts the northern boundary of the ACUGA. The nearest station is Marshall just over one kilometre north of the HBP. The Government has announced funding to begin construction on the new \$25.9m V/Line Station at Grovedale. Work on the station is due to start shortly and the station is scheduled for completion in late 2014. The station will include a car park with 200 spaces and a bus interchange and taxi rank.

Regional public transport is provided by bus services (on Surf Coast Highway and Barwon Heads Road). Local bus services in Grovedale will expand or be supplemented by new services as development and occupation of dwellings and activity nodes occurs in the ACUGA.

### 1.2.3 Key Existing and Planned Activity Centres

HBP is served by a hierarchy of activity centres in the region, the pre-eminent regional centre of these being the central activities area of Geelong.

Planned activity centres to serve HBP are as contained in the Framework Plan (Plan 1) and include:

- Armstrong Creek Town Centre, located on Surf Coast Highway and planned for approximately 137,000 square metres of retail, non-retail commercial and community services floor space together with a public transport interchange, approximately 3,500 jobs and higher density housing;
- North -east neighbourhood activity centre planned for approximately 7,000 square metres of retail; non-retail commercial; community services floor space; 300 jobs and medium density housing;
- Horseshoe Bend local activity centre and the north-west neighbourhood activity centre each of which are planned for up to 1,000 square metres of convenience shops and services; associated jobs and some possible medium density housing;
- Neighbourhood and local activity centres in other precincts.

The more significant existing employment areas reasonably accessible to HBP include the industrial areas of Geelong including North Geelong, North Shore, Moolap, Breakwater and Newtown / South Geelong.

### 1.2.4 Key Existing Public Open Space

The existing major public open space areas serving the region include:

- Key recreation nodes and passive open space associated with the Barwon River and its floodplain, which are proposed to be upgraded over time;
- Regional open space facilities in Greater Geelong such as the Geelong Botanic Gardens and Eastern Park;
- The beach and foreshore areas of Geelong, the Surf Coast and Bellarine Peninsula;
- Kardinia Park;
- Waurun Ponds Creek with major recreational facilities.

Existing local public open spaces in HBP or its vicinity include Stewarts Reserve in Stewarts Road and Mount Duneed Recreation Reserve in Feehans / Russell Roads (*refer Plan 2: Context*).

These will be complemented by the establishment of planned new passive and active local and regional public open space in the ACUGA and more specifically in the HBP (*refer Plan 1: Framework Plan*).

### 1.2.5 Key Existing Community Facilities

Existing and higher order social and community infrastructure that will serve HBP is based largely in Geelong and the Greater Geelong region. HBP contains the following existing community facilities:

- Alan David Lodge an aged care facility at 382 Surf Coast Highway;
- Narana Creations - Aboriginal Craft and Cultural Interpretation Centre at 410 Surf Coast Highway.

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The Narana Creations is a non - profit organisation run by the indigenous community and is an Australian Aboriginal cultural tourism & educational enterprise.

The Geelong Lutheran College and Geelong Memorial Park Crematorium and Cemetery are located just outside the precinct south of Burvilles Road.

COGG has adopted a community 'hubbing' approach to community facilities, which sees schools, community complexes, health and well-being centres, activity centres and active open space co-located together in hubs. This approach is reflected in the HBP however, should further community facilities be required including privately owned and operated centres (medical centres, child care centres etc.) it is anticipated that these facilities can be distributed throughout the precinct. This will ensure that the value generated by these facilities, in terms of community capital, is extended throughout the HBP.

### **1.2.6 Other Existing Features**

The existing Melbourne – Geelong - Warrnambool rail line forms part of the northern boundary of the PSP. The HBP makes planning provision for a new a new public transport corridor, designed to allow for ultimate delivery of rail, through the precinct from the existing rail corridor at the northern boundary through to the Armstrong Creek Town Centre precinct and further south to the Surf Coast.

The existing Black Rock sewer line extends through the precinct proximate to Barwon Heads Road. The existing sewer is being progressively connected into new growth area developments.

A disused Barwon Water Sewer Easement traverses a number of landparcels on the eastern side of the PSP area.

## **1.3 MONITORING AND REVIEW**

The CoGG will monitor the implementation of this HBSP. Its effectiveness will be evaluated regularly, at least every four years. It is expected that this HBSP will be revised and updated as required.



**PLAN 2**  
**CONTEXT PLAN**

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## 2 PRECINCT FEATURES

Plan 2 (**Context**) shows the key features of HBP as described in the sections following.

### 2.1 HERITAGE

#### ABORIGINAL HERITAGE

As part of investigations for the HBP, further archaeological studies were completed and accepted by the Office of Aboriginal Affairs Victoria (OAAV) as sufficient to allow preparation of the HBPS.

An Aboriginal Cultural Heritage Assessment (ACHA), incorporating a desk top and standard assessment has been completed for the HBP. The assessment was prepared in order to provide principles and guidance to future development proponents in relation to obligations and risk management principles for compliance with the *Aboriginal Heritage Act 2006* and *Aboriginal Heritage Regulations 2007* for any subsequent development of land. The ACHA did not identify significant constraints to the development of the area that need to be protected or managed through the HBP, but includes recommendations that can be addressed at the subsequent planning permit stage for individual developments.

Before planning permits for subdivision or development occur, further more detailed investigations will be required, and Cultural Heritage Management Plans (CHMPs) may be required for prescribed activities in areas of cultural heritage sensitivity.

#### EUROPEAN HERITAGE

The European cultural heritage of the area reflects the selection and settlement of the region from the late 1850's onwards and in particular the development of mixed farming during the late 19th and early 20th centuries. The modest cottages and outbuildings reflect typical residences of the period and the outbuildings typical structures used for mixed farming. Evidence of early civic works or government sponsored projects is limited to the sewerage station and Sparrovale Farm.

Fourteen tangible historic cultural heritage places were recorded in the study area. Each site has been investigated and recommendations for each site developed. The sites generally have low historic significance, though further investigations are required for a number of the properties prior to development.

The recorded historic places within the area are typical examples of small mixed farming in the Geelong region. The lack of significant values means they have little value in illustrating the themes of the development of primary production or working on the land. Other places, for example Sparrovale Farm, illustrate changing uses of the land.

## **2.2 BIODIVERSITY**

### **2.2.1 Biodiversity Significance**

The land is within the Barwon River Catchment and lies across the Otway Plain and Victorian Volcanic Plain Bioregions. The area would have originally been dominated by Plains Grassland (EVC 132) and Grassy Woodland (EVC 175) vegetation communities. The precinct is crossed by a network of drains that flow in an easterly direction before discharging into the Barwon River or the adjoining floodplain. The water eventually flows into the Connewarre Wetland Complex, part of the Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site.

Remnant patches of endangered Grassy Woodland remain in both bioregions with linear patches of Grassy Woodland extending along Horseshoe Bend, Barwarre, Sparrowvale and Boundary Roads, providing a series of vegetation corridors across the precinct.

Melbourne Yellow Gum (*Eucalyptus leucoxylon* ssp. *connata*) is listed under Department of Environment and Primary Industries (DEPI) threatened flora advisory list (2005) as vulnerable is found along several roadsides and vegetation patches in the precinct. The enhancement of several drainage corridors through re-vegetation and connectivity to the Barwon River and Connewarre Wetland Complex may see it as an important migratory corridor for birds and reptiles across the region.

The Lake Connewarre Wetland Complex has been identified in the Corangamite Catchment Management Authority (CCMA) Salinity Action Plan 2005- 2008 as being an area requiring actions to manage underlying salinity. Water management within the area is important to ensure that salinity through rising groundwater does not undermine the biodiversity values of the Armstrong Creek Growth Area. As a consequence of changed water regime within the Growth Area, off site impacts to the saline vegetation of the Connewarre Wetland Complex will need to be managed due to the increased inflows of freshwater.

The majority of the precinct has been previously subject to a range of agricultural practices and is covered by exotic vegetation, particularly pasture grasses. The scattered trees provide a level of landscape connectivity which may have important biodiversity value for the movement, roosting and food sources for birds and microbats.

### **2.2.2 Biodiversity Assets**

General values

The key biodiversity assets with the precinct are Boundary Road, Barwarre Road, Sparrowvale Road and Horseshoe Bend Road which form a series of linear corridors across the precinct. Sparrowvale Road on the eastern edge of the precinct. A patch of vegetation in the north central part of the precinct will provide some conservation value to Melbourne Yellow Gum and a number of understorey species. Scattered large trees and a series of farms dams exist in conjunction with patches of vegetation to form refuges for wildlife including a number of duck species. The combination of these assets provide for a series of wildlife corridors that cross the entire precinct to link into the nearby

wetlands.

#### Flora values

Numerous patches of endangered Grassy Woodland EVC exist along or adjacent to Barwarre Road which combined with linear stretches of vegetation existing along Horseshoe Bend Road and Boundary Road which will form the basis for a series of wildlife corridors. The development of land within this precinct provides the opportunity to enhance the flora and fauna values particularly Bellarine Yellow Gum habitat within the precinct with planting of indigenous species, management to maximise potential habitat and the eradication of weeds and exotic species.

#### Fauna values

The remnant patches and scattered trees are likely to be used for food and roosting by a number of species of microbats and birds. A colony of nationally threatened Grey Headed Flying Foxes roost in the Geelong Botanic Gardens approximately 10 km north - east of the precinct and regularly fly over the area in search of food resources. The dams and drainage infrastructure are likely to form important habitat for frogs and other aquatic fauna.

Although outside the precinct, Sparrovale Farm contains habitat for aquatic birds and the Growling Grass Frog.

## 2.3 TOPOGRAPHY AND LANDFORM

HBP is characterised by gently undulating land, rising to a central ridgeline which generally splits the precinct in an east west direction. Five sub-precincts are created by the topography (refer Plan 2 – **Context**) based on their aspect, slope and visual character.

A high point (40m AHD) is located generally at the site of the Alan David Lodge, in the north - west of the precinct, just east of the Surf Coast Highway.

The flatter areas of land are shown on Plan 2 (**Context**) being land with a slope of less than 1% including one area in the south, west of Horseshoe Bend Road and a second area along the northern boundary of the HBP area, west of Barwon Heads Road. These areas are suitable for recreation reserves, as construction can be undertaken in a manner that minimises earthworks associated costs.

To the south-west of the Armstrong Creek Urban Growth Plan (ACUGP) is Mt Duneed which acts as a green backdrop to the precinct and is easily accessible to the wider growth area.

The topography and landform offers no constraints to development other than in terms of land that will remain flood prone due to normal urban drainage requirements. The extent of the 1:100 flood line, has been estimated, having regard for the intended stormwater drainage treatment and management outcome proposed for the area.

Soils consist generally of red loamy clays which are characteristic of decomposing basalt.

## 2.4 CATCHMENTS AND DRAINAGE

HBP spans a number of drainage catchments (*refer Plan 18: Main Stormwater Drainage Network*) that drain into the Barwon River via Sparrovale Farm and the Marshall Precinct to the north.

A detailed surface water management strategy has been prepared for the HBP. Details of the drainage considerations and strategy for the precinct are contained in the final report.

The major features of the adopted drainage network are:

- The majority of the HBP (459 hectares) drains via the two main east-west drainage lines to Barwon Heads Road and then to Sparrovale Farm before ultimately discharging into the Barwon River.
- A smaller catchment (the South East Grovedale Catchment comprising 97 hectares) in the north - west drains north to Reserve Road / Marshall Precinct just west of Horseshoe Bend Road. The drainage strategy for HBP will see this 97 hectare catchment diverted south and east into the new Sparrovale drainage and conservation area.
- The Armstrong Creek East-West Link Road alignment forms a catchment barrier for lands to the north and also land west of the Surf Coast Highway in the ACWP and directs all such drainage into the Marshall Precinct. Options to address drainage, including an option to divert flows into the Sparrovale drainage and conservation area are being investigated as part of the preparation of the Marshall precinct structure plan.
- Downstream of Sparrovale Farm the receiving environments of the Lower Barwon River Wetlands, especially Hospital Swamps, are dominant environmental considerations for surface drainage planning. The adopted drainage strategy will protect the ecological conditions of the Hospital Swamps through a 514 hectare expansion of the Barwon River Parklands, which will include the creation of a new large scale wetland based around Sparrovale Farm.

### 3 VISION

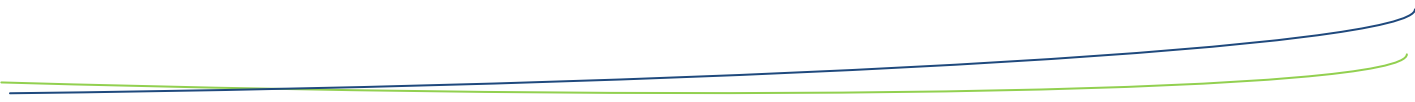
The vision for Armstrong Creek was first identified by CoGG, which envisaged the following.

- Armstrong Creek will be developed into a sustainable community that sets new benchmarks in best practice urban development. Natural and cultural features will be protected and enhanced to create a distinct urban character. Armstrong Creek will become a highly sought-after location for living, working and recreation, forming an attractive addition to Geelong.
- Armstrong Creek will provide a range of housing types and densities in an urban structure based on walkable neighbourhoods with access to public transport and mixed use activity centres.
- All residents will be within proximity to public open space that will provide adequate opportunities for recreation and passive use.
- Armstrong Creek is the key urban extension to Greater Geelong and will accommodate major population expansion for the next 20 plus years.

The vision for the HBP is derived from the overall Armstrong Creek Urban Growth Area (ACUGA) vision and draws on a combination of the existing and natural site features coupled with the desire to produce a distinct urban environment for future residents.

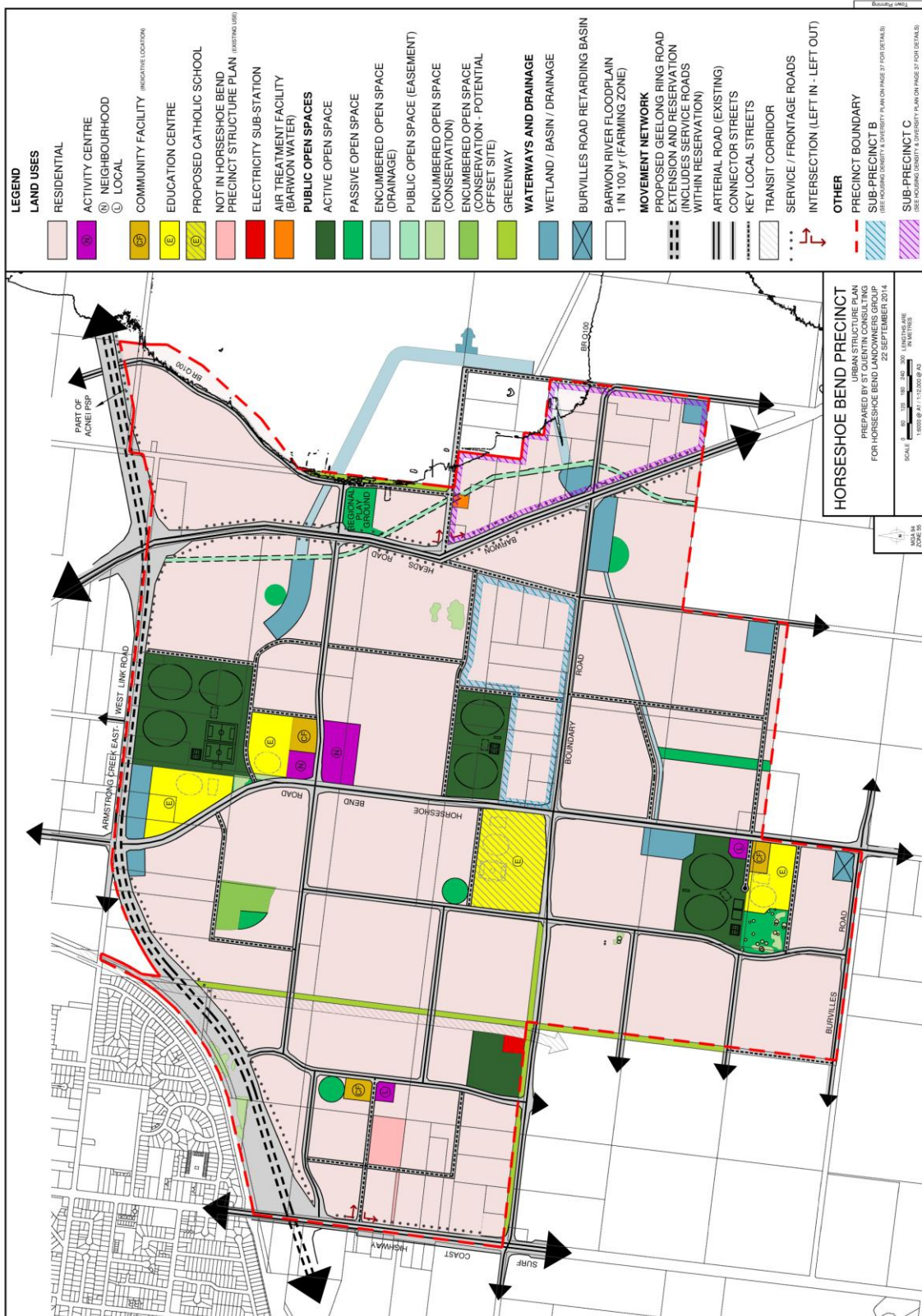
The vision is for the HBP will be characterised by:

- **Walkable, connected neighbourhoods.** Walkable neighbourhoods connected internally and externally will promote ease of movement and help to establish a positive sense of place. These neighbourhoods will be underpinned by connected street blocks, an equitable distribution of open space, and well spaced community hubs. Together, well distributed and connected neighbourhoods will minimise walking and cycling distance from homes to access key local services and facilities.
- **Promote walking and cycling.** Transport and movement systems that are permeable, legible, distribute transport flows and facilitate the ability to move about safely by walking and cycling. This will promote healthy exercise, assist energy conservation and increase potential for social interaction.
- **Quality public realm and streets.** Quality public realm that focuses on the important role of streets and street tree planting as highly important character elements as well as the importance of landscape design of parkland and community activity centres. These quality public spaces will support a diversity of housing and lifestyle opportunities.
- **Integrated public open space network.** An inter-linked public open space and path network, including greenways and public open space nodes, that build on the existing landscape character while protecting the biodiversity in habitat conservation areas and through native vegetation retention and protection.
- **Extension to the Barwon River Parklands.** Creation of an extension of the Barwon River Parklands to incorporate passive recreation opportunities around its edge, an expansive drainage / wetland area and a biodiversity conservation area in the east. The Horseshoe Bend section of the extension will be over 500 hectares and include a 300+



hectare wetland complex. Over time environmental and landscape works together with trail links as set out in the 'G21 Strategy' new can be undertaken to take advantage of the longer term opportunities.

- **Create unique clusters of services and facilities in and around activity centres.** These activity centres should be designed as human scale, street based activity centres, that apply 'main street' urban design principles. The clusters of retail, community and recreation facilities will be easily and safely accessible by all means of transport from throughout the HBPSP.
- **Easy access to whole of life community and recreation facilities.** Create three accessible community activity centres and four new recreation reserves. Together, the broad range of community and recreation facilities can act as a focus for community life and to build a sense of place and community.



**PLAN 3**  
**URBAN STRUCTURE PLAN**

## **3.1 INTEGRATED NEIGHBOURHOOD DESIGN**

The separation of HBP from established urban Geelong by the railway line and Barwon River and, in its early years, by its location at the southern edge of the ACUGA, enables it to be developed with its own identity or preferred neighbourhood character, based on best practice integrated neighbourhood design.

This integrated neighbourhood design is summarised under the headings that follow.

### **3.1.1 Sense of Place and Community**

A sense of place and community comes from people of all ages having opportunities to meet and interact in appropriate spaces in suitable ways and times. It requires community development over time but is facilitated through the provision of some necessary base ingredients - appropriate community infrastructure in the form of open space; internal and external meeting places for all age groups; related buildings and other structures; the provision of needed services and support people to bring the infrastructure to life; and appropriate design, materials and finishes.

The location and content of community infrastructure in HBP has been determined to give a grounding to the start of community development.

The vision of CoGG is to do whatever is reasonably possible to encourage / provide community infrastructure as early as possible in the life of HBP to maximise the availability of community buildings and services to new residents and other visitors to HBP. Community groups will be encouraged to establish to assist in building a sense of community via participation and input into future decisions about HBP community infrastructure development.

Public art within the HBP will provide opportunities for local communities (and broader audiences) to relate in new ways to the natural and built environment. Art is an important element in the urban fabric, providing interest and opportunities for a deeper connection with place, environment, story telling, wayfinding and community identity.

### **3.1.2 Housing Choice Diversity and Affordability**

The intention for HBP is that a variety of housing types and densities will be developed at a variety of prices, in order to provide suitable choices for a range of different needs, lifestyle preferences and income levels thus attracting a diverse mix of people.

### **3.1.3 Accessible and Vibrant Activity Centres**

The North-east neighbourhood activity centre in HBP will be focused on 'main street' with larger shops (such as the supermarket) and car parking generally sleeved by smaller shop fronts which will face onto 'main street'. Pedestrian access in and around the centre will be a primary design objective including along 'main street' and from car parking areas and bus stops.

A permeable network of streets, walkways and public spaces will provide high quality linkages, particularly for pedestrians, to the activity centres and will inter-link with other parts of HBP and beyond.

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A sense of vitality will be encouraged within the neighbourhood activity centre with buildings designed to address the street, resulting in continuous and contained streetscapes, which create interest and interaction at street level. Footpaths will be broad, enabling alfresco dining to further activate the streetscape. All activity centres will be tree lined, provided with seating and verandahs for shelter and shade and all contributing to enhance the centre as a pedestrian oriented environment.

The neighbourhood activity centre will sit beside Horseshoe Bend Road with its main street entry being signalised on that road. This will allow for safe pedestrian and vehicle movements at the intersection and will assist in linking the centre to its surrounding catchments.

The two local centres will be much smaller than the neighbourhood activity centre and will comprise a portion of community facilities than retail / commercial floorspace. The north-west centre will be located centrally within its neighbourhood. The southern centre will be co-located a primary school, community centre and a recreation reserve to ensure its will provide a local focus for place-making and community life.

### **3.1.4 Local Employment and Business Activity**

The ACUGA contains three proposed employment areas: in the north-east, in the west and associated with the Armstrong Creek Town Centre. All three are within easy access of the HBP.

Local employment opportunities will grow also within the HBP. It has been estimated that development of the neighbourhood activity centre in the HBP will generate a net increase of 300 direct jobs and additional indirect jobs over the long term.

### **3.1.5 Better Transport Options**

The HBP land use structure has been planned with the underlying goal that new urban development should be more sustainable ecologically, socially and economically. An essential ingredient of this is reduced distances for required travel and increased efficiency and overall community health in travel movements. The HBSP was designed to maximise these opportunities through the provision of:

- a planned hierarchy of walking and cycling paths that provide safe, attractive and convenient access from residential sub-precincts to other such sub-precincts and to all activity areas. Particular attention has been given to those activity areas that will generate expected higher demand, such as the neighbourhood and local activity centres, Armstrong Creek, key active and passive open space areas and links into neighbouring precincts and their attractions;
- as part of the path network, sections of several existing lower order streets as dedicated non-vehicular walking / cycling greenways, including parts of Boundary Road, Barwarre Road, Burvilles Road and Sparrovale Road;
- a dedicated sub-regional transit corridor reservation designed to allow ultimate provision of rail, with proposed convenient access in the Armstrong Creek Town Centre and linking to Geelong and Melbourne;
- ready access to bus services on Surf Coast Highway and Barwon Heads Road;

- an internal road design hierarchy that provides for a local bus service within 400 metres of the majority of households and with links to key activity centres and other nodes;
- a permeable and efficient local street network connecting to higher order roads at appropriate points with safe crossing control, including proposed traffic signals (for safe pedestrian and cyclist crossings and traffic control and safety) at key entry points to the HBP from Surf Coast Highway, Barwon Heads Road and in, the long term, from the Armstrong Creek East-West Link Road);
- as part of an efficient higher order road network and with the aim of improving convenience and travel times, capacity for the Armstrong Creek East-West Link Road, Horseshoe Bend Road and Barwon Heads Road to be duplicated if required in the longer term;
- a well-designed siting and spacing of higher order roads to cater for necessary district, regional and wider vehicle trips including service requirements;
- activity centres sited and designed to encourage and make them attractive for walking and cycling access and to provide a scale that is 'people friendly' rather than car-dominated;
- based on all of the above, convenient access to local employment opportunities within HBP, in dedicated employment areas outside HBP but within the ACUGA in close proximity and in the Greater Geelong area and beyond.

### **3.1.6 Climate Change and Environmental Sustainability**

The aim for the ACUGA and thus also HBP, is to deliver a sustainable community that is designed to:

- maximise passive solar design through lot orientation and building design;
- reduce car dependence through a convenient network of walking / cycling links to local employment opportunities and community infrastructure;
- retain native vegetation;
- provide for the availability of recycled water.

The early delivery of public transport will contribute significantly to the overall sustainability of the ACUGA.

The stormwater management strategy is based on the treatment and management of stormwater runoff as close to the point of origin as practicable within each sub-catchment and then the individual stormwater management strategies for each sub-catchment are combined as a set of cascading strategies within HBP. Objectives for stormwater management have been defined for each sub-catchment, as have the extent of distributed retardation basins, overland flow paths, drainage systems and constructed wetlands controlling stormwater flows and quality.

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By virtue of its inland location, the ACUGA and thus HBP, is unlikely to be subject to the expected future increase in storm surges and sea levels along the Victorian coastline generated by climate change.

The drainage study has sought to maximise environmental sustainability through integrated systems analysis techniques to develop a stormwater management strategy tailored specifically to the unique topography and stream corridor within HBP. The strategy has considered stormwater runoff volumes, flood mitigation, likely if any impacts from sea level rise due to climate change and stormwater quality objectives for public safety and environmental protection of waterways and the downstream Ramsar wetland.

The key features of the drainage strategy are:

- It adopts inclusion of the wetland area in Sparrovale Farm as part of an efficient strategic solution to overall stormwater management issues as well as to realise opportunities for conservation and passive recreation outcomes over time.
- It responds to the implications of the potential transit / rail corridor excavation and current preliminary design proposals for the Armstrong Creek East-West Link Road.
- Incorporates diversion of the Reserve Road sub-catchment in the HBP into the Sparrovale catchment.

The stormwater strategy aims to meet the objectives of the stormwater management policy for the ACUGA of CoGG (the relevant drainage authority).

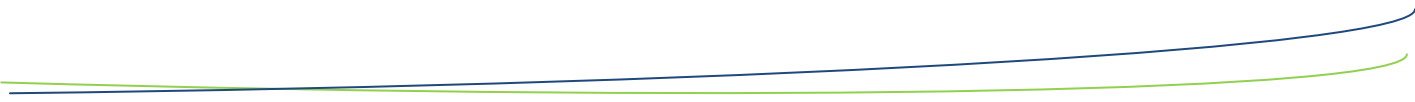
Low water use gardens will be encouraged. Alternative water supplies via a reticulated recycled water system will be provided. Water sensitive urban design principles will be incorporated throughout HBP through adopting the following measures:

- retardation basins;
- utilisation of storm water to conserve potable water;
- use of vegetation for filtering purposes;
- water efficient landscaping;
- gross pollutant traps;
- environmental buffers;
- swales;
- bio retention systems;
- porous pavements;
- localised water harvesting.

### **3.1.7 Accessible Integrated and Adaptable Community Facilities**

In HBP there are two main community hubs (a northern and a southern community hub) planned to incorporate local council services. A smaller third community hub is located adjacent to a local park in the western neighbourhood. A comprehensive network of active and passive public open spaces and recreation facilities are planned within easy reach of all homes and workplaces. This will range from active sports facilities to informal parks and passive areas including creek-side walks.

Playing fields are planned associated with;

- 
- the northern neighbourhood activity centre
  - the southern local activity centre
  - the north-west corner of Boundary Road and the proposed transit corridor and to the east of Horseshoe Bend Road
  - central to the Precinct and adjacent to the proposed Catholic school.

Indoor recreation facilities are envisaged to be located on the planned Government secondary college. Local parks and playgrounds designed specifically for children will be distributed within easy walking distance of every home. Linking all of these public open space and recreation facilities will be a network of greenways, leisure trails and more direct walking / cycling paths, contributing to the formation of a healthy community.

## 3.2 LAND USE BUDGET

HBP covers a gross development area (GDA) (all inclusive land within its boundaries irrespective of its use or condition) of 640 hectares and of this gross area, about 463 hectares are the net developable area (NDA). That is, about 72 per cent of HBP is available for development.

The NDA excludes a range of proposed developments and land uses that do not include dwellings (such as government schools, public open space, arterial roads and community facilities).

The summary land use budget (*refer Table 1: Summary Land Use Budget*) and summary yield analysis (*refer Table 2: Summary Residential Lot Yield Analysis*) provide target land budget and target lot yield details on the future urban structure as a whole. The detailed budget and detailed yield analysis (*refer Appendix 1: Detailed Land Use Budget by Property and Appendix 2: Detailed Residential Lot Yield by Property*) provide specific targets for each property.

**Table 1: Summary Land Use Budget**

Description	Hectares	% Total of	% NDA
<b>Total Precinct Area</b>	637.69		
<b>Transport</b>			
Armstrong Creek East-West Link Road	20.641	3.237	4.448
Barwon Heads Road	4.381	0.687	0.944
Sub-Arterial Roads	4.713	0.739	1.016
Connector Street (abutting Greenway)	7.076	1.110	1.525
Transit Corridor	4.977	0.780	1.072
Existing Road Reserves (including Greenways)	24.257	3.804	5.227
<b>Sub total</b>	<b>66.045</b>	<b>10.357</b>	<b>14.231</b>
<b>Community Facilities</b>			
Northern NAC Community Complex	1.250	0.196	0.269
Western LAC Community Complex	0.800	0.125	0.172
Southern LAC Community Complex	0.800	0.125	0.172
<b>Sub-total</b>	<b>2.850</b>	<b>0.447</b>	<b>0.614</b>
<b>Education</b>			
Northern Government School (P-6)	3.500	0.549	0.754
Northern Government School (7-12)	5.682	0.891	1.224
Southern Government School (P-6)	3.500	0.549	0.754
Catholic School	9.600	1.505	2.069
<b>Sub-total</b>	<b>22.282</b>	<b>3.494</b>	<b>4.801</b>
<b>Proposed Public Open Space</b>			
<i>Encumbered land available for Recreation</i>			
Sewerage Easement	3.287	0.515	0.708
Habitat Conservation Area	5.106	0.801	1.100
Wetland/Retarding Basin	13.479	2.114	2.904
Waterway/Drainage Line	8.565	1.343	1.846
<b>Sub-total</b>	<b>30.437</b>	<b>4.773</b>	<b>6.559</b>

Description	Hectares	% Total of	% NDA
<i>Un-Encumbered land available for recreation</i>			
Northern (NAC) Open Space	16.696	2.618	3.598
Central Open Space	8.072	1.266	1.739
Southern (LAC) Open Space	8.855	1.389	1.908
Western Open Space	3.967	0.622	0.855
Regional Open Space	1.964	0.308	0.423
Passive Open Space	6.985	1.095	1.505
<b>Sub-total</b>	<b>46.539</b>	<b>7.298</b>	<b>10.028</b>
<b>Other</b>			
Narana Cultural Centre	1.851	0.290	0.399
Alan Davis Lodge	2.654	0.416	0.572
Sub-station	0.489	0.077	0.105
Air Treatment Facility	0.224	0.035	0.048
Abandoned Sewer Easement	0.118	0.019	0.025
PRV Site	0.127	0.020	0.027
<b>Sub-total</b>	<b>5.463</b>	<b>0.857</b>	<b>1.177</b>
<b>Net Developable Area (NDA)</b>	<b>464.079</b>	<b>72.774</b>	

**Table 2: Summary Residential Lot Yield Analysis**

Description	Residential NDA hectares (Ha)	Dwellings/Ha	No. of Dwellings
<b>Retail and Employment</b>			
Neighbourhood Activity Centre (NAC)	4.000	N/A	N/A
Western Local Activity Centre (LAC)	0.500	N/A	N/A
Southern Local Activity Centre (LAC)	0.500	N/A	N/A
<b>Sub-total</b>	<b>5.000</b>		
<b>Residential</b>			
Sub-Precinct A	72.284	17	1,229
Sub-Precinct B	24.852	min. of 12	298
Sub-Precinct C	23.779	min. of 12	285
Sub-Precinct D	66.663	18	1200
Sub-Precinct E	271.501	15	4073
<b>Total</b>	<b>459.079</b>		<b>7086</b>



### **3.3 DEMOGRAPHIC PROJECTIONS**

The ACUGA is anticipated to provide housing for 54,000 people in 22,000 households, which translates to an average of 2.45 persons per household. At an average of 15 dwellings per net developable hectare (465 hectares) and 2.45 persons per household, HBP will house in the order of 17,000 people in over 7,000 dwellings assuming one household per lot.

Recent trends in new growth areas suggest occupancy rates closer to 2.9 persons per household which, for the HBP, would deliver an estimated population of 20,500 people. This sensitivity has been considered in the planning and provision of community infrastructure.

## 4 ELEMENTS

There are eight main elements that summarise the key ingredients of the HBSP:

- image and character;
- subdivision and housing;
- community facilities;
- public open space, natural systems and biodiversity;
- employment, activity centres and mixed use areas;
- transport and movement;
- utilities and energy;
- drainage and floodplain management.

These elements are detailed in this section with objectives, implementation requirements and any specific Planning and Design guidelines, set out for each, where:

- **objectives** describe the desired outcome to be achieved in the completed development;
- **plans / figures** are a spatial expression of objectives;
- **implementation** summaries describe how the objectives are met;
- **Planning and Design guidelines** including figures and tables, depending on the specific guideline, are indicated as **must** or **should** be met.

If the Responsible Authority is satisfied that an application for an alternative to a Planning and Design guideline that should be met, meets the objective, the alternative may be approved to the satisfaction of the Responsible Authority.

## 4.1 IMAGE AND CHARACTER

### 4.1.1 Objectives: Image and Character

The objectives for enhancing or developing the image and character as essential parts of the development of HBP are to:

- capitalise on the existing natural and cultural features of the site, and to deliberately incorporate specific urban design, landscaping and built form initiatives to create interesting, attractive and diverse neighbourhoods.
- enhance the waterways and drainage reserves as a linear green space, recreation area, walking / cycling link and landscape asset through the HBP;
- provide a series of off road (along the greenways, waterways, main sewer easement and other open space links) and on-street, open space and trails links to provide trail loops linking from the Armstrong Creek Town Centre, Armstrong Creek, Marshall railway station, the community hubs / sporting facilities and on to the Barwon River Parklands;
- facilitate a series of greenways that protect and enhance high quality roadside vegetation, and will be used as recreation links for cycling and walking and other recreation activities;
- protect and enhance the value of areas and sites of environmental significance and to promote their appropriate use or enjoyment as assets in HBP;
- retain and conserve the remnant indigenous tree communities (including roadside vegetation) in HBP;
- promote new landscape and street tree planting that is consistent with the existing predominantly native / indigenous landscape character but does not exclude exotic species where appropriate to promote a particular theme, to provide alternative feature trees or to enhance passive solar access;
- enhance the Surf Coast Highway as a major boulevard through the HBP, through:
  - Landscaping and road design that enables planting of large canopy trees (refer to Figure M) and
  - Design of adjacent land uses to provide a positive land use interface with the Highway;
  - Progressive reduction in the speed limit from 100 km/hr to 60km/hr (adjacent to the Armstrong Creek Town Centre) and 80 km/hr (north of the Armstrong Creek Town Centre) as intersections are constructed, and adjacent land uses are developed.
- Provide a balanced cross-section for the Armstrong Creek East-West Link Road to meet the needs of both the road users and the development and which provides opportunities for landscaping that responds to the amenity needs of the adjacent land use in both the interim and ultimate condition of the road;

- Provide for appropriate landscaping along the Armstrong Creek East-West Link Road that responds to the adjoining land use context (i.e. landscape character to change as the land use interface changes) and provides appropriate noise attenuation and a visual buffer for adjoining properties to the north and south;
- plan and provide for human-scale facilities including a 'main street' neighbourhood activity centre and a range of other planned and co-located community facilities;
- to plan and provide a subdivision design and pedestrian/cycle path network that emphasises walkability and safe access for bicycles;
- Encourage distribution of densities through the plan area to achieve a diverse selection of lots and housing forms in all streets and neighbourhoods;
- Encourage street based urban design treatments that create points of internal amenity, such as small green spaces, urban parks and character streets/diverse cross-sections that provide a context for diverse housing and land uses throughout the HBSP;
- Discourage intersections that aren't functional for pedestrians and cyclists, and road design speeds that prevent planting of canopy trees;
- protect or treat appropriately places of recognised heritage value;
- treat appropriately the eastern rural / urban interface in order to minimise adverse visual impacts beyond the growth area;
- Create a range of public art opportunities which enhance sense of place, interpret heritage and landscape and promote the identity and character of the HBP.

#### **4.1.2 Implementation: Image and Character**

The objectives for enhancing or developing the image and character are met by implementation of all of the following.

- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Appendix 5: Public Open Space Guidelines.
- Appendix 8: Road Cross Sections.
- Planning and design guidelines under Section 4.1.3.

#### **4.1.3 Planning and Design Guidelines: Image and Character**

The following planning and design guidelines must be met.

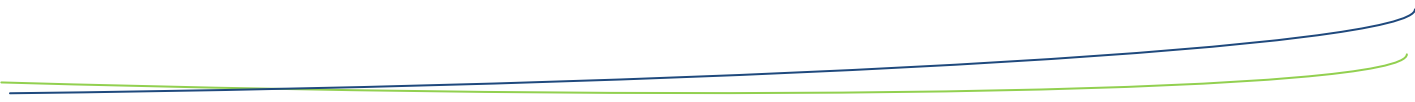
- New development with an interface with open space, including greenways, linear waterways and the Barwon River Parklands must be designed to address the public land while promoting public use and surveillance.

- New development adjacent to greenways must include an edge road condition, or alternative access or design arrangement that ensures the development fronts the greenway except in situations where limited side fences are approved.
- New development must implement (construction and landscaping) the footpaths and shared paths included in Appendix 7 and road cross-sections in Appendix 8.
- Street trees along declared arterial roads must be selected and planted in accordance with the clear zone guidelines to the satisfaction of the relevant road authority.
- The neighbourhood activity centre must be designed on 'main street' principles of street front activity rather than 'big box' shops / internal malls surrounded on all sides by large highly visible car parking areas.
- New development adjacent to the Armstrong Creek East-West Link Road must provide an active frontage to the arterial road, with access controlled via an appropriate treatment, such as a frontage road
- Development of the Armstrong Creek East-West Link Road must provide appropriate landscaping that softens the interface between the arterial road and the adjoining land uses.
- New development must provide safe road crossings for pedestrians and cyclists on key shared use paths that serve HBP and link to abutting precincts / neighbourhoods (refer Plan 13 Cycling and Walking).
- Development must respect sites of historic archaeological significance as identified in the Horseshoe Bend Historic Cultural Assessment. Where sites are to be disturbed, appropriate approvals must be sought and obtained prior to subdivision or development of those land parcels.
- Where key pedestrian and shared paths intersect with roads, safe road crossings must be provided to the satisfaction of the relevant Road Authority.
- New development must incorporate measures for protection of environmentally significant areas in accordance with the Native Vegetation Precinct Plan (NVPP) and any approved Offset Management Plan

The following planning and design guidelines should be met.

- New development should not include actions or results that harm or lessen the values within environmentally significant areas.
- New development fronting drainage reserves and open space should provide for a diverse range of lot types and sizes, including a range of (small and large) lot products and a diverse range of streetscapes.
- Protection, where possible, of existing vegetation, and in particular, scattered native trees as high amenity landscaped features in streetscapes and open space (refer to Section 4.4 for details).

- Street trees should:
  - be selected for streets to ensure the scale of the tree is in keeping with the scale of the street, ensuring the tree fits its planting area and provides an appropriate future form and character;
  - be selected, wherever possible, to provide appropriate canopy and shade character and advantages;
  - be selected on the basis that they are appropriate in local growing conditions;
  - be selected and placed to identify different sub-precincts (such as marking arrival at the neighbourhood activity centre or a key public open space area) and categories of road function as defined by the cross-sections in Appendix 8;
  - be selected to enhance and be compatible with existing trees at key interface locations (such as along Armstrong Creek, adjacent to habitat conservation areas and adjacent to the proposed greenways that contain significant existing roadside vegetation);
  - be selected to match tree species planted in roads and streets that enter a new development area from an adjacent completed or approved (in terms of landscape plans for streetscapes) development area;
  - be guided by Appendix 3: Indicative Street Tree Planting which provides suggestions (the list is advisory only and is not intended to prohibit other appropriate species) on tree species options suitable for HBP.
  - Be selected on the basis that they will not become a weed issue to waterways and conservation reserves.
- New development should avoid loss of roadside vegetation of recognised significance where possible, and where achievable through application of the cross sections in Appendix 8 Road Cross Sections and through appropriate application of the Native Vegetation Framework's three-step approach for trees identified as 'practical retention trees in Appendix 2 of the NVPP).
- Public art is encouraged and where provided should meet the requirements of the Responsible Authority.
- Planning for public art needs to identify opportunities of different types for artists to respond to the design of new development, its context and the makeup of the community.
- The rural urban interface should minimise adverse impacts at the growth area boundary between urban land uses and rural activity by:
  - achieving a well designed transition, including a physical separation of the urban land use from the rural boundary by locating a combination of roads /



access lanes, vegetated linear reserves and pathways, drainage reserves, basins and systems or infrastructure and easements;

- ensuring the adjacent street network is arranged to provide good visual integration and physical access for emergency services.

## 4.2 SUBDIVISION AND HOUSING

### 4.2.1 Objectives: Subdivision and Housing

The objectives for housing as an essential part of the development of HBP are to:

- provide a diversity of lots sizes that can facilitate different housing types;
- encourage opportunities for affordable housing;
- to reach a target density for each sub-precinct in accordance with Plan 4 housing density and diversity and Table 3 Lot Yield and distribution of densities, or by demonstrating an alternative means of balancing densities across the sub-precinct;
- provide residential neighbourhoods that promote liveability through high urban design standards, creating attractive streetscapes and a distinctive neighbourhood character;
- provide lot sizes and housing types which are responsive to the character of the natural and built environment in the area and respond to principles of environmental sustainability;
- encourage large integrated housing sites (including for example medium density housing and other specialised housing forms) within or at the interface of activity centres and overlooking open space.
- avoid gated communities in order to maximise residential permeability and neighbourhood integration.
- facilitate delivery of smaller lot housing through implementation of the Small Lot Housing Code in suitable locations, generally;
  - Within the walkable catchment to activity centres, including the MAC, NAC, and LACs
  - Within 800m of the train station,
  - Within 120m of open space,
  - Where a contiguous row of lots smaller than 300m<sup>2</sup> is proposed.

### 4.2.2 Implementation: Subdivision and Housing

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

- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Table 2: Summary Residential Lot Yield Analysis.
- Plan 6: Public Open Space.
- Plan 11: Walking / Cycling Links.
- Planning and design guidelines as set out in Section 4.2.3.
- Small Lot Housing Code (GAA, 2012)

- Road Cross Sections as set out in Appendix 8.

### **4.2.3 Planning and Design Guidelines: Subdivision and Housing**

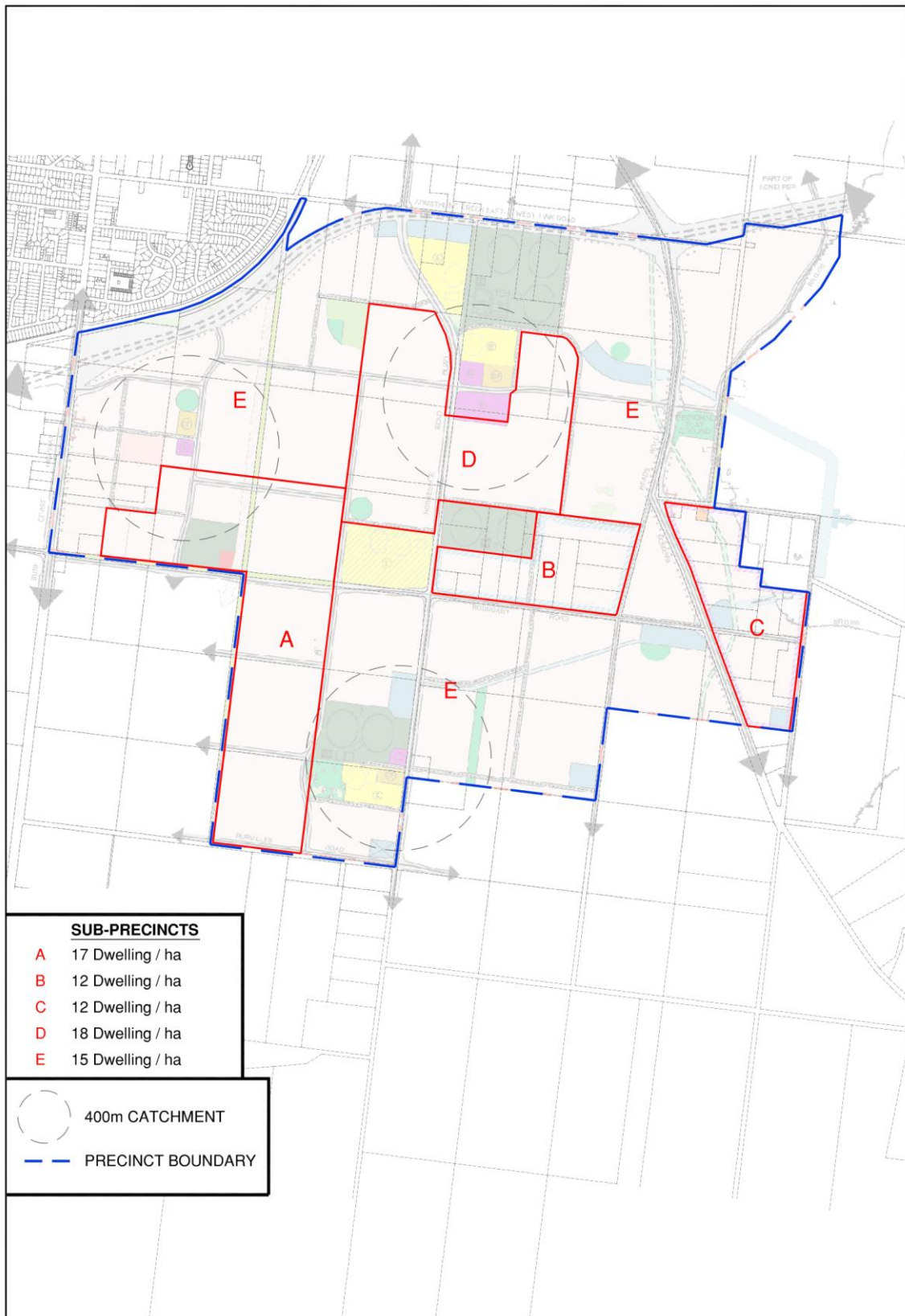
The following planning and design guidelines must be met.

- Prior to residential development of existing land parcels within areas nominated on Plan 4 as sub-precinct B (Boundary Road) and sub-precinct C (Charlemont Road) a Master Plan must be developed that:
  - Creates an integrated road network that provides opportunities for road connections to abutting landholdings;
  - Avoids the creation of cul-de-sacs;
  - Provides through connections (vehicle, pedestrian and cycle) between sub-precincts D and E and the surrounding parcels to integrate these areas within the broader community; and,
  - Provides a service delivery strategy which identifies timing and provision of critical drainage and utility infrastructure.
- Residential densities in Plan 4 Housing Density and Diversity and Table 3 must be met within the boundaries of the planning permit application for subdivision, unless it can be demonstrated that densities will be achieved across a larger, contiguous area within the applicant's control. If densities are proposed to be 'balanced' across a broader area, the applicant must provide an overall density strategy for their entire landholding or area of control, which:
  - Shows how densities will be distributed across current and future planning permit application areas;
  - Demonstrates how the distribution of densities responds to the target densities identified in Plan 4, or how an alternative approach that promotes greater housing diversity will result in achievement of yield targets contained in Table 3;
  - Includes a table that tracks density and yields achieved in previous, current and future planning permit applications within the HBP and within the applicant's control.
  - This density strategy must be updated as part of each application for a planning permit submitted by or on behalf of the applicant for land within the HBP.
- Residential development must include a range of dwelling densities, including conventional, small lot / medium density.
- Each dwelling must be connected to a reticulated recycled water supply system (where connected to the lot) for toilet flushing and garden watering.

- Development adjacent to the Armstrong Creek East-West Link Road, Surf Coast Highway and Barwon Heads Road must provide an active frontage to the arterial road, with access controlled via frontage roads.
- Development adjacent to drainage reserves must provide an active frontage other than corner lots as necessary. Design guidelines in appendix 5 apply to drainage reserves.
- The subdivision of land for housing that creates a lot less than 300m<sup>2</sup>, where the Responsible Authority has approved application of the Small Lot Housing Code, must be nominated via a restriction on title.
- Residential development is to be within 400 metre street walking distance of an existing or planned public transport stop.

The following planning and design guidelines should be met.

- The total lot yield recommended for HBP as outlined in Table 3 should be achieved.
- Development of medium density housing is encouraged as follows:
  - part of an integrated development site and designed to comply with the objectives of Clauses 54 or 55 of the Scheme;
  - generally within 400 metres of the main street core of activity centres;
  - associated with other high activity areas.
- Back and side fences along access controlled roads (e.g. Surf Coast Highway and Armstrong Creek East-West Link Road) should be avoided. Lots must be designed and sited to address access controlled roads but be separated from these roads by frontage roads or inter-connected T-head courts except where approved by the Responsible Authority.



**PLAN 4**  
**HOUSING DENSITY AND DIVERSITY**

**TABLE 3: Target Lot Yield and Distribution of Densities**

Density Target	Area (hectares)	Target Densities	Total Dwellings	% of Net Development Area	% of Total Lots	Average Lot Size (square metres) ^
A	72.28	17	1229	15.75	17.35	440
B	24.85	12	298	5.41	4.21	625
C	23.78	12	285	5.18	4.03	625
D	66.66	18	1200	14.52	16.94	420
E	271.50	15	4073	59.14	57.48	500
Totals			7086			

^ Average lot size calculated assuming 25% road.

\* Minimum 12 dwellings per hectare based on precinct fragmentation and constraints. Densities above 12 dwellings per hectare are strongly encouraged.

## **4.3 COMMUNITY FACILITIES**

### **4.3.1 Objectives: Community Facilities**

The objectives for community facilities as an essential part of the development of HBP are to:

- include co-located services and facilities in the three community hubs provided in HBP;
- plan and design high quality local social and community infrastructure that will facilitate the provision of a range of services to reflect changing community needs over time;
- support the provision of local social and community infrastructure such as schools, health and wellbeing facilities and active open space early in the development of HBP to maximise the opportunities for new residents and visitors;
- plan for social and community infrastructure to be safe and accessible and connected by walking and cycling paths, as well as public and private transport.

### **4.3.2 Implementation: Community Facilities**

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

- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Plan 5: Community Facilities.
- Table 4: Community Facilities.
- Plan 6: Public Open Space.
- Figures A and B: Community Hub - Indicative Concepts.
- Plan 11: Walking / Cycling Links (ultimate and interim).
- Plan 12: Public Transport Network.
- Planning and design guidelines as set out in section 4.3.3.

### **4.3.3 Planning and Design Guidelines: Community Facilities**

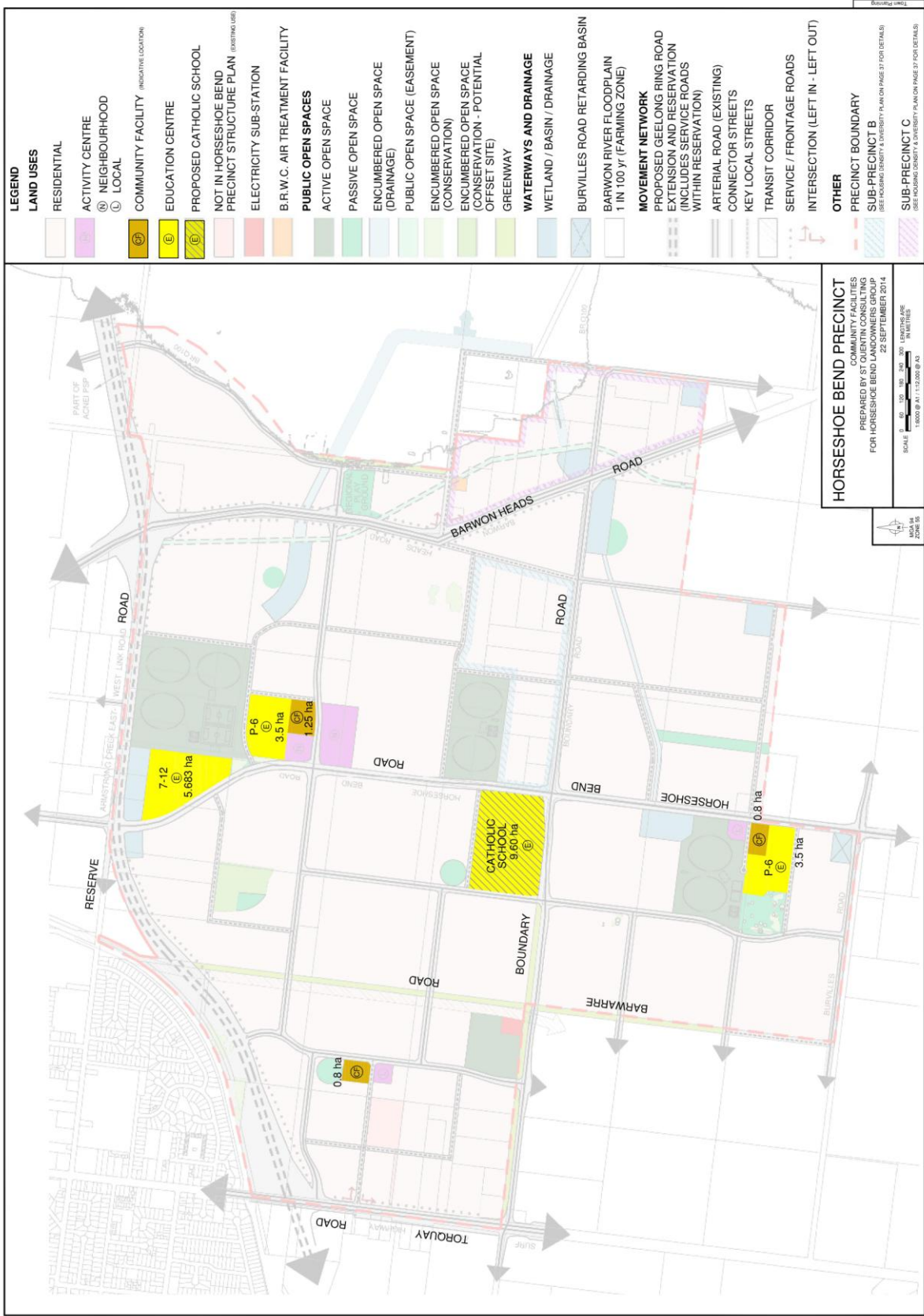
The following planning and design guidelines must be met.

- A building which is to be connected to a potable water supply must be connected also to a reticulated recycled water supply (where connected to the lot) for toilet flushing and garden watering.
- All public land for community facilities must be provided to the satisfaction of the Responsible Authority before the transfer of land with but not limited to:
  - completed bulk earthworks where required fit for intended purpose;
  - cleared of all rubbish and environmental weeds, top soiled and grassed with warm climate grass;
  - a water tapping for recycled and potable water;

- shared paths and footpaths, as appropriate;
- vehicle exclusion devices and maintenance access points (as required);
- any liability for native vegetation offsets to be provided to the satisfaction of DEPI.

The following planning and design guidelines should be met.

- Community facilities should be co-located and where possible integrated with other CoGG and government facilities, appropriate commercial facilities and / or proposed public open spaces;
- Education and community services (public and private) and other activities (such as childcare centres) should be:
  - within or adjoining community hubs;
  - within or on the edge of activity centres; or
  - on either connector streets or arterial roads where access can be provided safely;
- The three community hubs should be planned to reflect the principles in Figures A and B although alternative approaches will be considered that meet the objectives for community facilities, to the satisfaction of the Responsible Authority;



**PLAN 5**  
**COMMUNITY FACILITIES**

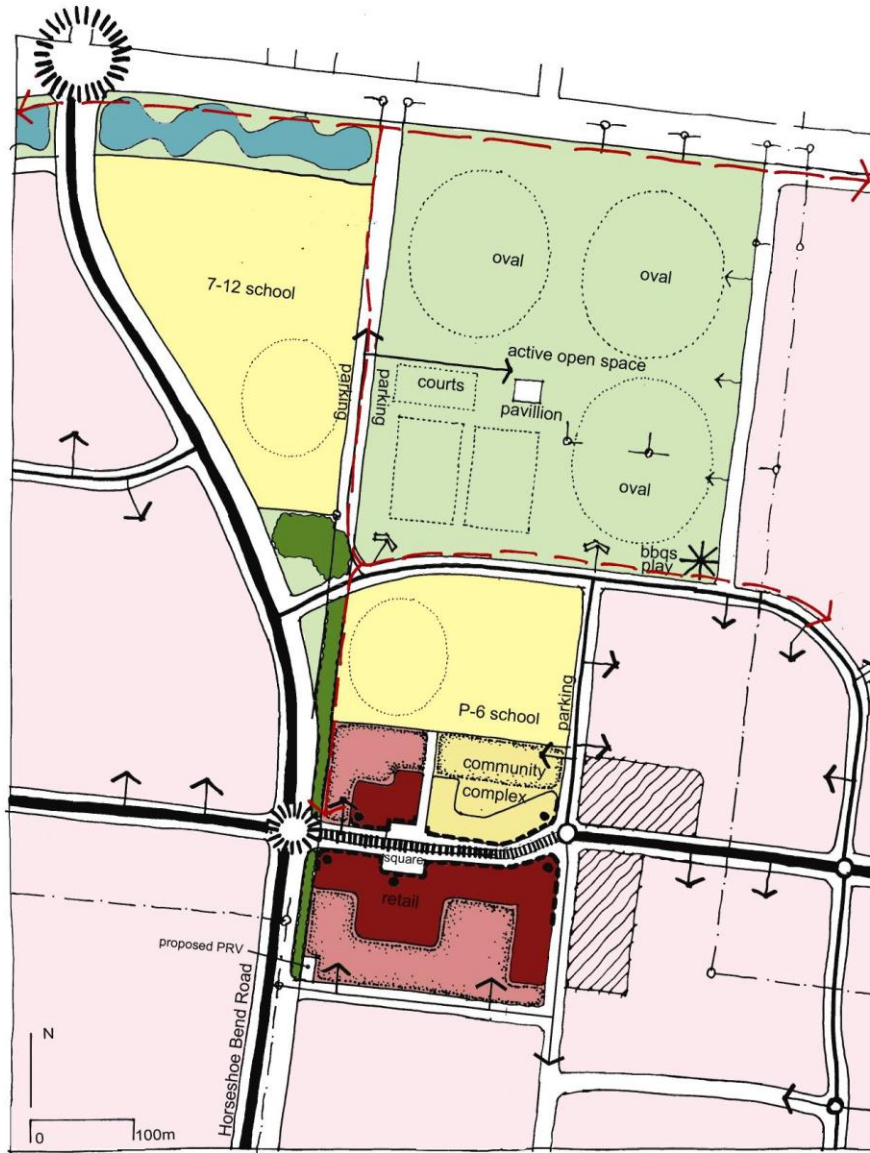
**TABLE 4: Community Facilities**

Facilities and services	Location	Lead Agency
State primary school – 3.5 hectares.	Two schools are proposed, the schools form part of a community activity centre	DEECD
State secondary school – 6 hectares  1 x multi-purpose stadium – 2 court (located on the secondary school site).	North east NAC adjacent to the Northern Recreation Reserve.	DEECD
Catholic P-12 School – 9.6 hectares.	On the north-west corner of Boundary Road (greenway) and Horseshoe Bend Road	Catholic Education Office
Community complex incorporating: <ul style="list-style-type: none"> <li>• Kindergarten.</li> <li>• Child care.</li> <li>• Community meeting space.</li> <li>• MCH</li> </ul>	Three community complexes forming part of the: <ul style="list-style-type: none"> <li>• Northern NAC.</li> <li>• Western LAC.</li> <li>• Southern LAC.</li> </ul>	COGG
Health and wellbeing complex – Neighbourhood.	North -east NAC	To be determined, Barwon Health and /or private medical provider or a combination of both.
Health and wellbeing complex – Local.	Southern LAC	To be determined, Barwon Health and /or private medical provider or a combination of both.
Northern Recreation Reserve – 16.75 hectares: <ul style="list-style-type: none"> <li>• 3 x full size football / cricket ovals.</li> <li>• Flexible space, potential soccer fields.</li> <li>• 2 x pavilion.</li> <li>• 1 x multi-purpose stadium</li> <li>• 2 x netball courts.</li> </ul>	Northern Recreation Reserve	COGG
Central Recreation Reserve 8.0 hectares: <ul style="list-style-type: none"> <li>• 2 x full size football / cricket ovals.</li> <li>• 1 x pavilion</li> </ul>	Central Recreation Reserve	COGG

<b>Facilities and services</b>	<b>Location</b>	<b>Lead Agency</b>
Southern Recreation Reserve 8.737 hectares: <ul style="list-style-type: none"> <li>• 2 x full size football / cricket ovals.</li> <li>• 2 x netball courts.</li> <li>• 2 x lawn bowling greens (including croquet).</li> <li>• 1 x pavilion.</li> </ul>	Southern Recreation Reserve	COGG
Western Recreation Reserve – 4 hectares: <ul style="list-style-type: none"> <li>• Athletics track/soccer/junior oval</li> <li>• Multi-purpose flexible space.</li> <li>• 1 x pavilion.</li> </ul>	Western Recreation Reserve	COGG
Regional passive public open space – 2.5 hectares: <ul style="list-style-type: none"> <li>• Regional playground.</li> <li>• Picnic facilities.</li> <li>• Car park.</li> </ul>	Barwon River Parklands – Sparrovale Extension	COGG

Funding for community facilities will be from a range of sources including the Horseshoe Bend Precinct Development Contributions Plan (HBPDCP).

**FIGURE A: NORTH - EAST NEIGHBOURHOOD ACTIVITY CENTRE COMMUNITY HUB - INDICATIVE CONCEPT**

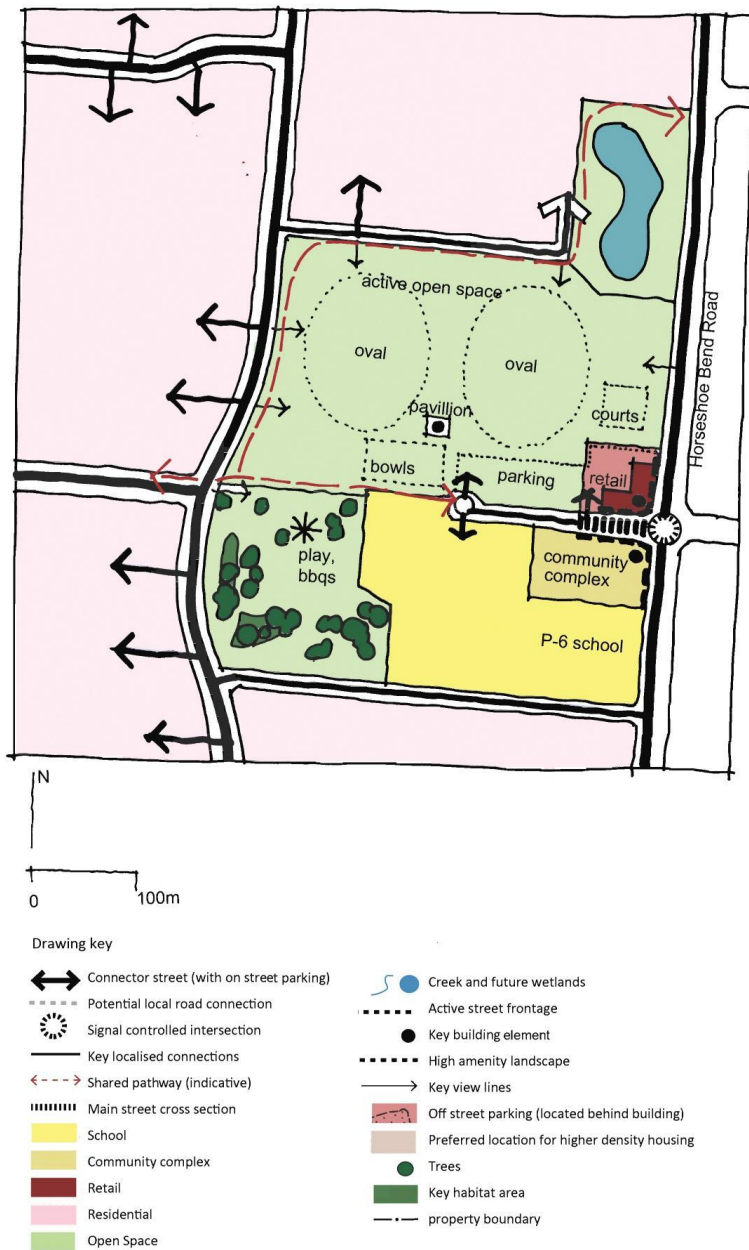


Drawing key

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>↔ Connector street (with on street parking)</li> <li>- - - Potential local road connection</li> <li>⊙ Signal controlled intersection</li> <li>— Key localised connections</li> <li>← - - - Shared pathway (indicative)</li> <li>     Main street cross section</li> <li>■ School</li> <li>■ Community complex</li> <li>■ Retail</li> <li>■ Residential</li> <li>■ Open Space</li> </ul> | <ul style="list-style-type: none"> <li>⦿ Creek and future wetlands</li> <li>- - - Active street frontage</li> <li>● Key building element</li> <li>- - - High amenity landscape</li> <li>→ Key view lines</li> <li>■ Off street parking (located behind building)</li> <li>/// Preferred location for higher density housing</li> <li>● Trees</li> <li>■ Key habitat area</li> <li>- - - property boundary</li> </ul> |
|--|--|

**HORSESHOE BEND PRECINCT STRUCTURE PLAN  
NORTHERN NODE - INDICATIVE NAC LAYOUT**

**FIGURE B: SOUTHERN LOCAL ACTIVITY CENTRE COMMUNITY HUB - INDICATIVE CONCEPT**



**HORSESHOE BEND PRECINCT STRUCTURE PLAN  
SOUTHERN NODE - INDICATIVE LAC LAYOUT**



#### **4.3.4 Community Facilities Delivery Statement**

Appendix 4 contains a CoGG community facilities delivery statement which identifies the intentions it has for such delivery and provides insights on how all facility and service providers might be expected to assist.

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## 4.4 PUBLIC OPEN SPACE, NATURAL SYSTEMS AND BIODIVERSITY

### 4.4.1 Objectives: Public Open Space and Natural Systems

The objectives for public open space and natural systems as an essential part of the development of HBP are to:

- inter-connect public open spaces, residential areas, activity centres and the public transport network through safe and attractive on- and off-road pavement walking / cycling links;
- ensure the appropriate landscape treatment of public open spaces in keeping with their intended character and functions and the objective of life-cycle sustainability (care, growth and maintenance);
- promote the early provision of public open space in its intended functional form.

### 4.4.2 Implementation: Public Open Space and Natural Systems

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

- Plan 3: Horseshoe Bend Precinct Urban Structure;
- Plan 6: Public Open Space;
- Masterplans for Figures C-F (active open space);
- Table 4: Community Facilities.
- Appendix 7: Road Design and Delivery Characteristics (and in particular shared paths and footpaths).
- Appendix 8: Road Cross Sections (Figures G to W)
- Plan 7: Biodiversity
- Plan 11: Walking / Cycling Links. (ultimate and interim)
- Plan 12: Public Transport Network.
- Planning and design guidelines as set out in section 4.4.3.
- Armstrong Creek Horseshoe Bend Native Vegetation Precinct Plan.

### 4.4.3 Planning and Design Guidelines: Public Open Space and Natural Systems

The following planning and design guidelines must be met.

- Unencumbered land for public open space must be provided generally in the locations specified on Plan 6 (**Public Open Space**).

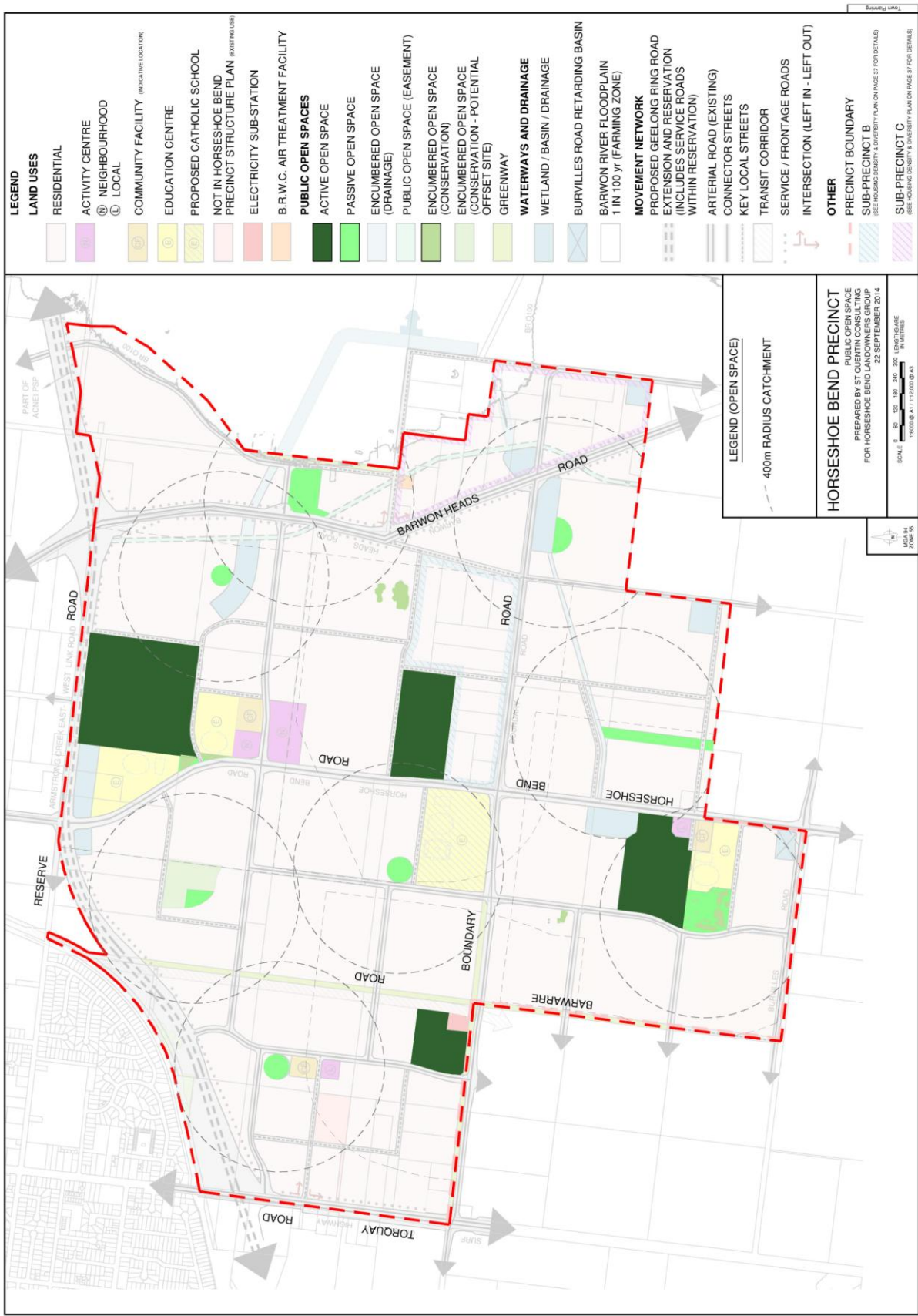
Unencumbered public open space is subject to equalisation. Each property owner in HBP must provide land or cash-in-lieu equal to 10 per cent of the net developable area of HBP, at a pro-rata rate equivalent to the net developable area of that property. Plan 6 and the land use budget in section 3.2 of this HBSP provide jointly the relevant details for each property. A property with greater than 10 per cent unencumbered public open space will

receive compensation for the value of the land above 10 per cent. A property with less than 10 per cent unencumbered public open space will be required to pay cash-in-lieu equal to the value of the land less than 10 per cent.

- A developer may elect to provide unencumbered public open space in addition to that shown on Plan 6 (**Public Open Space**) and the land budget but it will neither be included in nor affect the equalisation scheme. It must be provided and embellished entirely at the cost of the developer.
- A building which is to be connected to a potable water supply must be connected also to a reticulated recycled water supply (where connected to the lot) for toilet flushing and garden watering.
- All public open space (excluding habitat conservation areas) must be provided to the satisfaction of the Responsible Authority before the transfer of land with but not limited to:
  - completed bulk earthworks where required fit for intended purpose;
  - cleared of all rubbish and environmental weeds, top soiled and grassed with warm climate grass;
  - a water tapping for recycled and potable water;
  - landscaping including drought-resistant tree and other planting;
  - shared paths and footpaths, as appropriate;
  - vehicle exclusion devices and maintenance access points;
  - for active recreation spaces, connected to all utilities;
  - any liability for native vegetation offsets to be provided to the satisfaction of DEPI;
  - the installation of basic play equipment, as appropriate.
- Any habitat conservation areas must be provided to the satisfaction of the Responsible Authority before the land is transferred Council.
- Rehabilitation of the dam on property 19 for the purposes of unencumbered open space needs to be to the satisfaction of the Responsible Authority.

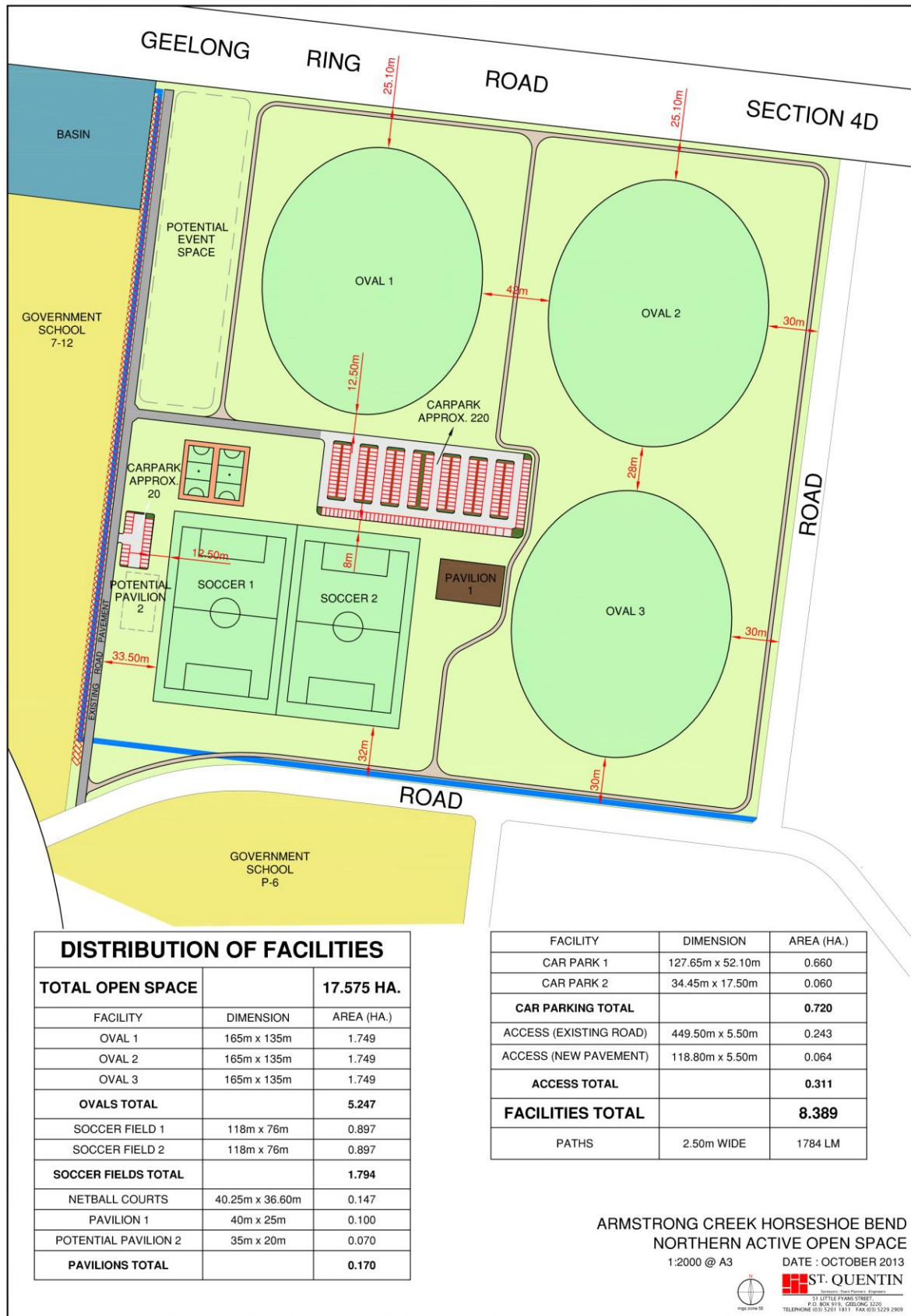
The following planning and design guidelines should be met.

- All public open space (active and passive) should be provided to address the guidelines in Appendix 5.
- The neighbourhood and local active public open space should consider the indicative Figures C - F.



**PLAN 6**  
**PUBLIC OPEN SPACE**

**FIGURE C: NORTHERN ACTIVE OPEN SPACE MASTERPLAN**



ARMSTRONG CREEK HORSESHOE BEND  
NORTHERN ACTIVE OPEN SPACE  
1:2000 @ A3 DATE : OCTOBER 2013



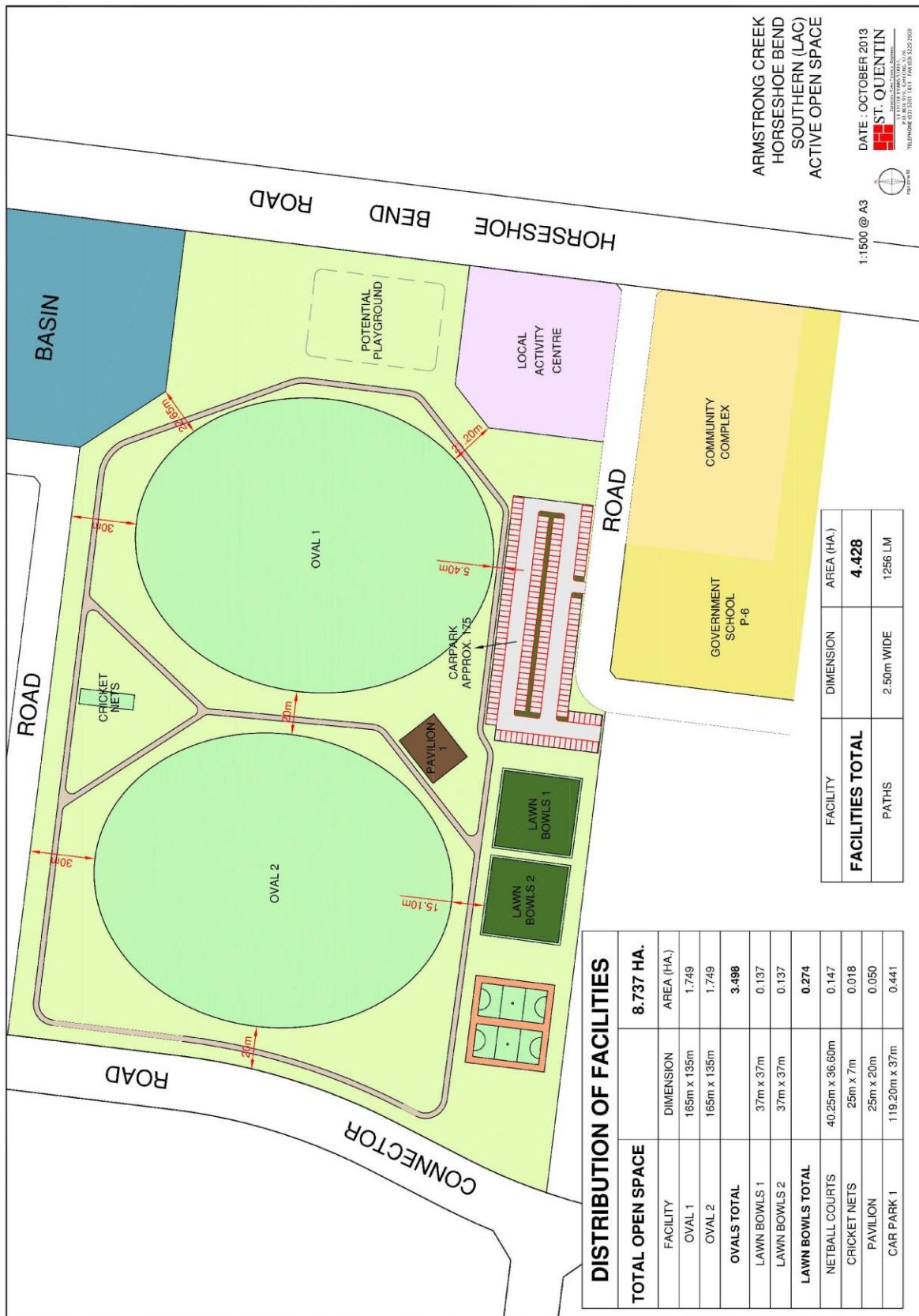
**FIGURE D: CENTRAL ACTIVE OPEN SPACE MASTERPLAN**



ARMSTRONG CREEK HORSESHOE BEND  
CENTRAL ACTIVE OPEN SPACE  
1:1500 @ A3 DATE: OCTOBER 2013



**FIGURE E: SOUTHERN ACTIVE OPEN SPACE MASTERPLAN**



ARMSTRONG CREEK  
HORSESHOE BEND  
SOUTHERN (LAC)  
ACTIVE OPEN SPACE

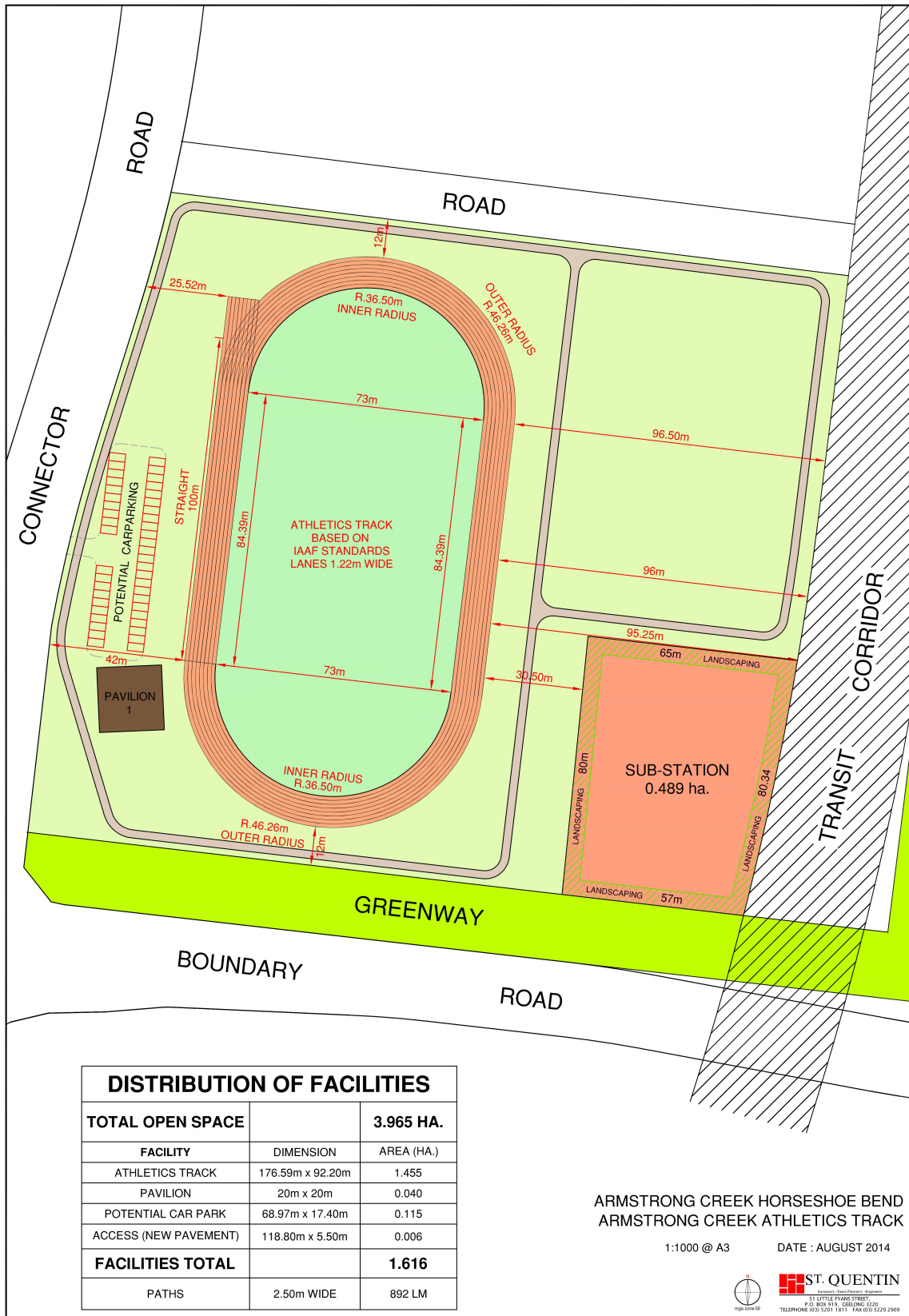
DATE: OCTOBER 2013  
ST. QUENTIN  
ARCHITECTS  
10/100 WILSON ROAD, WILSON  
TELEPHONE: (08) 9331 1111 FAX: (08) 9331 2908

1:1500 @ A3

FACILITY	DIMENSION	AREA (HA.)
<b>FACILITIES TOTAL</b>		<b>4.428</b>
PATHS	2.50m WIDE	1266 LM

DISTRIBUTION OF FACILITIES		TOTAL OPEN SPACE	8.737 HA.
FACILITY	DIMENSION	AREA (HA.)	
OVAL 1	165m x 135m	1.749	
OVAL 2	165m x 135m	1.749	
<b>OVALS TOTAL</b>		<b>3.498</b>	
LAWN BOWLS 1	37m x 37m	0.137	
LAWN BOWLS 2	37m x 37m	0.137	
<b>LAWN BOWLS TOTAL</b>		<b>0.274</b>	
NETBALL COURTS	40.25m x 36.60m	0.147	
CRICKET NETS	25m x 7m	0.018	
PAVILION	25m x 20m	0.050	
CARPARK 1	119.20m x 37m	0.441	

**FIGURE F: ATHLETICS OPEN SPACE MASTERPLAN**



#### 4.4.4 Objectives: Biodiversity

The objectives for biodiversity as an essential part of the development of HBP are to:

- ensure HBP (the precinct) is developed in ways sympathetic to the continuing conservation management of areas of significant native vegetation and fauna habitat in key locations (such as along drainage lines and in consolidated patches) in accordance with the Horseshoe Bend Native Vegetation Precinct Plan (NVPP);
- plan for the long term conservation management of areas of significant native vegetation and fauna habitat in accordance with the NVPP;
- balance the assessment and management of native vegetation as either a conservation outcome or a landscape/aesthetic outcome recognising the planned urban context of the land;
- maximise retention of biodiversity and/or landscape values within the precinct and to facilitate their function as corridors linking habitats across the precinct and beyond;
- enhance the biodiversity of the area, including the designation of areas in the precinct in which to concentrate on revegetation activities to provide habitat;
- protect and enhance the biodiversity values along any drainage structures with design to maintain a habitat corridor link;
- maximise retention of trees identified for Practical Retention in the NVPP as part of detailed design.
- plan for the long term conservation management of areas of significant native vegetation and fauna habitat in accordance with the NVPP;
- plan for biodiversity values to be retained and enhanced within the precinct, in particular the remnant patches, drainage lines and vegetation within the road reserves of Barwarre Road, Horseshoe Bend Road and Boundary Road. These areas function in part to link habitats across the landscape and provide a focus for revegetation activities;
- enhance the biodiversity of the area to provide habitat and ecological connectivity throughout the precinct particularly for threatened species as the area develops in accordance with the HBSP.

#### 4.4.5 Implementation: Biodiversity

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

- Plan 7: Biodiversity Plan.
- Section 4.4.6 Biodiversity Conservation Planning and Design Guidelines.
- Section 4.4.7 Horseshoe Bend Native Vegetation Precinct Plan.
- Plan 6: Public Open Space.
- Appendix 5: Open Space Guidelines

#### 4.4.6 Planning and Design Guidelines: Biodiversity

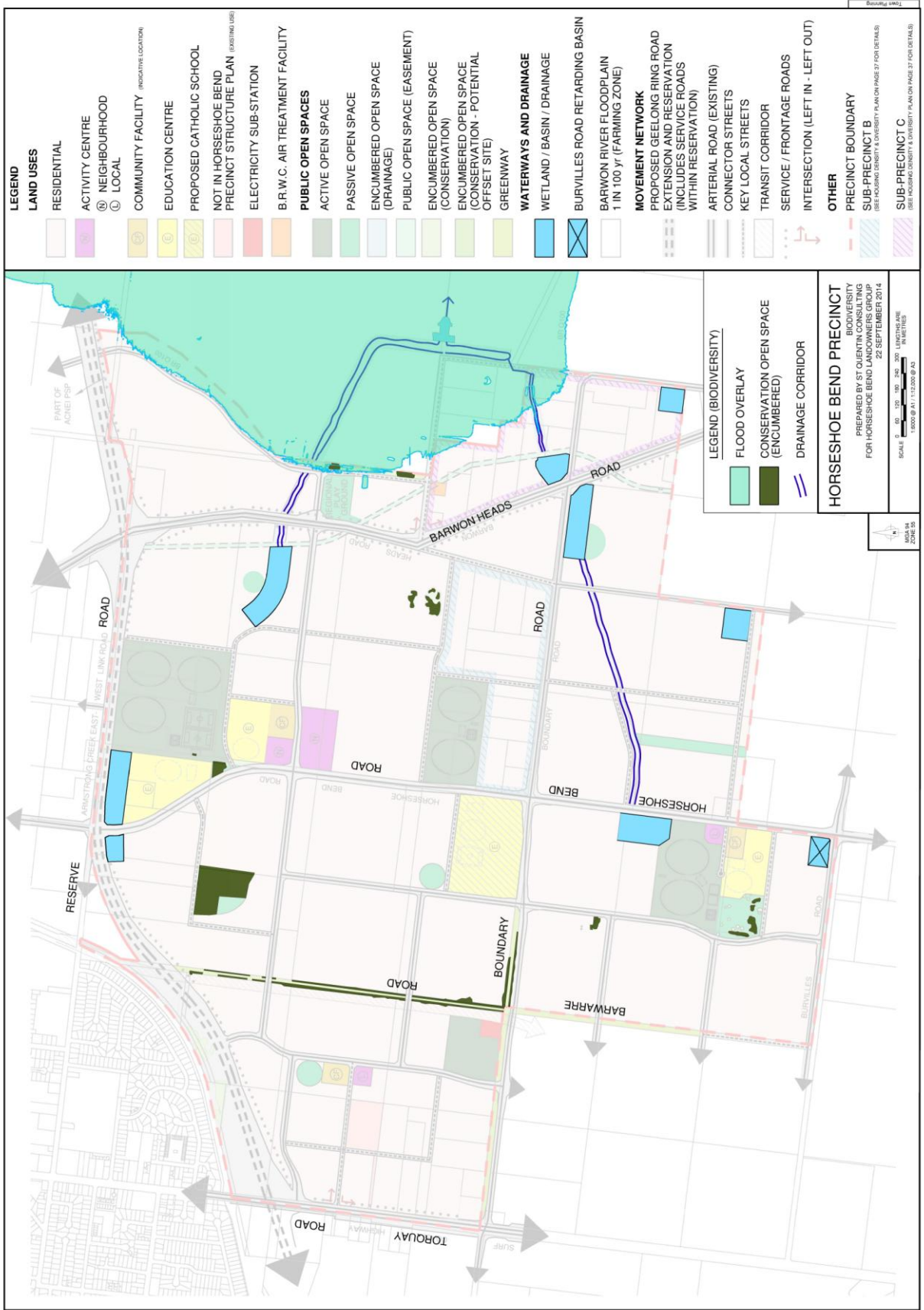
The following planning and design guidelines must be met to the satisfaction of the responsible authority.

- Applications must provide an assessment in accordance with the three-step approach for trees identified as Practical Retention Trees in the NVPP, having regard to details such as:
  - Fill/excavation
  - Drainage/services
  - Road Construction techniques.
- Loss of Practical Retention Trees must be offset in accordance with the NVPP. Where trees are proposed to be retained, but die within 12 months of completion of works, the tree must be offset in accordance with the NVPP.
- Development in proximity to trees identified for protection in the Armstrong Creek Horseshoe Bend Native Vegetation Precinct Plan or Practical Retention Trees identified for retention at detail design stage must be completed in accordance with any Tree Protection and Construction Management Plan.
- Any Tree Protection and Construction Management Plan developed in consultation with DEPI must address the following:
  - The protection of trees identified as retained and protected in the NVPP to Australian Standards (as defined in the NVPP except along the development side of a habitat zone, where works may occur up to the drip line of the tree) and the planting of indigenous ground storey;
  - The retention of trees identified as Practical Retention Trees in the NVPP, and identified as being retained at detailed design stage, to Australian Standards (as defined in the NVPP);
  - The need for measures to be used that will limit and manage earthworks in proximity to the tree identified for retention;
  - Management of subdivisional and public open space drainage to support the health of vegetation to be retained;
  - Conditions and requirements for permits in the Armstrong Creek Horseshoe Bend Native Vegetation Precinct Plan.
- Where works will impact or has impacted upon more than 10% of the Tree Protection Zone of a tree to be retained, the tree must be offset unless advice from an appropriately qualified arborist is provided to the satisfaction of the Department of Sustainability and Environment and the responsible authority confirming that the tree will not be/has not been significantly damaged.



The following planning and design guidelines should be met:

- Development of public open space and drainage works should include design requirements for fauna habitat where appropriate.
- Street trees and public open space landscaping should contribute to habitat for indigenous fauna species in particular arboreal animals and avifauna (birds). Where appropriate the use of indigenous trees is encouraged along streets and in parks. Lower level indigenous planting may be appropriate where it can be demonstrated it is compatible with the planning and design guidelines for street tree planting and delivery of public open space.
- Design and landscaping of drainage areas should promote the establishment of habitat suitable for local species such as the Growling Grass Frog (*Litoria raniformis*).
- Linear parks, water ways, greenways and widened road reserves should support the connection of areas capable of supporting the flora and fauna habitat through appropriate design and planting.
- Construction of utilities within greenways should be avoided, but where unavoidable must be undertaken in a manner that avoids or minimises incursion into the defined Tree Protection Zone.



**PLAN 7**  
**BIODIVERSITY**

#### **4.4.7 Horseshoe Bend Native Vegetation Precinct**

The incorporated Horseshoe Bend Native Vegetation Precinct Plan (HBP NVPP) applies to the majority of HBP and related requirements must be met.

The HBP NVPP identifies 23 quality zones ranging in size from 0.02 to 3.25 ha in HBP, of which 3.77 ha are to be retained (or partially retained), 2.73 ha are to be fully or partially retained for offset and 8.40 ha are to be completely removed (with 2.72 ha identified for Practical Retention). The vegetation removals will generate an offset requirement of 3.95 Habitat Hectares. The offsets will be achieved through a combination of on-site and offsite offsets utilising 'prior management', 'security', 'maintenance', 'improvement' and 'revegetation' gains. Potential offset sites are identified in the ACHBNVPP, and will be confirmed as part of preparation of an Offset Management Strategy for the entire precinct.

The remainder of the required offsets will need to be secured in an appropriate offsite location, as agreed with DEPI and COGG through the development of the offset management strategy, and associated Vegetation Offset Management Plans (VOMP) for each stage of development.

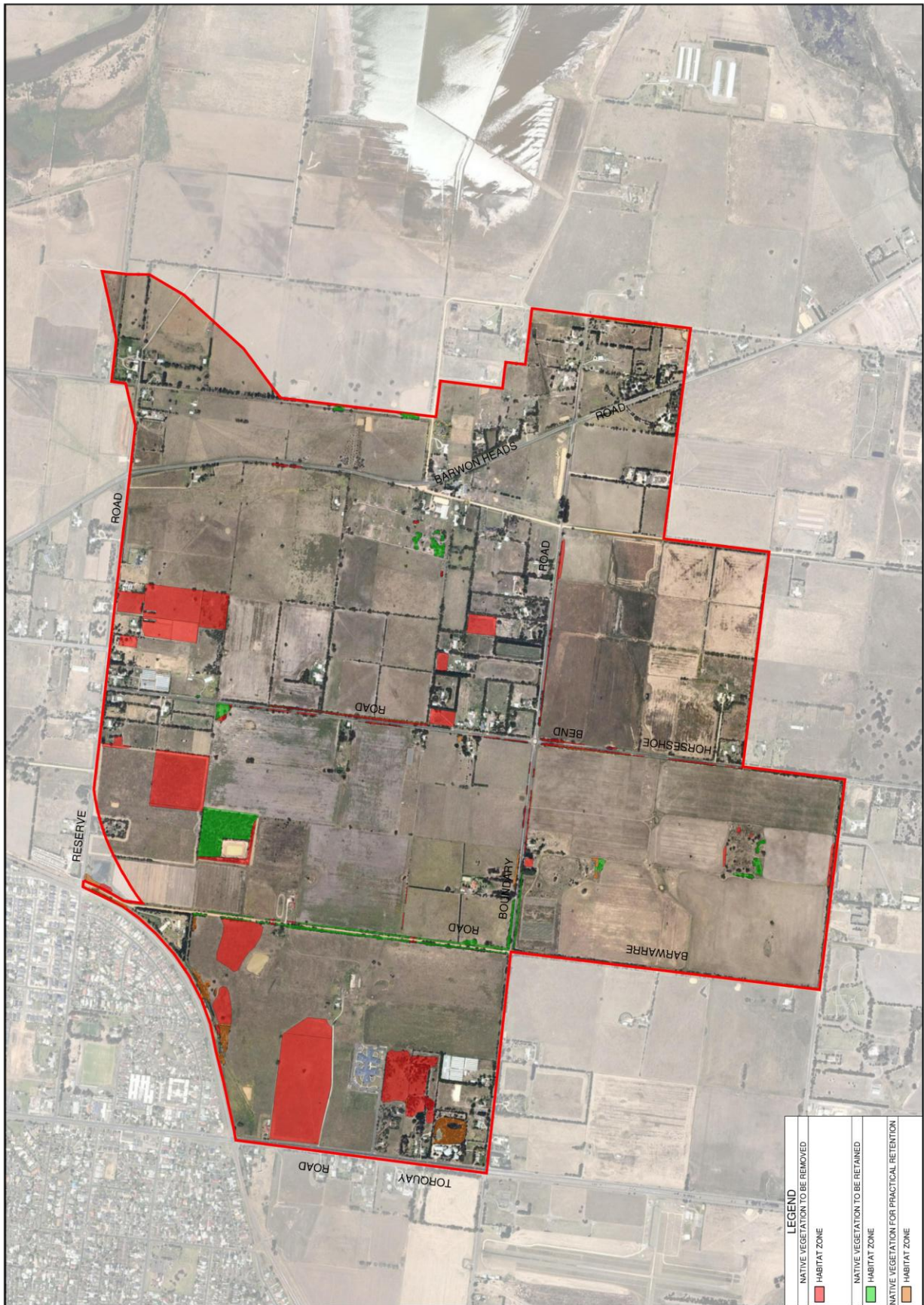
The HBP NVPP identifies 186 scattered indigenous trees including:

- 56 Small Trees;
- 49 Medium Old Trees (MOT);
- 75 Large Old Trees (LOT);
- 6 Very Large Old Trees (VLOT);

Of these trees, 110 are to be retained and 76 are to be removed (of the trees identified as being able to be removed, 31 are identified as Practical Retention Trees, and as such, it is likely that many more scattered trees will be retained than identified in the HBP NVPP).

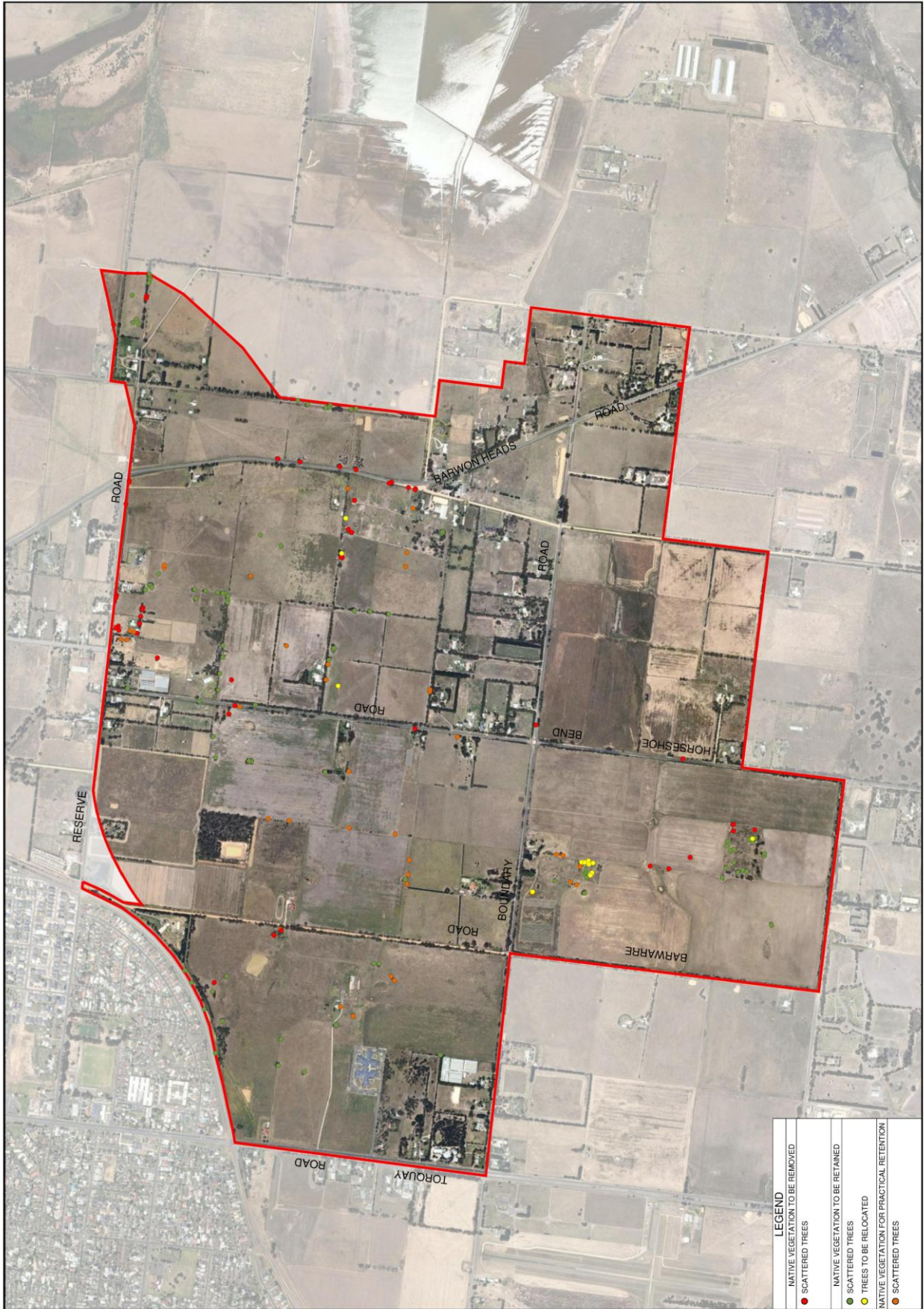
The following plans summarise the information above.

- Plan 8 Status of Habitat Zones within the Horseshoe Bend Precinct;
- Plan 9 Scattered Indigenous Trees within the Horseshoe Bend Precinct.



**PLAN 8**

**STATUS OF HABITAT ZONES WITHIN THE HORSESHOE BEND PRECINCT**



**PLAN 9**

**SCATTERED INDIGENOUS TREES WITHIN THE HORSESHOE BEND PRECINCT**

## 4.5 EMPLOYMENT AND ACTIVITY CENTRES

### 4.5.1 Objectives: Employment and Activity Centres

The objectives for activity centres as essential parts of the development of HBP are to:

- maximise neighbourhood and local activity centres as public spaces and thus community meeting or gathering places;
- promote a 'main street' neighbourhood activity centre with an open character and active street frontages.
- promote a visual and physical relationship between the NAC and adjacent recreation facilities such as picnic areas and playgrounds (including the Northern Active Open Space).
- Promote high quality built form at key 'gateway' corners.
- Support a change in land use character at the interface with activity centres and surrounding land uses in the form of changes to the cross-section and landscaping of adjacent roads.
- To support employment opportunities within HBP (primarily within Activity Centres) and within the broader area, including the Armstrong Creek Town Centre and the North East Industrial Precinct.

### 4.5.2 Implementation: Employment and Activity Centres

The objectives for activity centres are met by implementation of all of the following.

- Section 4.5 of the Horseshoe Bend PSP.
- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Planning and design guidelines as set out in section 4.5.3.
- Figure A – Neighbourhood Activity Centre Community Hub - Indicative Concept.
- Figure B – Southern Local Activity Centre Community Hub – Indicative Concept.

### 4.5.3 Planning and Design Guidelines: Employment and Activity Centres

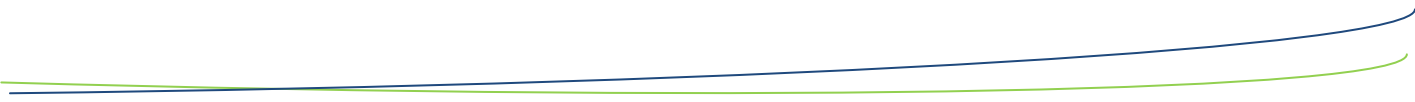
The following planning and design guidelines for activity centres must be met.

- A building which is to be connected to a potable water supply must also be connected also to a reticulated recycled water supply (where connected to the lot) for toilet flushing and garden watering.
- Before development starts an Urban Design Framework must be completed for the neighbourhood activity centre to the satisfaction of the Responsible Authority.

- The subdivision, development and use of the Neighbourhood Activity Centre must be generally in accordance with any Urban Design Framework approved by the Responsible Authority.

The following planning and design guidelines should be met when preparing a neighbourhood activity centre urban design framework.

- An Urban Design Framework should:
  - be consistent generally with the Table 5: Activity Centres Hierarchy;
  - address the whole neighbourhood activity centre area and adjoining land;
  - demonstrate the relationship and connectivity of the neighbourhood activity centre to proposed development beyond its boundaries;
  - address any relevant design guidelines prepared by the Victorian Government or CoGG;
  - provide convenient access for public transport;
  - include an appropriate design response to the neighbourhood activity centre urban design framework guidelines outlined in Appendix 6 (**Neighbourhood Activity Centre Urban Design Framework Guidelines**) and the indicative concept illustrated in Figure A;
  - propose an overall landscape concept for the neighbourhood activity centre;
  - set out guidelines to address environmental sustainability including integrated water management and energy conservation;
  - set out provisions for car parking including the location and design of car parking areas and car parking rates for proposed uses within the neighbourhood activity centre;
  - set out design guidelines for the provision of service areas for deliveries and waste disposal including access for larger vehicles and measures to minimise the impact on the amenity of the activity centre and adjoining neighbourhoods;
  - show how opportunities for medium density housing and future commercial expansion can be incorporated into the neighbourhood activity centre;
  - provide guidance on land uses and floor space areas.
  - establish a 'main street' structure that provides for:
    - Activated street frontage.
    - Pedestrian movement along and across streets.
    - Diverse architecture.
    - Parking on street and in key discrete (but convenient) locations.
    - Containment of activities within a walkable core.
    - An adaptable/flexible design that supports change in land uses over time.

- 
- Multiple access points and movement options.
  - Safe places for children to cross the street.
  - Include specific cross-section for 'main street' and any other internal streets that provide an appropriate balance (for movement and parking) between pedestrians and vehicles.
  - Demonstrate the relationship and connectivity of the neighbourhood activity centre to proposed development (including the community complex and the P-6 school) and open space areas beyond its boundaries.
  - Set out design guidelines for the provision of service areas for deliveries and waste disposal including access for larger vehicles and measures to minimise the impact on the amenity of the activity centre and adjoining neighbourhoods.
  - Show how opportunities for medium density housing and future commercial expansion can be incorporated into the neighbourhood activity centre.
  - Demonstrate how the roads and community spaces visually and physically connect with the surrounding residential neighbourhoods.
  - Avoid the creation of privately owned 'public space'.

**TABLE 5: Activity Centres Hierarchy**

Activity Centre	Role and function
Neighbourhood activity centre	<ul style="list-style-type: none"> <li>• Maximum shop floorspace of 7,000 square metres, or more subject to justification and permit. A permit may be granted to exceed this amount where a net community benefit is established in terms of the planned regional retail hierarchy.</li> <li>• Indicative office floorspace of 1,400 square metres.</li> <li>• Amenity-based centre as a focus for retail and community based uses.</li> <li>• Public gathering place, including as an informal place to meet or for structured/organised events (these spaces should not be privately owned) A 'main street' centre anchored by a supermarket, potentially a second supermarket and supported by specialty shops.</li> <li>• Co-location with community facilities including a P-6 school and community complex.</li> <li>• Relationship with adjacent open space and recreation facilities including picnic areas, parks and the active open space.</li> <li>• Provision for public health and other community facilities, private medical and allied medical services.</li> <li>• Provision for the development of non-retail commercial uses which include office and small office / home office development.</li> <li>• Provision for the development of privately owned and operated community facilities.</li> <li>• Economic development / business support services.</li> <li>• Planned walking / cycling links to community facilities throughout HBP and beyond.</li> <li>• Excludes electronic gaming machines (EGMs)</li> </ul>
Local activity centres – Southern	<ul style="list-style-type: none"> <li>• Indicative retail floorspace of up to 1,000 square metres</li> <li>• indicative office floorspace of up to 500 square metres</li> <li>• Co-location with community facilities including a primary school.</li> <li>• Excludes electronic gaming machines (EGMs)</li> </ul>
Local activity centres - Western	<ul style="list-style-type: none"> <li>• Indicative retail floorspace of up to 1,000 square metres</li> <li>• Indicative office floorspace of up to 200 square metres.</li> <li>• Co-location with community facilities including a primary school.</li> <li>• Excludes electronic gaming machines (EGMs)</li> </ul>

## **4.6 TRANSPORT AND MOVEMENT**

### **4.6.1 Objectives: Transport and Movement**

The objectives for transport and movement as an essential part of the development of HBP are to:

- ensure the detailed planning of HBP facilitates a broad range of transport modes that start with making attractive, accessible and convenient walking and cycling trips;
- develop shared paths or safe on-road links that provide a network of inter-connected walking and cycling routes throughout HBP and inter-linking activity centres and other people places (including to link with similar routes outside HBP);
- develop a safe and appropriate road network that services HBP and beyond, that recognizes the wider regional function of key existing highways and major roads but one that encourages trips by walking and cycling through the planning of movement links and mode choices;
- plan appropriately for and to facilitate the provision of public transport with good accessibility to all households and other people places.
- encourage diversity in street design to support diverse land uses and to protect scattered native vegetation where possible.
- Ensure the design of the cross-section and road elements creates a positive relationship between the street and adjacent land uses.

### **4.6.2 Implementation: Transport and Movement**

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

- Plan 3: Horseshoe Bend Precinct Structure.
- Plan 10A: Road Hierarchy (interim).
- Plan 10B: Road Hierarchy (ultimate).
- Appendix 7: Road Design and Delivery Characteristics.
- Plan 11: Walking / Cycling Links.
- Plan 12: Public Transport Network.
- Appendix 8: Road Cross Sections.

### 4.6.3 Planning and Design Guidelines: Transport and Movement

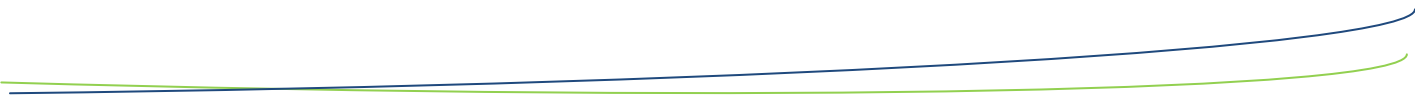
The following planning and design guidelines for transport and movement must be met.

- Connector streets (including any culverts and all related infrastructure) must be constructed progressively by development proponents as part of the subdivision works (before the issue of a statement of compliance for the relevant stages).
- All road designs that have an interim role must be designed to easily facilitate the delivery of the ultimate cross section.
- Underground infrastructure such as drainage and utilities must be provided in their ultimate location e.g. within ultimate cross section allocation as reflected in Appendix 8.
- All intersections with Surf Coast Highway, Barwon Heads Road and the Armstrong Creek East-West Link Road must be designed, constructed and controlled, in accordance with the precinct infrastructure plan, to the satisfaction of the Responsible Authority and the Roads Corporation.
- Subdivisions must be staged to provide for the timely connection of road links between properties and to the arterial road network to support transport and movement links (that is, public transport, walking, cycling and vehicular links).
- The provision must be made for any bus route and bus stop (which must have direct and safe pedestrian access connected to an existing walking / cycling path) where nominated by Public Transport Victoria.
- Walking and cycling path crossings must be provided at all relevant intersections and at the intersection of key HBP -wide shared paths and higher order roads.
- Cycle parking facilities must be provided in convenient and prominent locations at key destinations such as schools, community centres, activity centres and public transport interchanges.
- Any roundabouts constructed on roads that are planned to accommodate a public transport route shown in Plan 13 Public Transport Plan must be designed to accommodate ultra low floor buses, to the satisfaction of Public Transport Victoria.
- Bicycle priority for the shared path network, at the intersections of minor streets, must be achieved through strong and consistent visual and physical cues and supportive road signs.
- The design of Boundary Road dedicated cycle path must:
  - Prioritise the off-road cycle path at the intersections of minor streets must be achieved through strong and consistent visual and physical cues and supportive road signs (refer Figure Z3).
  - Allow for movement of cyclists travelling at least 20km/h.
- Connections to the off-road cycle path network must be provided to the adjoining network.

- No on-road parking is to be provided in either the interim or ultimate cross-section of Horseshoe Bend Road. The Responsible Authority may grant approval for indented parking bays where it can be demonstrated that remnant vegetation will not be negatively impacted.
- Back and side fences along access controlled roads (e.g. Surf Coast Highway, Barwon Heads Road and the Armstrong Creek East-West Link Road) must be avoided. Lots must be designed and sited to address, access controlled roads but be separated from these roads by frontage roads or inter-connected T-head courts except where approved by the Responsible Authority.
- Cycle parking facilities must be provided in convenient and prominent locations at key destinations such as schools, community centres, activity centres and public transport interchanges.
- Walking and cycling path crossings must be provided at all relevant intersections and at the intersection of key ACHB wide shared paths and higher order roads.

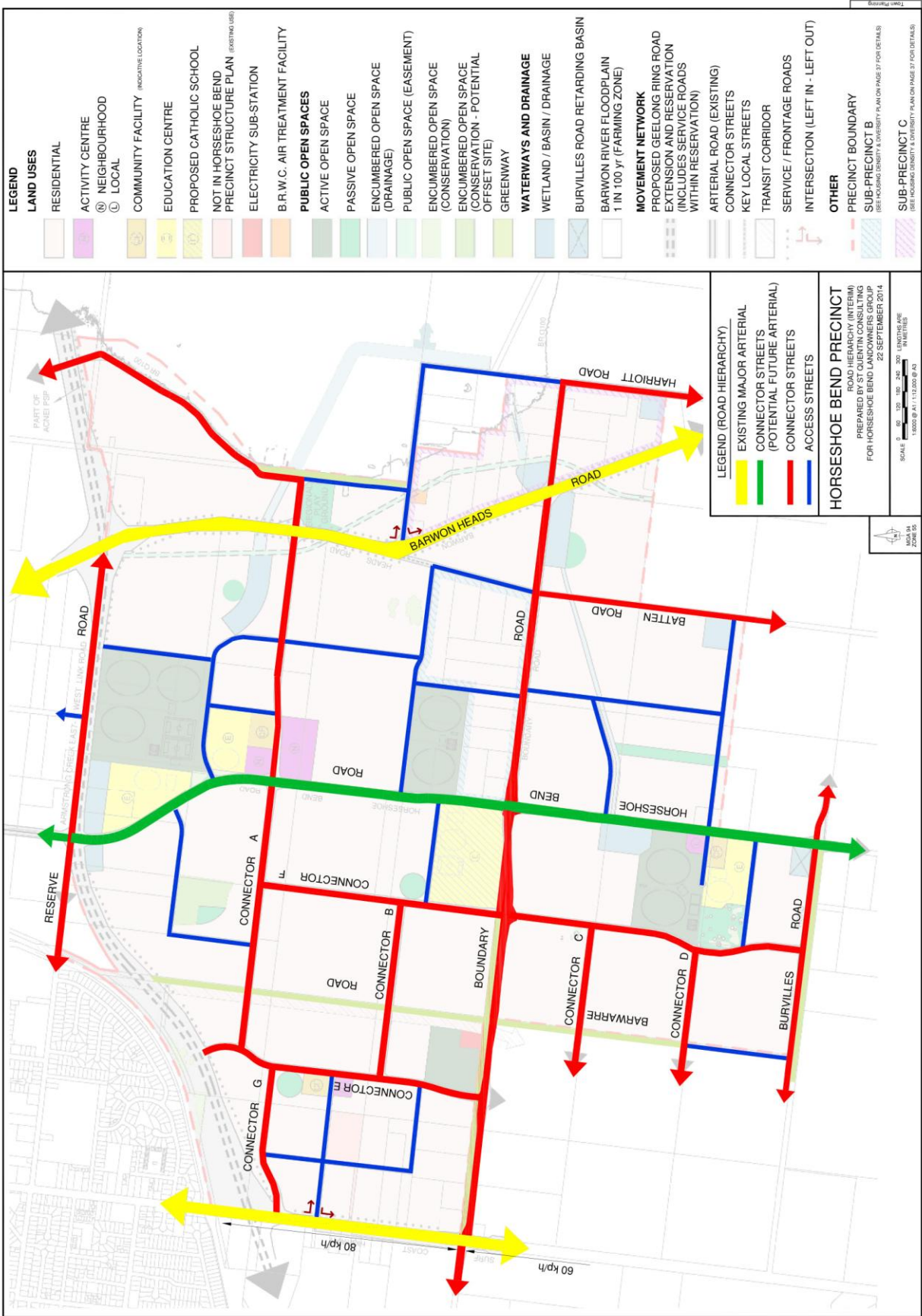
The following planning and design guidelines for transport and movement should be met.

- Development should plan for the future grade separation of the transport corridor by ensuring that sufficient land is set aside to accommodate grade separated road and rail intersections. Land areas to be set aside are to be to the satisfaction of the Responsible Authority (determined in consultation with the Department of Transport (including VicTrack)).
- Bus stops should be designed as an integral part of activity centres and activity generating land uses, such as schools, community hubs and regional active public open space.
- Bus stop facilities constructed by the development proponents as part of the subdivision works (before the issue of a statement of compliance for the relevant stage or bonded) should be to a design standard approved by Public Transport Victoria.
- Bicycle lanes should be designed to allow for the smooth transition between on-road and off-road facilities.
- Walking/cycling paths should be constructed by development proponents as part of subdivision works (before the issue of a statement of compliance for the relevant stage except if the works are bonded).
- Walking/cycling paths and footpaths should be designed and located to maximise passive surveillance.
- The local street network should be designed to provide permeable and safe routes for walking / cycling to activity centres, community facilities, public open spaces and public transport.
- Road and street cross sections should be consistent generally with those in Appendix 8: Road Cross Sections (Figures I to Z3.) but with consideration of the need for adjustments



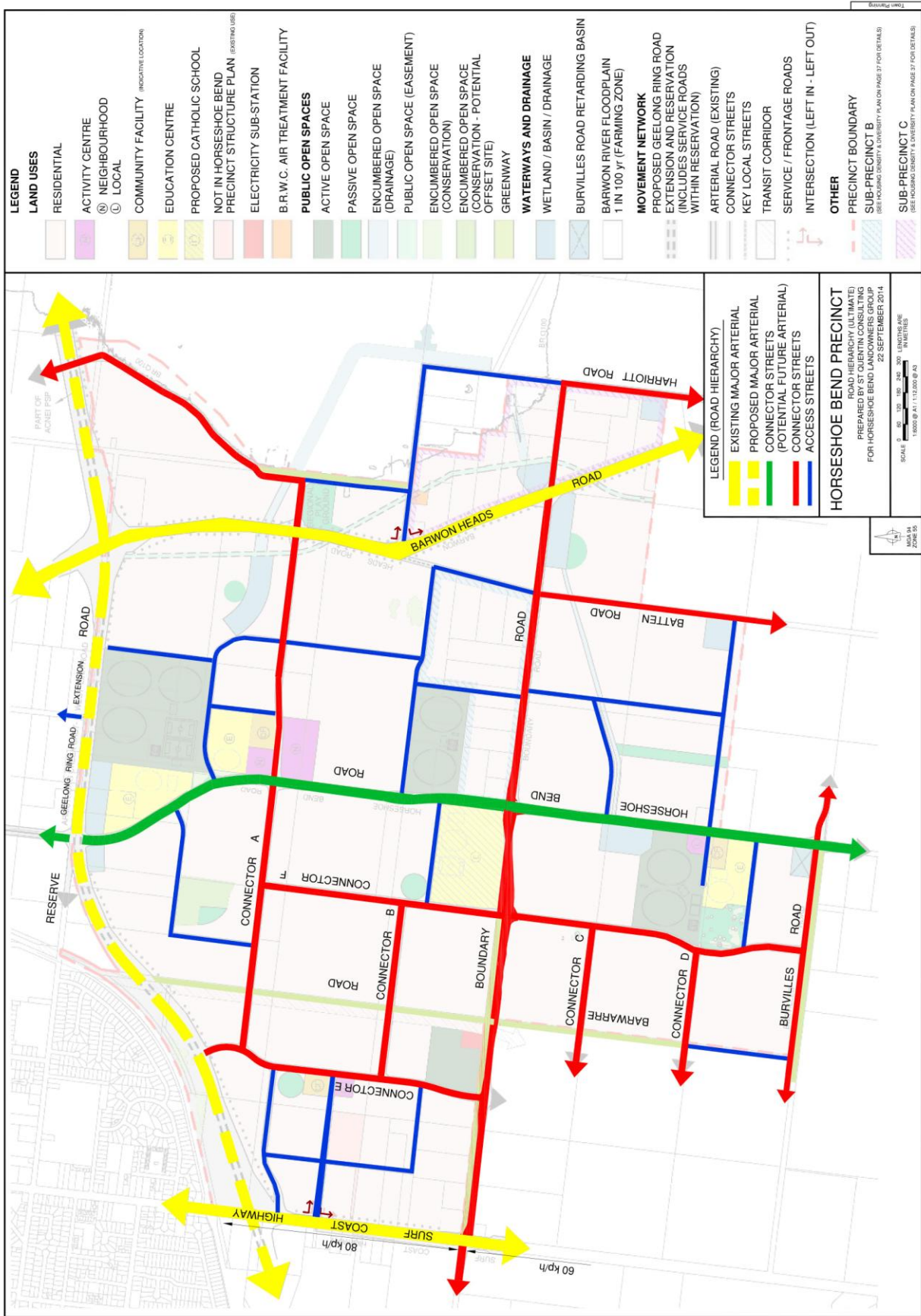
within the overall specified road reserve widths if required to cater for existing utilities and existing street trees.

- Courts that are not inter-connected for walking / cycling permeability should be avoided.
- Courts where included must have a T-head, court bowl or equivalent except where providing vehicle access to four or less dwellings and garbage collection is to occur at the mouth of the court.



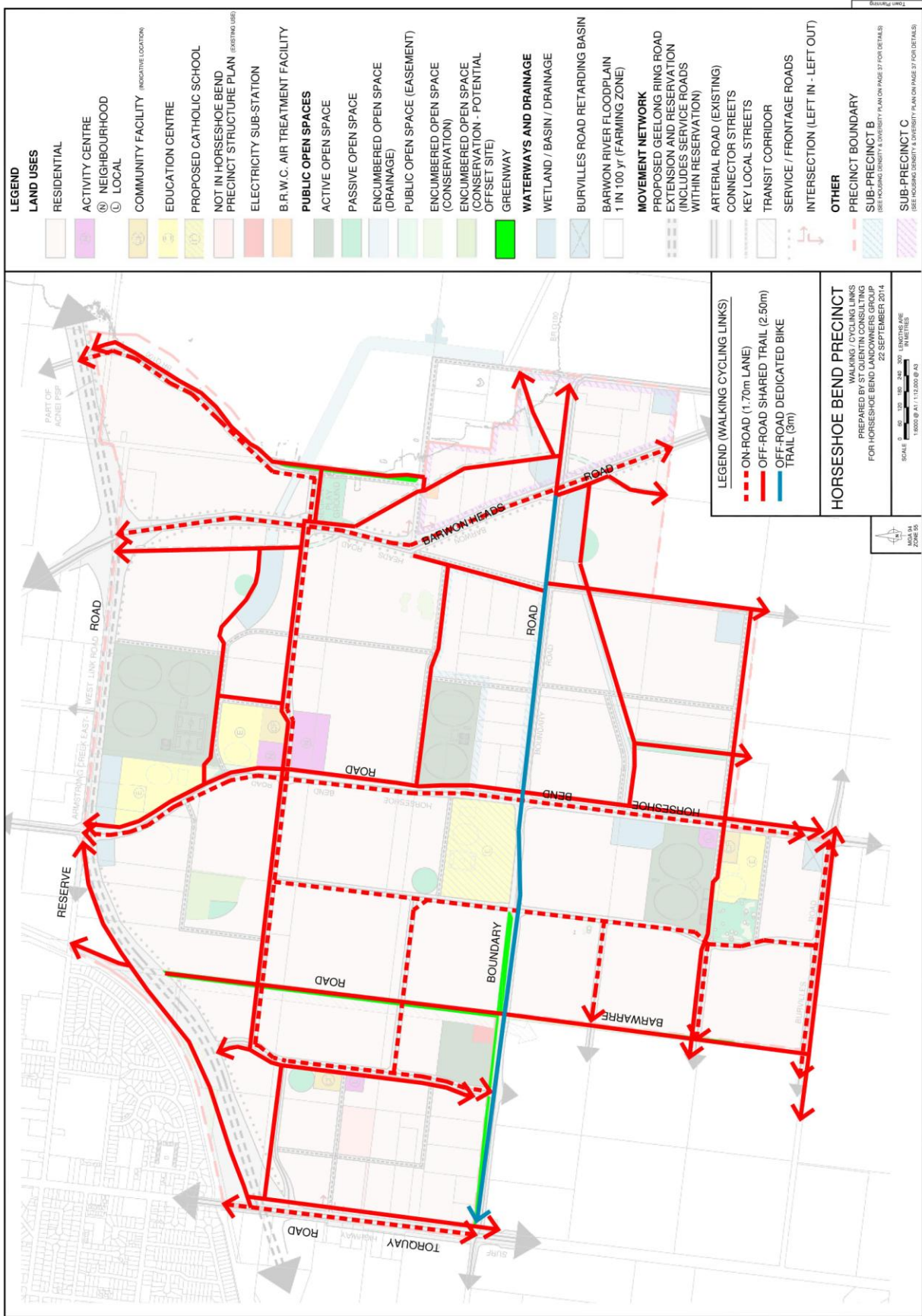
**PLAN 10A**

**ROAD HIERARCHY (INTERIM)**



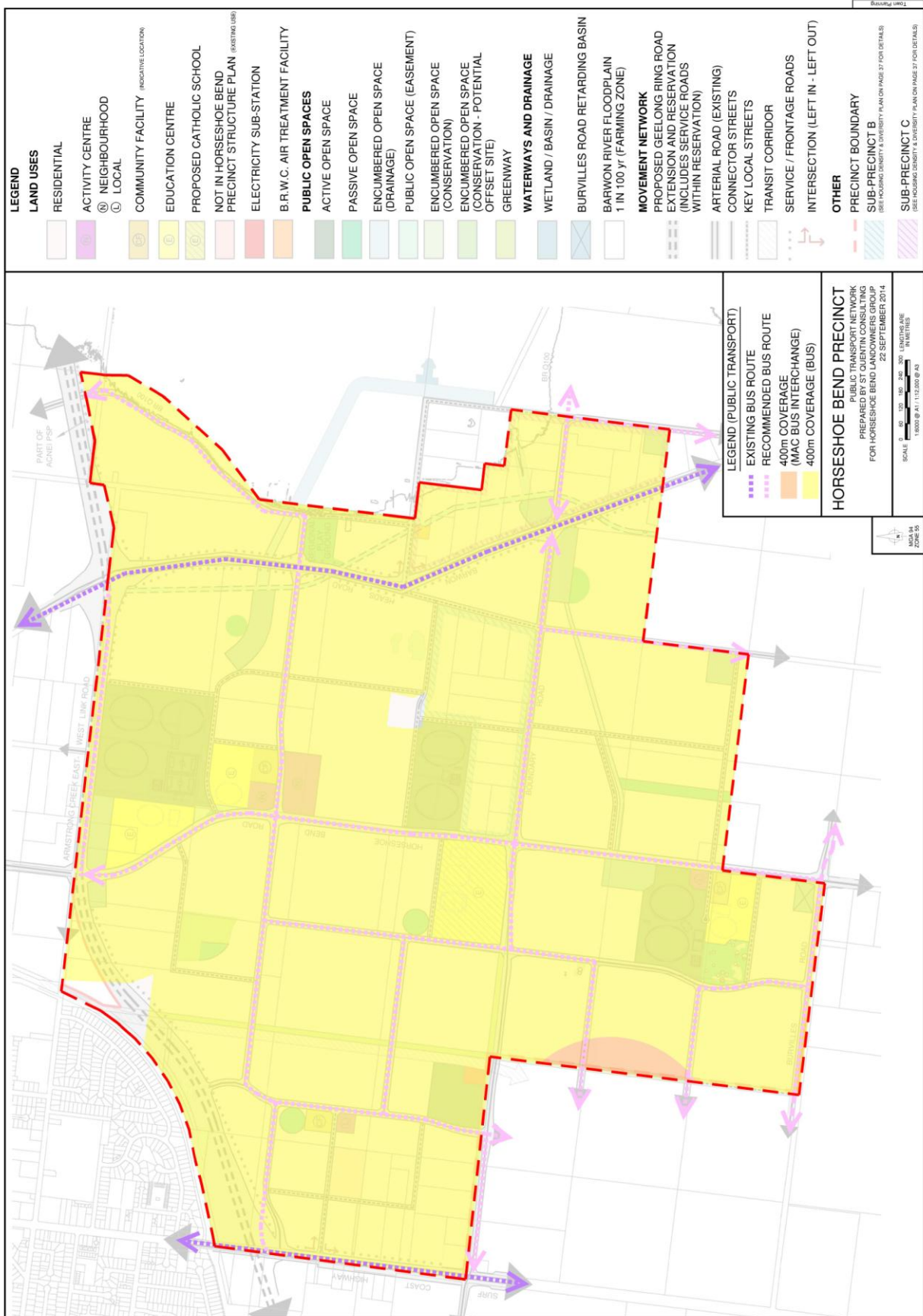
**PLAN 10B**

**ROAD HIERARCHY (ULTIMATE)**



PLAN 11

WALKING/CYCLING LINKS



**PLAN 12**  
**PUBLIC TRANSPORT NETWORK**

## 4.7 UTILITIES AND ENERGY

### 4.7.1 Objectives: Utilities and Energy

The objectives for the provision of utilities as an essential part of the development of HBP are to:

- ensure all land is serviced appropriately including the supply to all developed lots to the satisfaction of the relevant authority of:
  - a potable water supply;
  - reticulated sewerage;
  - gas;
  - underground electricity (except for infrastructure to support cables with a voltage greater than 66kv and sub-stations);
  - telecommunications (including fibre to the lot);
  - a recycled water supply;
  - encourage relevant authorities to work toward the undergrounding of existing electricity services.
  - Facilitate innovative, sustainable and energy efficient approaches to the provision of such servicing

### 4.7.2 Implementation: Utilities and Energy

The objectives for the provision of utilities are met by implementation of all of the following.

- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Plan 13: Main Sewerage Supply Network.
- Plan 14: Main Water Supply Network.
- Plan 15: Main Recycled Water / Third Pipe Supply Network.
- Plan 16: Main Electricity Supply Network.
- Plan 17: Main Natural Gas Supply Network.
- Figure G: Charlemont Sub Station Concept Plan

The exact location of physical infrastructure and staging of development will be determined by proponents of development at the planning permit stage and will be implemented through appropriate permit conditions.

### 4.7.3 Planning and Design Guidelines: Utilities and Energy

The following planning and design guidelines for utilities and energy must be met.

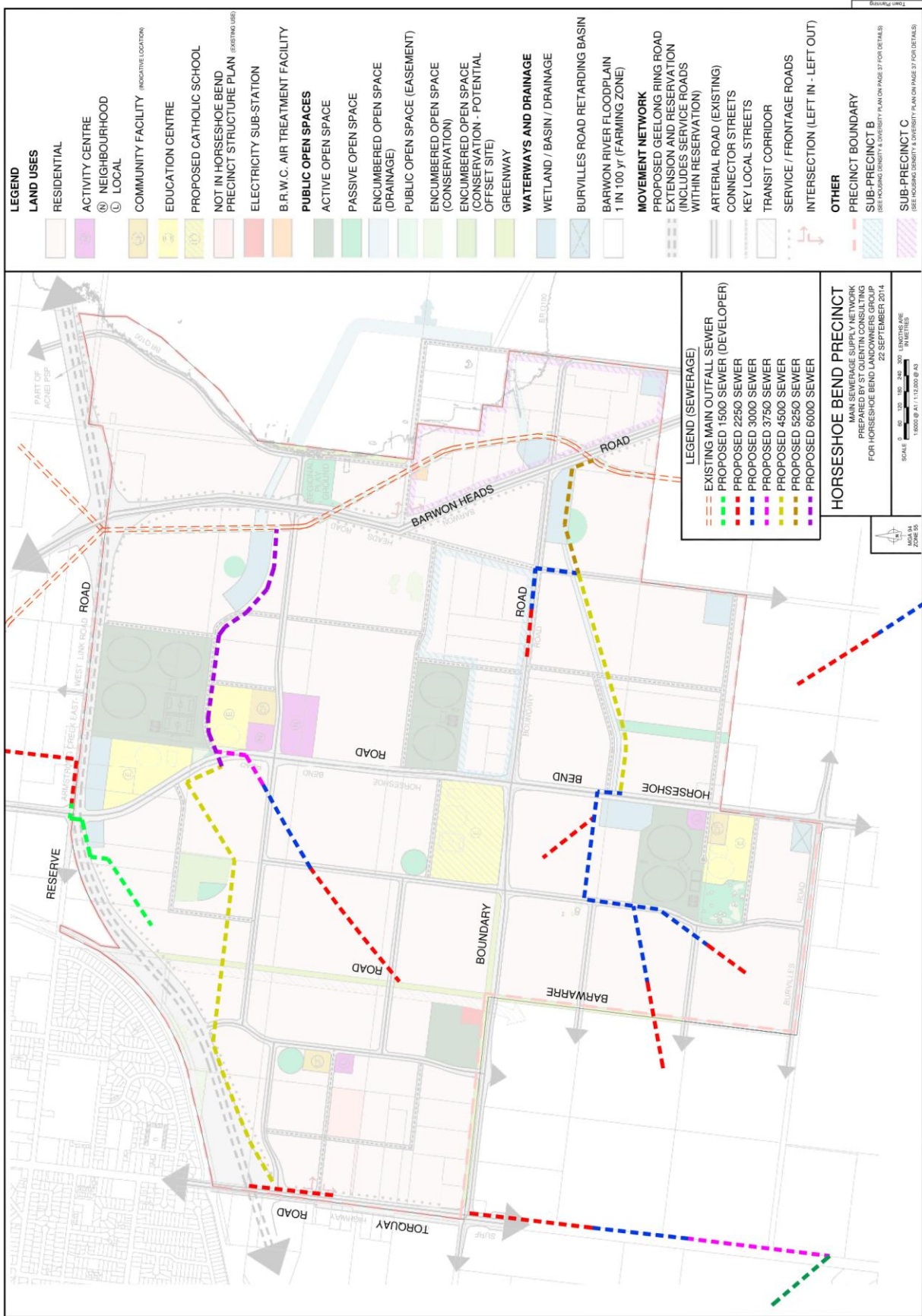
- Permits for the subdivision of land into lots must include a condition requiring the installation of infrastructure to the satisfaction of the Responsible Authority and the relevant water authority for the delivery of recycled water to each lot.
- The proposed Charlemont Sub Station nominated within the south-east corner of the Athletics Facility must be delivered in accordance with Plan 16A and Figure G.
- The Charlemont Sub Station is to be within a building and be screened to the satisfaction of the Responsible Authority.
- Each dwelling must be connected to a reticulated recycled water supply system (where connected to the lot) for toilet flushing and garden watering.
- Development must plan for the future grade separation of the transport corridor by ensuring that sufficient land is set aside to accommodate grade separated road and rail intersections. Land areas to be set aside are to be to the satisfaction of the Responsible Authority (determined in consultation with the Department of Transport, including VicTrack).
- Ensure all road designs that have an interim role are designed to easily facilitate the delivery of the ultimate cross section and that underground infrastructure such as drainage and utilities are provided in their ultimate location

The following planning and design guidelines for utilities and energy should be met.

- provision of utility sub-stations/kiosks should be located outside unencumbered open space.
- services should avoid incursion into greenways where possible. Where incursion cannot be avoided, measures (e.g. underboring) must be undertaken to avoid detrimental impact on the ecological values of the greenway.

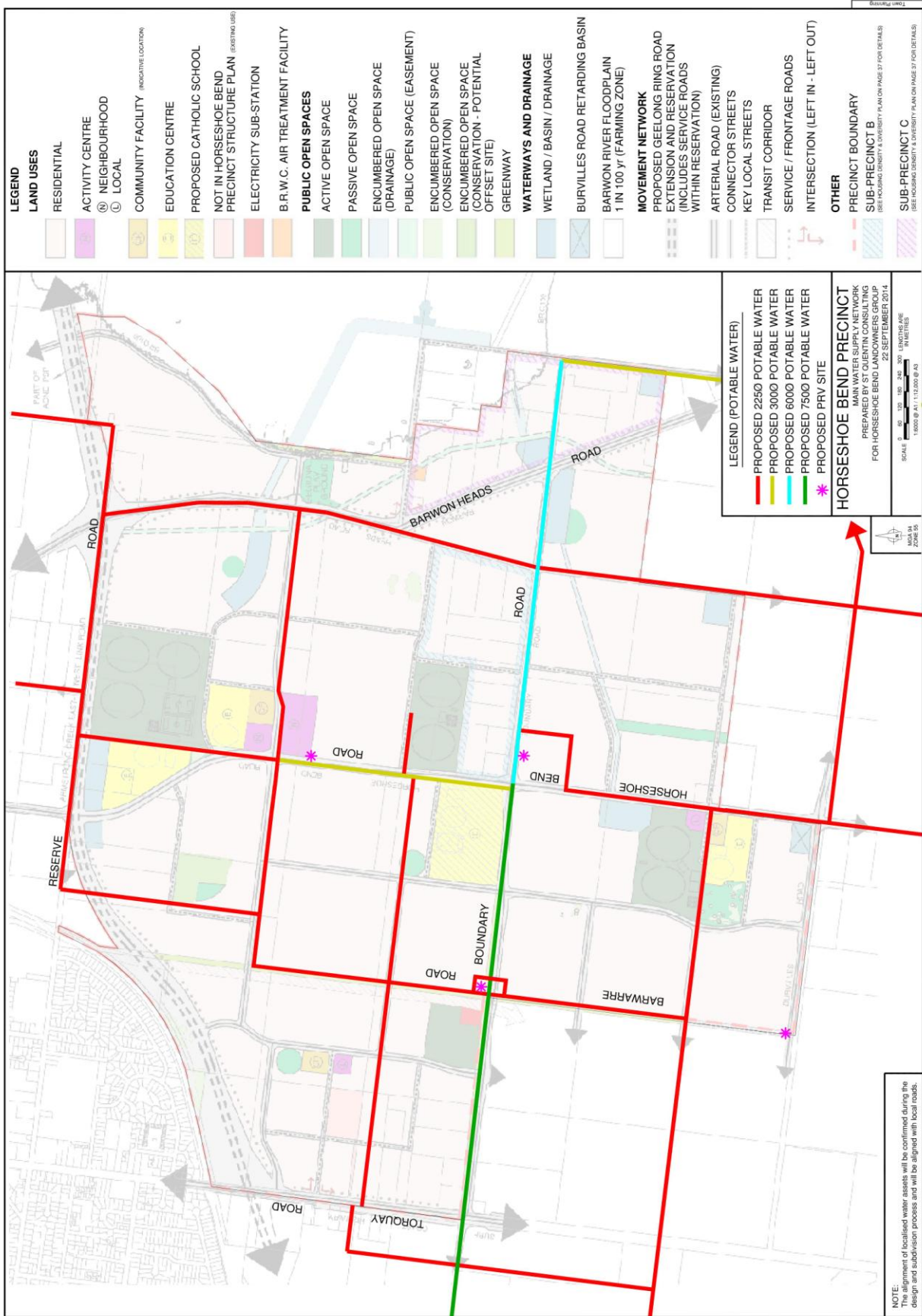
**Table 6: Service Authorities**

Service	Relevant Authority
Water	Barwon Water
Sewerage	Barwon Water
Reticulated recycled water	Barwon Water
Gas	SPAusNet
Electricity	Powercor
Telecommunications	NBN Co (or other provider)



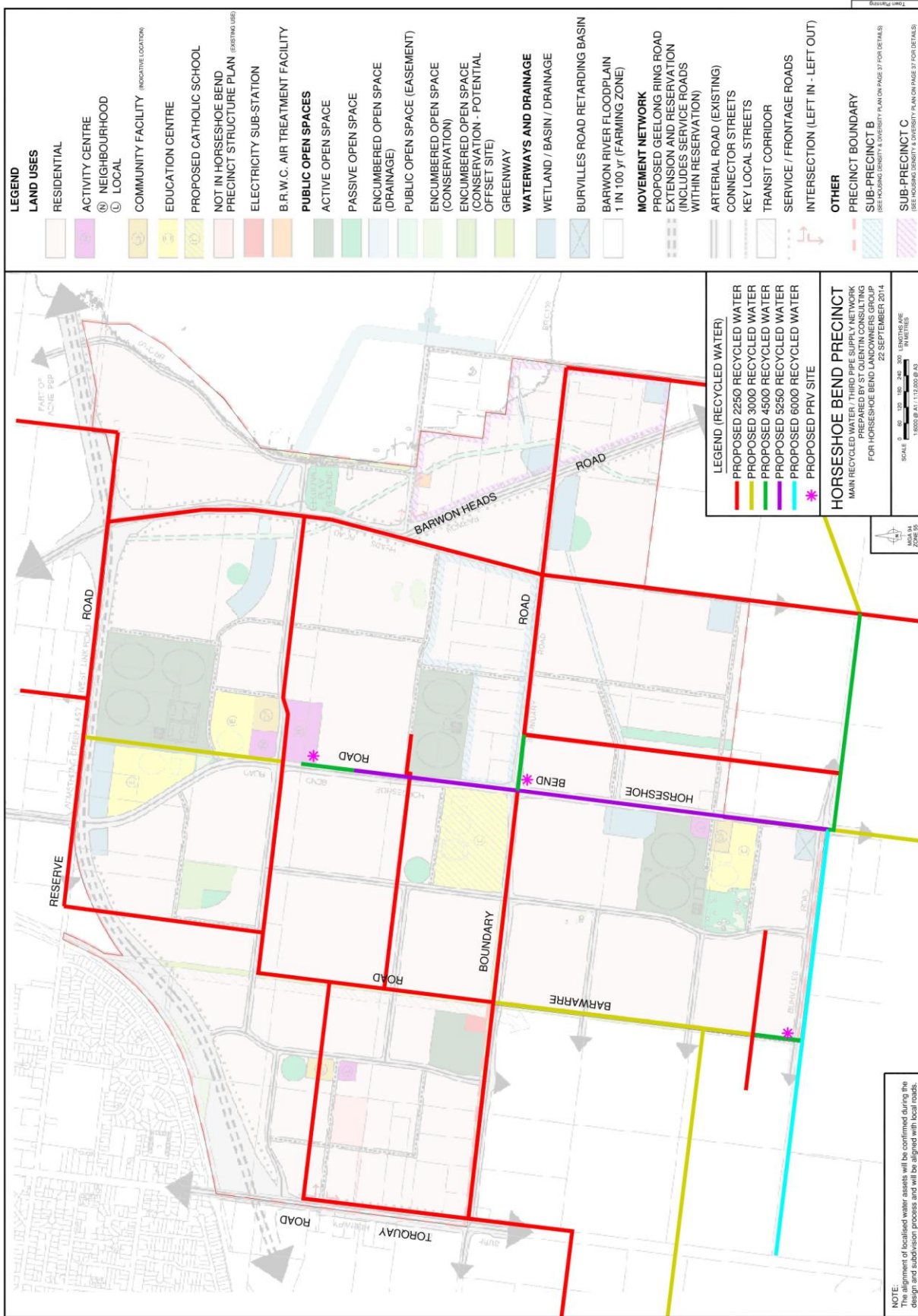
PLAN 13

MAIN SEWERAGE SUPPLY NETWORK



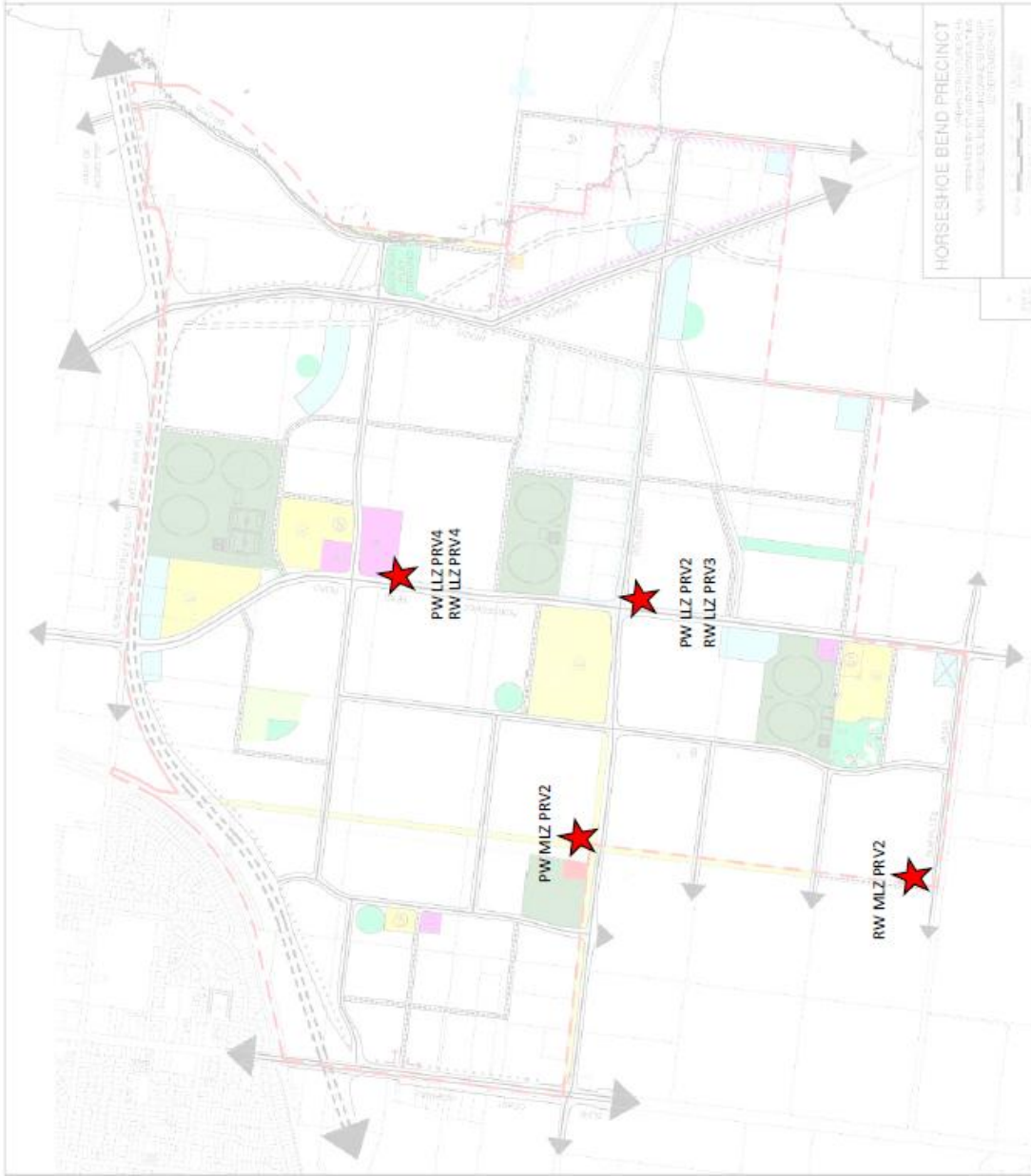
**PLAN 14**

**MAIN WATER SUPPLY NETWORK**



**PLAN 15**

**MAIN RECYCLED WATER/THIRD PIPE SUPPLY NETWORK**

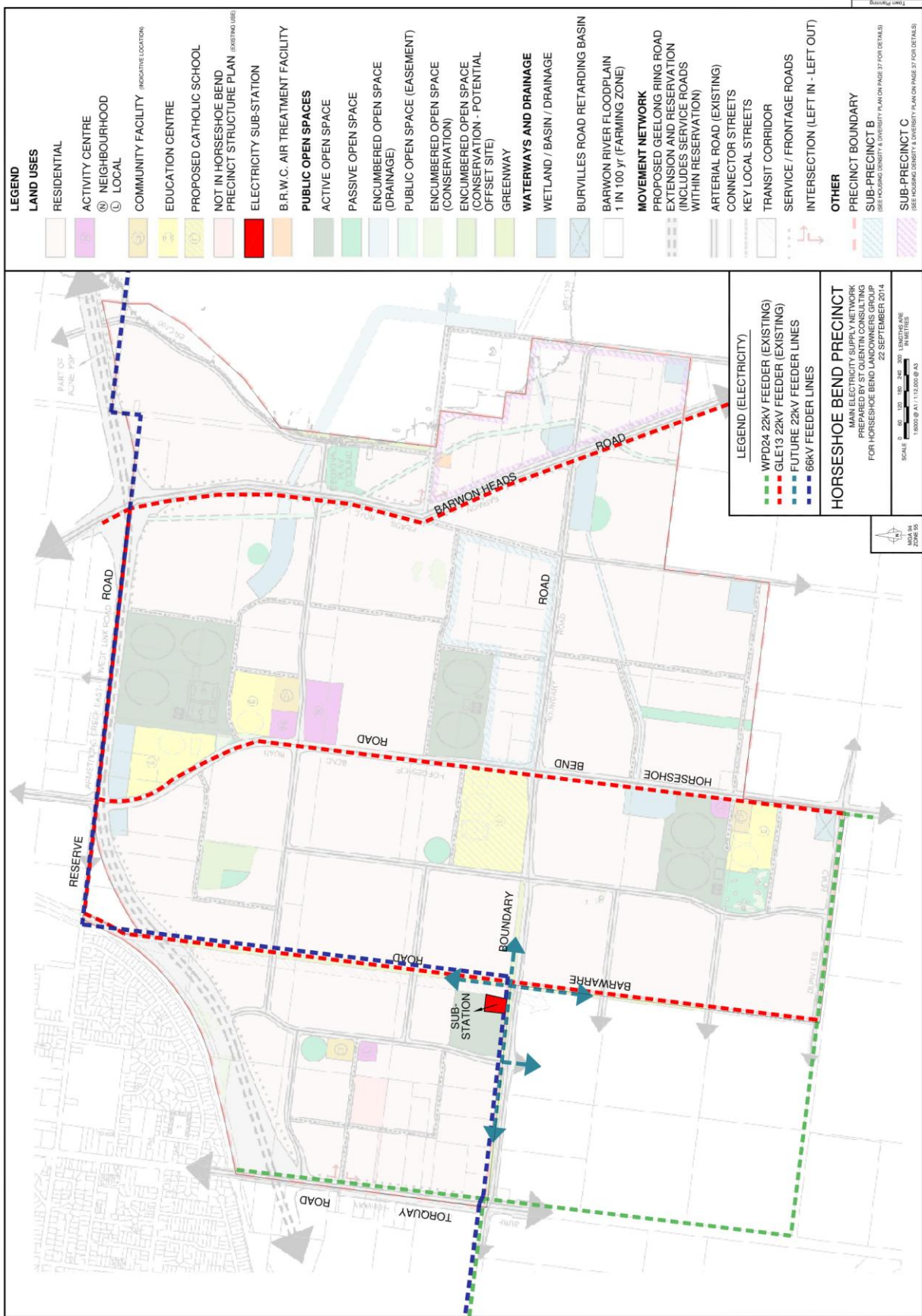


**NOTATION:**

While not all sites are finalised in terms of their exact location, they must be within the vicinity shown in order to connect to the trunk distribution infrastructure and achieve their hydraulic purpose. There is some minor flexibility for relocation (i.e. opposite side of roads ect.), but this flexibility is limited.

The layout and size of a PRV is typically between 300-500m<sup>2</sup> Barwon Water has constructed these assets throughout Geelong and is committed to screening and limiting the visual impact as much as practical. The final size of each site will be determined by its access requirements and alignment with the trunk infrastructure.

**PLAN 15A**  
**PRESSURE REDUCTION VALVES**



- LEGEND**
- LAND USES**
- RESIDENTIAL
  - ACTIVITY CENTRE
  - NEIGHBOURHOOD LOCAL
  - COMMUNITY FACILITY (INDICATIVE LOCATION)
  - EDUCATION CENTRE
  - PROPOSED CATHOLIC SCHOOL
  - NOT IN HORSESHOE BEND PRECINCT STRUCTURE PLAN (EXISTING USE)
  - ELECTRICITY SUB-STATION
  - B. R. W. C. AIR TREATMENT FACILITY

- PUBLIC OPEN SPACES**
- ACTIVE OPEN SPACE
  - PASSIVE OPEN SPACE
  - ENCUMBERED OPEN SPACE (DRAINAGE)
  - PUBLIC OPEN SPACE (EASEMENT)
  - ENCUMBERED OPEN SPACE (CONSERVATION)
  - ENCUMBERED OPEN SPACE (CONSERVATION - POTENTIAL OFFSET SITE)
  - GREENWAY

- WATERWAYS AND DRAINAGE**
- WETLAND / BASIN / DRAINAGE
  - BURVILLES ROAD RETARDING BASIN
  - BARWON RIVER FLOODPLAIN 1 IN 100 Yr (FARMING ZONE)

- MOVEMENT NETWORK**
- PROPOSED GEELONG RING ROAD EXTENSION AND RESERVATION (INCLUDES SERVICE ROADS WITHIN RESERVATION)
  - ARTERIAL ROAD (EXISTING)
  - CONNECTOR STREETS
  - KEY LOCAL STREETS
  - TRANSIT CORRIDOR
  - SERVICE / FRONTAGE ROADS
  - INTERSECTION (LEFT IN - LEFT OUT)

- OTHER**
- PRECINCT BOUNDARY
  - SUB-PRECINCT B
  - SUB-PRECINCT C

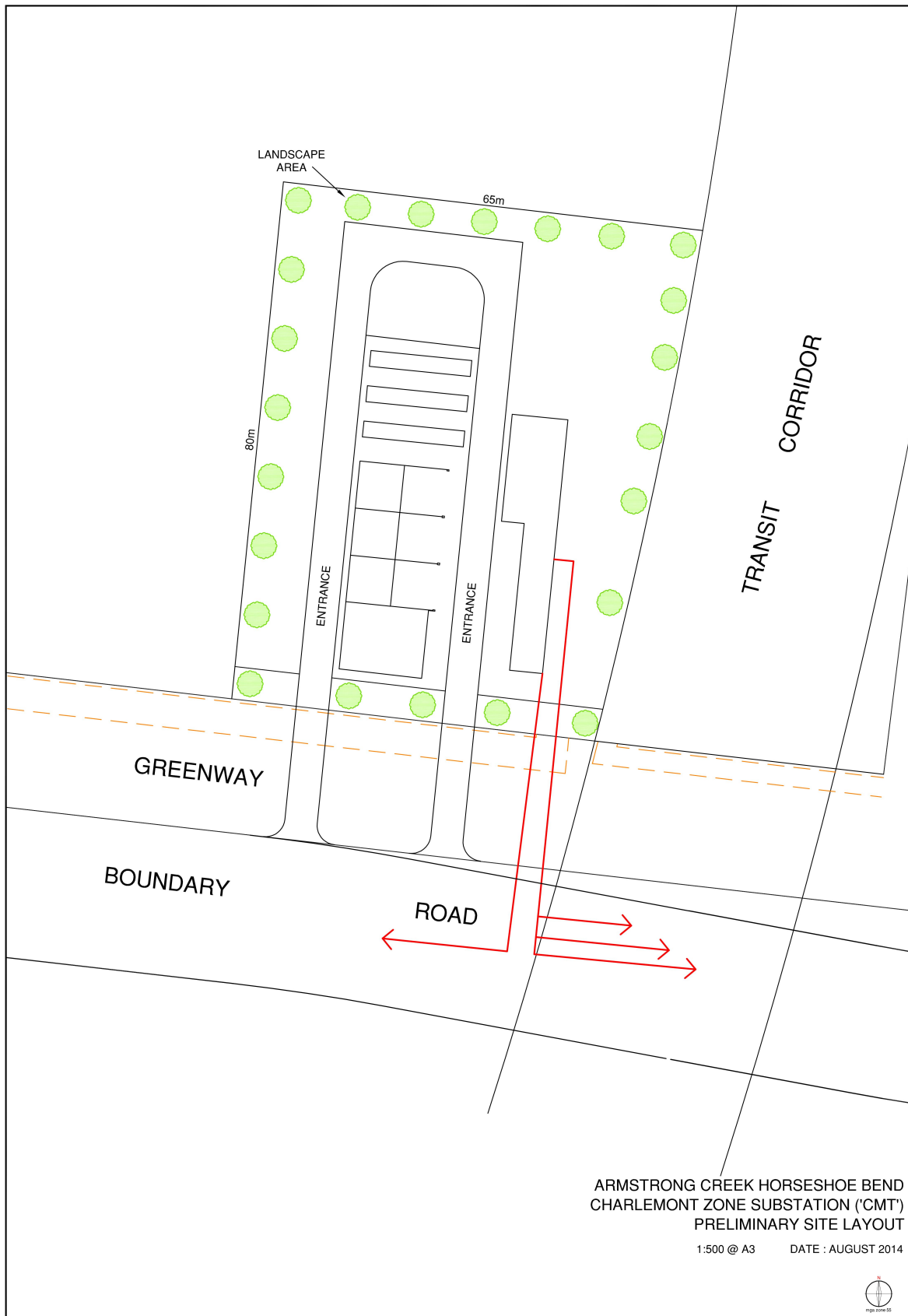
**LEGEND (ELECTRICITY)**

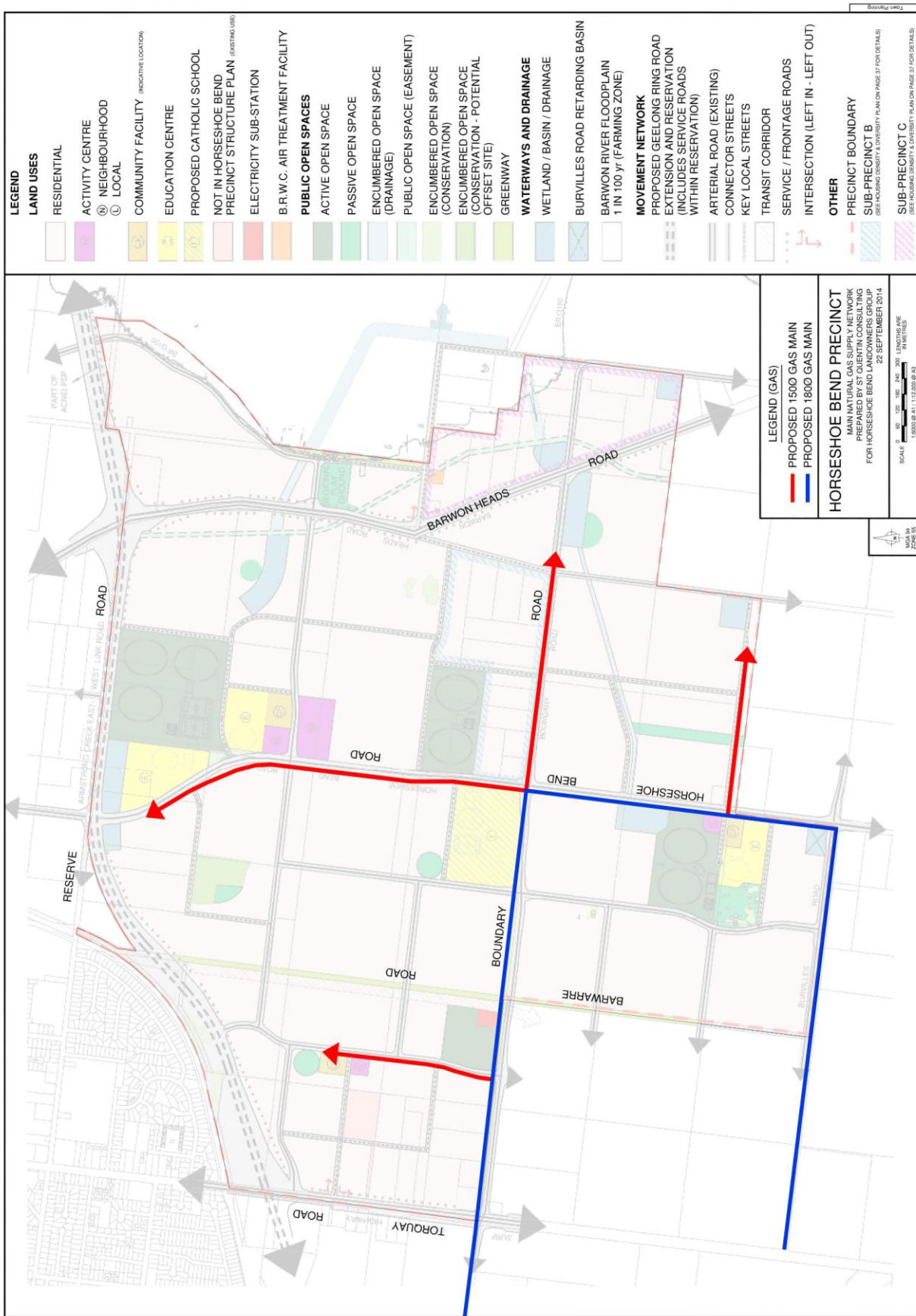
- WPD24 22kV FEEDER (EXISTING)
- GLE13 22kV FEEDER (EXISTING)
- FUTURE 22kV FEEDER LINES
- 66kV FEEDER LINES

**HORSESHOE BEND PRECINCT**  
 MAIN ELECTRICITY SUPPLY NETWORK  
 PREPARED BY ST QUENTIN CONSULTING  
 FOR HORSESHOE BEND LANDOWNERS GROUP  
 22 SEPTEMBER 2014

SCALE 0 50 100 200 300 METRES  
 1:5000 @ A1 11/10/2008 @ AD

**FIGURE G**  
**CHARLEMONT SUB STATION CONCEPT PLAN**





**PLAN 17**

**MAIN NATURAL GAS SUPPLY NETWORK**

## 4.8 DRAINAGE AND FLOODPLAIN MANAGEMENT

### 4.8.1 Objectives: Drainage and Floodplain Management

The objectives for the provision of drainage and floodplain management as an essential part of the development of HBP are to:

- ensure appropriate floodplain management in HBP and beyond;
- reduce the total annual average volume of stormwater runoff from developed catchments by a minimum of 30% over traditional drainage treatment measures through implementation of the approved drainage strategy and design guidelines contained in the HBSP.
- protect and/or enhance downstream environments including recognised social, environmental and economic values, by managing appropriately the quality and quantity of stormwater runoff in accord with best practise ;
- integrate appropriately designed stormwater systems into the natural and built environments whilst optimising the potential uses of drainage corridors for recreation, landscape and environmental values;
- manage volumes and frequency of treated stormwater runoff to best suit downstream receiving environment constraints;
- ensure the peak stormwater discharge from developed catchments is not greater than peak discharges from the same catchment subject to existing conditions (for all events up to and including the 100 year ARI flood) until such time as the Sparrovale wetlands system is delivered and downstream drainage infrastructure is in place;
- ensure that impervious surfaces and piped drainage systems are not directly connected to waterways;
- ensure stormwater quality from is treated to contemporary best practice objectives, as measured/referenced at the precinct outfall boundaries;
- ensure no significant change to stormwater discharges for critical storm durations up to 100 years Average Recurrence Interval (ARI) events, as measured/referenced at the precinct outfall boundaries and taking into account other external catchments;
- as far as practically feasible, protect Hospital Swamps from the impacts of altered hydrology arising from urbanisation, particularly the maintenance of existing summer/autumn drying periods and seasonal saline/freshwater cycles;
- convert the Sparrovale lowlands to a freshwater wetland system managing runoff from development areas;
- integrate surface water management features with open space;

- rationalise subcatchment boundaries to optimise the strategic stormwater management value offered by integration of the Sparrovale lowland as a major freshwater wetland system treating runoff;
- create stormflow mitigation storages that avoid the use of high embankments (on safety and cost grounds);
- protect key flora/fauna habitat areas and sites of cultural heritage value;
- consolidate drainage management assets wherever possible to minimise ongoing maintenance costs;
- encourage reuse of stormwater;
- encourage landholders to co-operate to ensure delivery of required drainage and wetland infrastructure as land is developed.

#### **4.8.2 Implementation: Drainage and Floodplain Management**

The objectives for drainage and floodplain management are met by implementation of all of the following.

- Plan 3: Horseshoe Bend Precinct Urban Structure.
- Plan 18: Main Stormwater Drainage Network.
- Appendix 5: Public Open Space Guidelines
- Appendix 9: Stormwater Management Strategy - Implementation Guidelines

#### **4.8.3 Planning and Design Guidelines: Drainage and Floodplain Management**

The following planning and design guidelines for drainage and floodplain management must be met.

- Wetlands and retarding basins must be generally located in accordance with Plan 18 Main Stormwater Drainage Network except that, in the case of DI\_DR\_09, may be approved to the satisfaction of the Responsible Authority.
- Development must ensure the peak stormwater discharge from developed catchments is not greater than peak discharges from the same catchment subject to existing conditions (for all events up to and including the 100 year ARI flood) until such time as the Sparrovale wetlands system is delivered and downstream drainage infrastructure is in place;
- While the Sparrovale wetland system, and appropriate downstream drainage infrastructure, is not in place, development must provide temporary drainage infrastructure that ensures peak discharge from the developed catchment does not exceed that of pre development conditions. This infrastructure is to be constructed to the

satisfaction of the Responsible Authority and at the cost of the developer with no reimbursement.

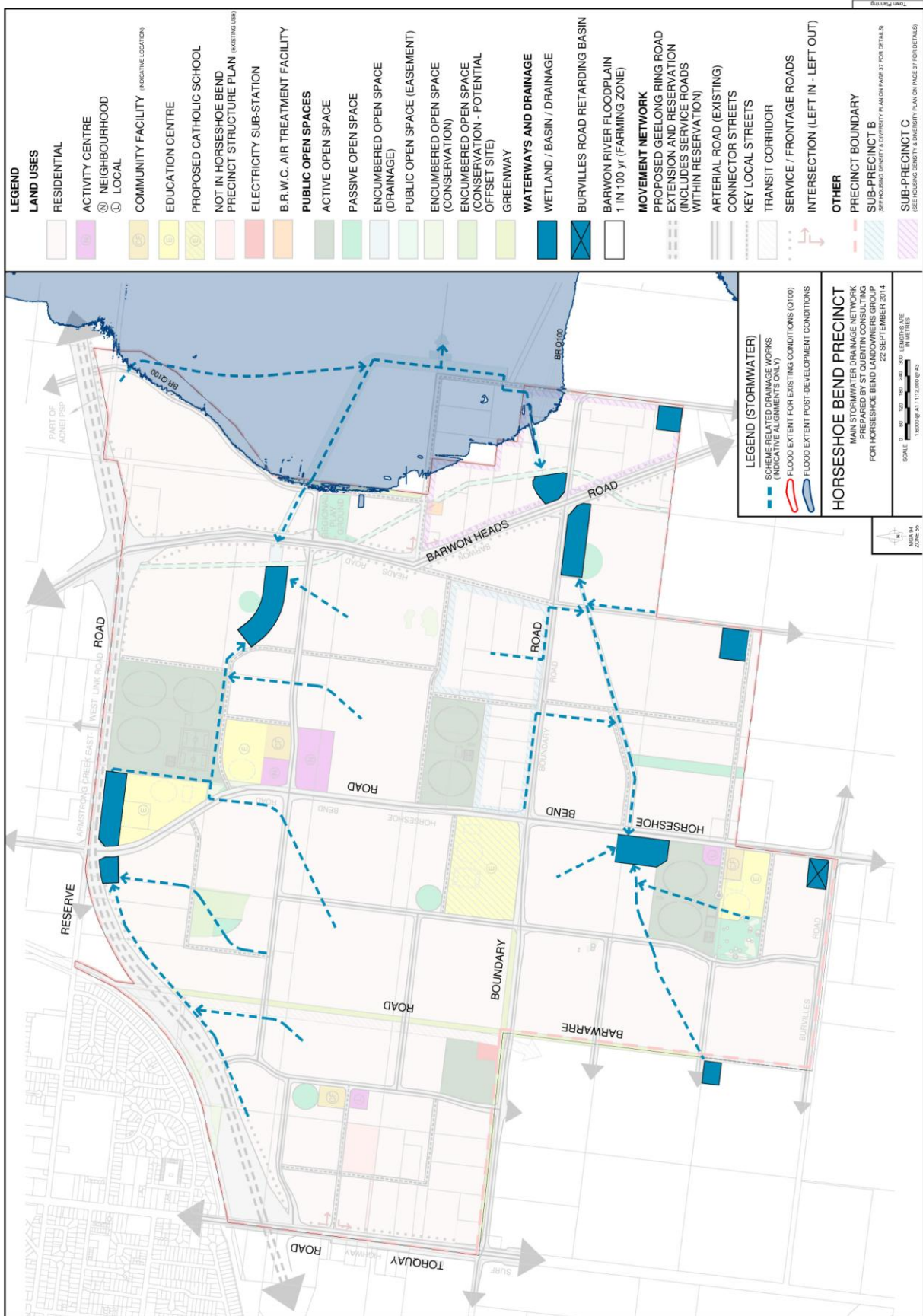
- Development including subdivision within the Q100 flood event (existing and proposed) (refer to Plan 18 (**Main Stormwater Drainage Network**)) must be designed to satisfy the requirements of the Corangamite Catchment Management Authority (CCMA), including any interim flood mitigation works, to the satisfaction of the Responsible Authority.
- The minimum surface gradient on all lots to allow for appropriate drainage must be to the satisfaction of the Responsible Authority.
- The minimum finished surface level (excluding access driveways and paths) on all lots must be not less than 300 millimetres above the Q100 flood event.
- The minimum floor level on all buildings must be 600 millimetres above the Q100 flood event. On roads used as floodways not flanking main waterways, floor levels on all lots should be not less than 300 mm above 100 year ARI flood levels as measured at the midpoint of the lot. The absolute minimum floor level of any building in the HBP is 3.60m AHD which is 600mm above the Q100 level for the Barwon River floodplain.
- Underground drainage must cater for the flood event as specified in the drainage strategy endorsed by CoGG for HBP.
- Culvert augmentation / upgrade works for major drainage must be provided to the satisfaction of the Responsible Authority for all road crossings.
- Piped and open drains, water quality treatment trains and peak flow retardation, must be provided to the satisfaction of the Responsible Authority.
- Local retardation basins, overland flow paths, water quality treatment trains and stream interface / outlet works, must be provided to the satisfaction of the Responsible Authority on relevant land parcels in accordance with the stormwater management strategy for HBP, as approved by the relevant drainage authority.

The following planning and design guidelines should be met.

- Any development proposing interim/temporary or out-of sequence works should give adequate consideration to any site specific requirements nominated in Appendix 9 – Horseshoe Bend Stormwater Management Strategy – Implementation Guidelines, to the satisfaction of the Responsible Authority.
- Rainwater tanks are recommended for each dwelling and other relevant building structures.
- Gross pollutants/ litter should be effectively addressed as part of the drainage design downstream of areas of high generation of litter e.g activity centres and schools.

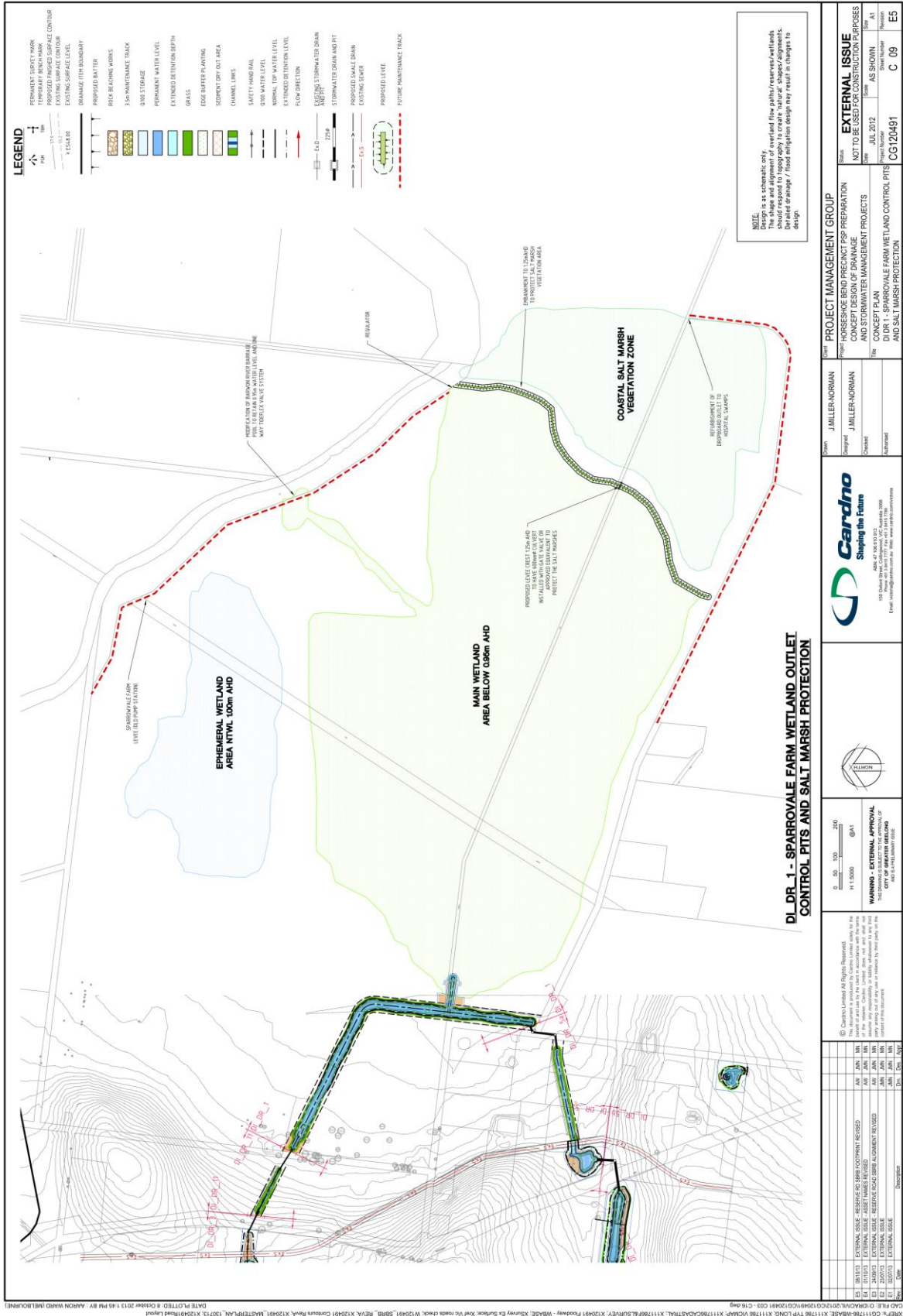
**Table 7: Drainage and Floodplain Management Authorities**

<b>Management Item</b>	<b>Relevant Authority</b>
Drainage	CoGG
Floodplain Management	Corangamite Catchment Management Authority



**PLAN 18**

**MAIN STORMWATER DRAINAGE NETWORK**



PLAN 18A

## 5 PRECINCT INFRASTRUCTURE PLAN

### 5.1 INTRODUCTION

This Precinct Infrastructure Plan (*refer Table 8: Infrastructure Required in Horseshoe Bend Precinct*) summarises the infrastructure required to ensure the appropriate development of HBP generally in accordance with the HBPSP. The infrastructure is to be provided through a number of mechanisms including:

- land development works and / or full funding by developers (individually or jointly in some cases);
- development contributions (community infrastructure levy and development infrastructure levy);
- utility service provider works and / or funding;
- capital works and / or funding by the Australian Government, State Government, CoGG and other agencies and non-Government organisations;
- grants funding available from a variety of sources.

**Table 8: Infrastructure Required in Horseshoe Bend Precinct**

Project	Title / Description	Lead Agency	Funding Responsibility
<b>8.1 Transport and Movement</b>			
<b>Armstrong Creek East-West Link Road</b>			
	Land and Road Construction	Roads Corporation	Roads Corporation
	Intersection with North-South MAC Connector Street	Roads Corporation	Roads Corporation
	Intersection with Connector E	Roads Corporation	Roads Corporation
	Intersection with realigned Horseshoe Bend Road	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
	Intersection with Barwon Heads Road (western leg)	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
<b>Surf Coast Highway</b>			
	Land and construction	Roads Corporation	Roads Corporation
	Grade Separated Intersection with Baanip Boulevard	Roads Corporation	Roads Corporation
	Fourth Leg Intersection with Armstrong Creek East-West Ring Road (along future ramp alignment to provide interim connection to North-South MAC Connector Street)	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
	Intersection with existing Boundary Road - Stage 1	Roads Corporation	Armstrong Creek Horseshoe Bend, West and MAC DCPs
	Intersection with new Boundary Road – Interim	Roads Corporation	Horseshoe Bend DCP
	Intersection with Burvilles Road	Roads Corporation	Armstrong Creek West and MAC DCPs
<b>Barwon Heads Road</b>			
	Land and construction	Roads Corporation	Roads Corporation
	Grade Separated Intersection with Armstrong Creek East-West Link Road	Roads Corporation	Roads Corporation
	Intersection with Boundary Road	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
	Intersection with NAC Connector Street	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
	Intersection with NE NAC Connector	Roads Corporation	Armstrong Creek Horseshoe Bend DCP
<b>Boundary Road</b>			
	Land	CoGG	Armstrong Creek Horseshoe Bend DCP
	Construction	CoGG	Relevant Developer
	Intersection at MAC Connector	CoGG	Armstrong Creek Horseshoe Bend DCP (signals only)
	Intersection at N-S Connector	CoGG	Armstrong Creek Horseshoe Bend DCP (signals only)
	Intersection at Horseshoe Bend Road	CoGG	Armstrong Creek Horseshoe Bend DCP
<b>Horseshoe Bend Road</b>			
	Land (Widening and Deviation)	CoGG	Armstrong Creek Horseshoe Bend DCP

Project	Title / Description	Lead Agency	Funding Responsibility
Construction		CoGG	Relevant Developer
	Intersection at NAC Connector Street	CoGG	Armstrong Creek Horseshoe Bend DCP
	Intersection at MAC Main Street Connector	CoGG	Armstrong Creek Horseshoe Bend DCP
	Intersection at Burvilles Road	CoGG	Armstrong Creek Horseshoe Bend DCP
<b>Burvilles Road</b>			
	Intersection with N-S Connector	CoGG	Armstrong Creek Horseshoe Bend DCP (signals only)
<b>Other Road Items</b>			
	Connector Streets	Developer	Developer
	Connector Street Creek Crossings	Developer	Developer
	Local Streets	Developer	Developer
	Frontage Roads	Developer	Developer
	Walking and Cycle Trail Network	CoGG	Armstrong Creek Horseshoe Bend DCP/Developer
<b>8.2 Public Transport</b>			
	Transit Corridor (through HBP)	Department of Transport	Armstrong Creek Horseshoe Bend DCP
	Bus Services	Department of Transport	Department of Transport
	Bus Stops	Department of Transport	Developer
<b>8.3 Community Facilities</b>			
	Northern State Primary School (part of northern NAC)	DEECD	DEECD
	Northern State Secondary College (part of northern NAC)	DEECD	DEECD
	• 1 x multi purpose stadium – 2 court	CoGG	Armstrong Creek Horseshoe Bend DCP/CoGG/DEECD
	Southern State Primary School (part of southern LAC)	DEECD	DEECD
	Catholic P-12 School	Catholic Education Office	Catholic Education Office
	Northern Community Complex (part of northern NAC)	CoGG	Armstrong Creek Horseshoe Bend DCP
	Southern Community Complex (part of southern LAC)	CoGG	Armstrong Creek Horseshoe Bend DCP
	Western Community Complex (part of western LAC)	CoGG	Armstrong Creek Horseshoe Bend DCP
	Northern Open Space Reserve Includes:	CoGG	Armstrong Creek Horseshoe Bend DCP
	• 3 x full size football / cricket ovals;		
	• Multi-use potential fields;		
	• 2 x pavilions;		
	Central Active Open Space Reserve (part of northern NAC) Includes:	CoGG	Armstrong Creek Horseshoe Bend DCP
	• 2 x full size football / cricket ovals;		
	• 1 x pavilion		

Project	Title / Description	Lead Agency	Funding Responsibility
	Southern Active Open Space Reserve (part of southern LAC) Includes: <ul style="list-style-type: none"> <li>• 2 x full size football / cricket ovals;</li> <li>• 2 x netball courts;</li> <li>• 2 x lawn bowling greens (including croquet);</li> <li>• 1 x pavilion.</li> </ul>	CoGG	Armstrong Creek Horseshoe Bend DCP
	Athletics Recreation / Multi-Purpose Reserve: <ul style="list-style-type: none"> <li>• Athletics facility;</li> <li>• Multi-purpose space;</li> <li>• 1 x pavilion.</li> </ul>	CoGG	Armstrong Creek Horseshoe Bend DCP
	Passive Open Space	CoGG	Developer / Armstrong Creek Horseshoe Bend DCP (playground equipment only)
	Waterway landscape, recreation and drainage works	CoGG	Armstrong Creek Horseshoe Bend DCP/Developer
<b>8.4 Biodiversity</b>			
	Conservation areas / Native vegetation offset sites	CoGG / DEPI	Developer
<b>8.5 Utilities and Energy</b>			
	Potable water / Recycled water	Barwon Water	Barwon Water/Developer
	Sewerage	Barwon Water	Barwon Water/Developer
	Air Treatment Facility	Barwon Water	Barwon Water
	Electricity	Powercor	Powercor
	Gas	SPAusNet	SPAusNet
	Telecommunications	NBN Co or other supplier	NBN Co or other supplier

### **5.1.1 Land Development Works by Developers**

As part of land development works, new development by a developer must provide and fully fund the cost of delivering the following infrastructure on or where abutting or related to the land:

- land and construction of the interim condition of Council controlled roads including related culverts, intersection works and traffic management measures (excluding components funded by DCP) as listed in Appendix 7;
- landscaping of all relevant roads and streets as listed in Appendix 7; local walking / cycling paths along streets in accordance with Appendix 7 and the relevant road cross-sections;
- unencumbered land equal to 10 per cent of the net developable area for public open space, to be located as specified on Plan 5 or cash-in-lieu to the equivalent value, all subject to equalisation;

embellishment of open space beyond that nominated in the DCP;

- local infrastructure as required by utility service providers including water, sewerage, electricity, gas and telecommunications;
- all drainage system and flood mitigation works (excluding HBP drainage infrastructure works, that are included in the development contributions plan project);
- embellishment of encumbered land beyond that nominated in the DCP.

### **5.1.2 Development Contributions Plan**

A Development Contribution Plan (DCP) has been prepared for HBP in conjunction with this HBSP. The HBP DCP is an incorporated document in the Scheme.

## **5.2 INFRASTRUCTURE AND SERVICES REQUIRED OUTSIDE HBP TO SUPPORT DEVELOPMENT OF HBP**

The DCP provides for;

- the acquisition and works associated with the Sparrovale Farm wetlands which are located outside the precinct.
- Boundary, Barwarre and Burvilles Road Greenways (including shared paths) which are located in adjoining precincts.

Otherwise there are no infrastructure or services outside HBP required to be provided by developers or through the HBP DCP to support its development.

## **5.3 PROJECT CO-ORDINATION**

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

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

- the State secondary and the adjacent sports fields;
- the State primary and the neighbourhood activity centre;
- the State primary and the local activity centre;
- combinations of sub-projects that make up the active open space;
- community facilities and associated works in the neighbourhood activity centre;
- community facilities and associated works in the local activity centre;
- the active public open space and seniors' recreation facility in the neighbourhood activity centre.

## **5.4 DELIVERY AND MONITORING**

CoGG will monitor the implementation of the Precinct Infrastructure Plan.



## **6 OTHER INFORMATION**

### **6.1 ACRONYMS AND GLOSSARY**

Appendix 9 contains a list of acronyms used throughout this HBSP together with a glossary of words.

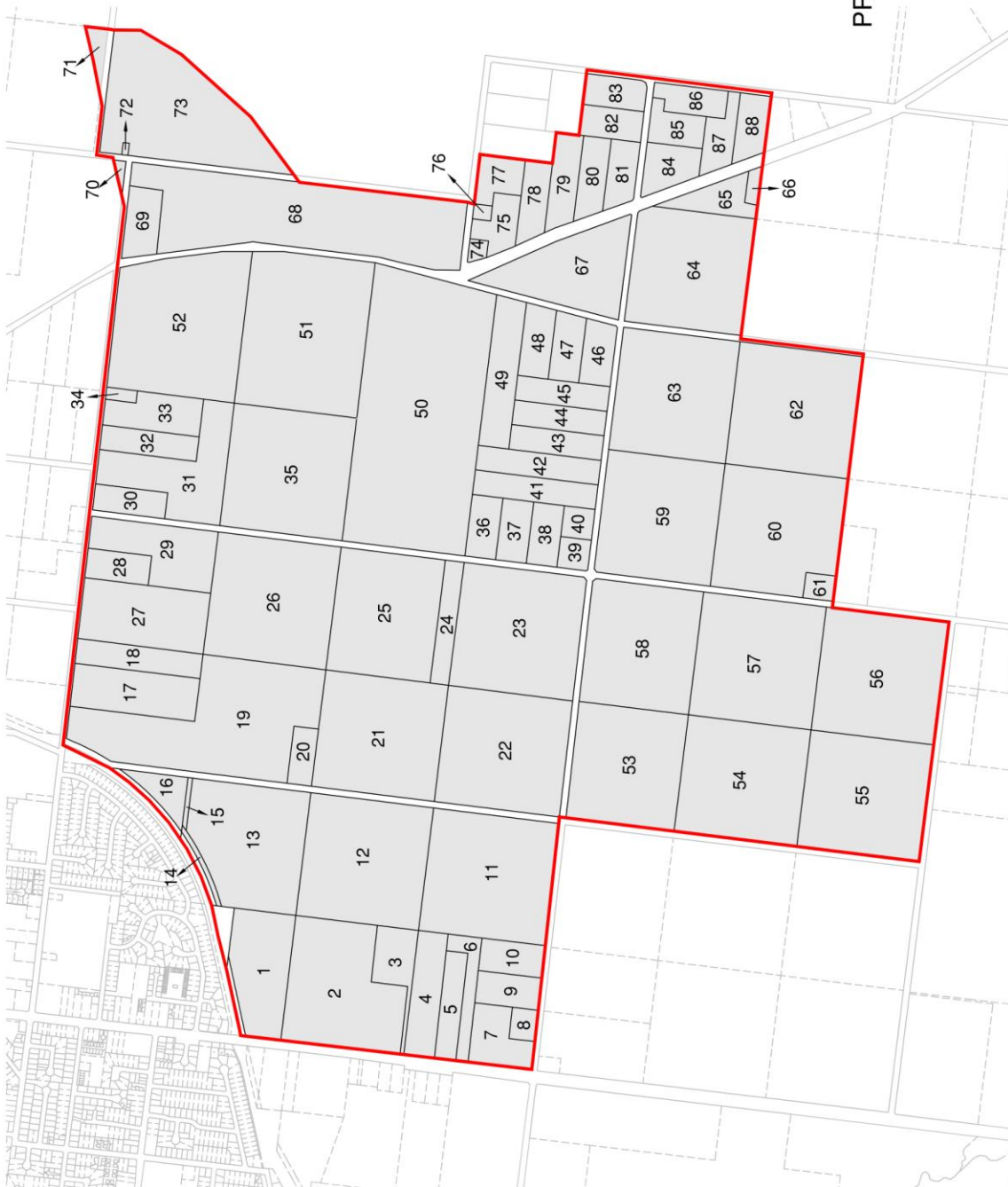


## **6.2 SUPPORTING INFORMATION**



# **APPENDIX 1**

## **DETAILED LAND USE BUDGET BY PROPERTY**



PROPERTY IDENTIFICATION  
**ST. QUENTIN**

Surveyors • Town Planners • Engineers

51 LITTLE FYANS STREET,  
 P.O. BOX 919, GEELONG 3220

TELEPHONE (03) 5201 1811 FAX (03) 5229 2909

SCALE SURVEY REF. UPDATED

1:12000 8818 28/05/2012 **A3**

Property Number	Total Area (Ha)	Transport						Community					Sewerage Easement	Conservation Area	Greenway	Wetland / Retarding	Waterway / Drainage Line	Unencumbered Land for				Existing Uses	Sub-Station	Recreation	Sewer Easement	PRV Site	Total Net Developable Area	Area Percentages				Open Space Development Target	Difference	Equivalent Land Area (Hectar)
		Geelong Ring Road Extension	Arterial Road / Widening	Sub Arterial Roads	Connector Street (abutting Greenway)	Transit Corridor	Existing Road Reserve	Community Facilities	Government Schools	Non Govt Schools	Active Open Space	Passive Open Space						Passive Open Space - regional park	Active Open Space	Passive Open Space	Passive Open Space - regional park							Net Developable Area % of Precinct	Active Open Space % NDA	Passive Open Space % NDA	Total Passive & Active Open Space %			
		Not included in NDA	Not included in NDA	Not included in NDA	Not included in NDA	Not included in NDA	Not included in NDA	Not included in NDA	Not included in OS %	Not included in OS %	Not included in OS %	Not included in OS %	Not included in OS %	Included in OS %	Included in OS %	Included in OS %	Not included in NDA	Not included in NDA	Not included in NDA	Not included in NDA														
Property 1	7.172	5.336											0.042													1.794	25.01%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.717	
Property 2	13.674	1.068																								12.606	92.19%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.367	
Property 3	2.654																2.654									0.000	0.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.265	
Property 4	4.002																									4.002	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.400	
Property 5	2.454																									2.454	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.245	
Property 6	2.013																									2.013	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.201	
Property 7	3.155																1.851									1.304	41.33%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.316	
Property 8	0.863																									0.863	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.086	
Property 9	2.188																									2.188	100.00%	100.00%	0.00%	100.00%	10.00%	90.00%	1.969	
Property 10	2.201																									2.201	100.00%	100.00%	0.00%	100.00%	10.00%	90.00%	1.981	
Property 11	16.524					1.554								3.967					0.489							10.514	63.63%	37.73%	0.00%	37.73%	10.00%	27.73%	4.582	
Property 12	16.157					1.490	0.800																			13.117	81.18%	0.00%	5.72%	5.72%	10.00%	-4.28%	-0.692	
Property 13	13.987	3.171				1.489							0.248													9.079	64.91%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.399	
Property 14	0.423	0.221										0.202														0.000	0.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.042	
Property 15	0.243	0.187				0.055																				0.001	0.41%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.024	
Property 16	1.770	1.729				0.041																				0.000	0.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.177	
Property 17	4.946	0.968																								3.978	80.43%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.495	
Property 18	3.235	0.484																								2.630	81.30%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.324	
Property 19	17.976	1.590											2.613													13.270	73.82%	0.00%	3.79%	3.79%	10.00%	-6.21%	-1.116	
Property 20	1.500																									1.500	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.150	
Property 21	15.335																									15.335	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.534	
Property 22	15.521																							0.030	15.491	99.81%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.552		
Property 23	16.344			0.124			9.600																			5.870	35.92%	0.00%	12.78%	12.78%	10.00%	2.78%	0.454	
Property 24	2.463			0.077																						2.386	96.87%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.246	
Property 25	13.763			0.474																						13.289	96.56%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.376	
Property 26	16.178			0.955								0.345														14.799	91.48%	0.00%	0.53%	0.53%	10.00%	-9.47%	-1.532	
Property 27	8.217	0.771		0.997				0.625																		4.702	57.22%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.822	
Property 28	2.006	0.262																								0.000	0.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.201	
Property 29	6.312	0.284		0.626				4.058																		0.529	8.38%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.631	
Property 30	2.025	0.233												1.792												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	1.823	
Property 31	8.294	0.306												7.988												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	7.465	
Property 32	2.550	0.217												2.333												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	2.295	
Property 33	3.523	0.225												3.298												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	3.171	
Property 34	0.405	0.108												0.297												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	0.365	
Property 35	16.117					1.250	3.500							0.988										0.032	10.347	64.20%	9.55%	0.00%	9.55%	10.00%	-0.45%	-0.073		
Property 36	2.030			0.055										1.975												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	1.827	
Property 37	2.030			0.106										1.924												0.000	0.00%	100.00%	0.00%	100.00%	10.00%	90.00%	1.827	
Property 38	2.030			0.128																						1.902	93.69%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.203	
Property 39	1.012			0.157																						0.855	84.49%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.101	
Property 40	1.013																									1.013	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.101	
Property 41	3.237													1.620												1.617	49.95%	100.19%	0.00%	100.19%	10.00%	90.19%	2.919	
Property 42	3.237													1.621												1.616	49.92%	100.31%	0.00%	100.31%	10.00%	90.31%	2.923	
Property 43	2.435													0.471												1.964	80.66%	23.98%	0.00%	23.98%	10.00%	13.98%	0.340	
Property 44	2.435													2.435												2.435	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.244	
Property 45	2.435													2.435												2.435	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.244	
Property 46	2.116													2.116												2.116	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.212	
Property 47	2.183													2.183												2.183	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.218	
Property 48	2.318													2.318												2.318	100.00%	0.00%	0.00%	0.00%	10.00%	-10.00%	-0.232	
Property 49	4.859													0.461												4.398	90.51%	10.48%	0.00%	10.48%	10.00%	0.48%	0.023	
Property 50	35.651		0.021	0.009								0.003	0.709													34.909	97.92%	0.00%	0.00%	0.00%	10.00%	-10.00%	-3.565	
Property 51	20.342		0.140									0.620								2.617	0.329					16.136	79.32%	0.00%	3.10%	3.10%	10.00%	-6.90%	-1.404	
Property 52	18.988	1.607	0.297									0.575														16.509	86.94%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.899	
Property 53	13.578					1.085							0.119													12.374	91.13%	0.00%	0.00%	0.00%	10.00%	-10.00%	-1.358	
Property 54	15.347												0.009													15.286	99.60%	0.27%	0.07%	0.34%	10.00%	-9.66%	-1.483	
Property 55	15.371					0.879							0.061													14.230	92.58%	0.00%	1.17%	1.17%	10.00%	-8.83%	-1.357	
Property 56	16.197					0.925				0.653	3.322		0.572													8.245	50.90%	0.00%	20.38%	20.3				






## **APPENDIX 2**

### **DETAILED RESIDENTIAL LOT YIELD BY PROPERTY**

Property Number	Total Area (Hectares)	Total Net Developable Area (Hectares)	Other Land Uses		Total Residential Area Ha (NRhA)	CONVENTIONAL DENSITY 12 Dwellings per Nrha		CONVENTIONAL DENSITY 15 Dwellings per Nrha		MEDIUM DENSITY 17 Dwellings per Nrha		HIGH DENSITY 18 Dwellings per Nrha		TOTAL COMBINED		
			NAC	LAC		NRhA	Dwellings	NRhA	Dwellings	NRhA	Dwellings	NRhA	Dwellings	NRhA	Dwellings / NRhA	Dwellings
Property 1	7.172	1.794			1.794	0	0	1.794	27	0	0	0	0	1.794	15.0	27
Property 2	13.674	12.606			12.606	0	0	12.606	189	0	0	0	0	12.606	15.0	189
Property 3	2.654	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 4	4.002	4.002			4.002	0	0	4.002	60	0	0	0	0	4.002	15.0	60
Property 5	2.454	2.454			2.454	0	0	2.454	37	0	0	0	0	2.454	15.0	37
Property 6	2.013	2.013			2.013	0	0	2.013	30	0	0	0	0	2.013	15.0	30
Property 7	3.155	1.304			1.304	0	0	1.304	20	0	0	0	0	1.304	15.0	20
Property 8	0.863	0.863			0.863	0	0	0.863	13	0	0	0	0	0.863	15.0	13
Property 9	2.188	2.188			2.188	0	0	2.188	0	2.188	37	0	0	2.188	17.0	37
Property 10	2.201	2.201			2.201	0	0	2.201	0	2.201	37	0	0	2.201	17.0	37
Property 11	16.524	10.514			10.514	0	0	10.514	0	10.514	179	0	0	10.514	17.0	179
Property 12	16.157	13.117	0.500		12.617	0	0	12.617	189	0	0	0	0	12.617	15.0	189
Property 13	13.987	9.079			9.079	0	0	9.079	136	0	0	0	0	9.079	15.0	136
Property 14	0.423	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 15	0.243	0.001			0.001	0	0	0.001	0	0	0	0	0	0.001	15.0	0
Property 16	1.770	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 17	4.946	3.978			3.978	0	0	3.978	60	0	0	0	0	3.978	15.0	60
Property 18	3.235	2.630			2.630	0	0	2.630	39	0	0	0	0	2.630	15.0	39
Property 19	17.976	13.270			13.270	0	0	13.270	199	0	0	0	0	13.270	15.0	199
Property 20	1.500	1.500			1.500	0	0	1.500	23	0	0	0	0	1.500	15.0	23
Property 21	15.335	15.335			15.335	0	0	15.335	230	0	0	0	0	15.335	15.0	230
Property 22	15.521	15.491			15.491	0	0	15.491	0	15.491	263	0	0	15.491	17.0	263
Property 23	16.344	5.870			5.870	0	0	5.870	0	5.870	106	0	0	5.870	18.0	106
Property 24	2.463	2.386			2.386	0	0	2.386	0	2.386	43	0	0	2.386	18.0	43
Property 25	13.763	13.289			13.289	0	0	13.289	0	13.289	239	0	0	13.289	18.0	239
Property 26	16.178	14.799			14.799	0	0	14.799	0	14.799	266	0	0	14.799	18.0	266
Property 27	8.217	4.702			4.702	0	0	4.702	71	0	0	0	0	4.702	15.0	71
Property 28	2.006	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 29	6.312	0.529			0.529	0	0	0.529	8	0	0	0	0	0.529	15.0	8
Property 30	2.025	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 31	8.294	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 32	2.550	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 33	3.523	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 34	0.405	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 35	16.117	10.347	2.854		7.493	0	0	7.493	0	7.493	135	0	0	7.493	18.0	135
Property 36	2.030	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 37	2.030	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Property 38	2.030	1.902			1.902	1.902	23	0	0	0	0	0	0	1.902	12.0	23
Property 39	1.012	0.855			0.855	0.855	10	0	0	0	0	0	0	0.855	12.0	10
Property 40	1.013	1.013			1.013	1.013	12	0	0	0	0	0	0	1.013	12.0	12
Property 41	3.237	1.617			1.617	1.617	19	0	0	0	0	0	0	1.617	12.0	19
Property 42	3.237	1.616			1.616	1.616	19	0	0	0	0	0	0	1.616	12.0	19
Property 43	2.435	1.964			1.964	1.964	24	0	0	0	0	0	0	1.964	12.0	24
Property 44	2.435	2.435			2.435	2.435	29	0	0	0	0	0	0	2.435	12.0	29
Property 45	2.435	2.435			2.435	2.435	29	0	0	0	0	0	0	2.435	12.0	29
Property 46	2.116	2.116			2.116	2.116	25	0	0	0	0	0	0	2.116	12.0	25
Property 47	2.183	2.183			2.183	2.183	26	0	0	0	0	0	0	2.183	12.0	26
Property 48	2.318	2.318			2.318	2.318	28	0	0	0	0	0	0	2.318	12.0	28
Property 49	4.859	4.398			4.398	4.398	53	0	0	0	0	0	0	4.398	12.0	53
Property 50	35.651	34.909	1.146		33.763	0	0	14.472	217	0	19.291	347	0	33.763	16.7	564
Property 51	20.342	16.136			16.136	0	0	12.601	189	0	3.535	64	0	16.136	15.7	253
Property 52	18.988	16.509			16.509	0	0	16.509	248	0	0	0	0	16.509	15.0	248
Property 53	13.578	12.374			12.374	0	0	12.374	0	12.374	210	0	0	12.374	17.0	210
Property 54	15.347	15.286			15.286	0	0	15.286	0	15.286	260	0	0	15.286	17.0	260
Property 55	15.371	14.230			14.230	0	0	14.230	0	14.230	242	0	0	14.230	17.0	242
Property 56	16.197	8.245			8.245	0	0	8.245	124	0	0	0	0	8.245	15.0	124
Property 57	16.205	5.165	0.500		4.665	0	0	4.665	70	0	0	0	0	4.665	15.0	70
Property 58	14.530	13.795			13.795	0	0	13.795	207	0	0	0	0	13.795	15.0	207
Property 59	15.310	14.172			14.172	0	0	14.172	213	0	0	0	0	14.172	15.0	213
Property 60	15.350	12.729			12.729	0	0	12.729	191	0	0	0	0	12.729	15.0	191
Property 61	0.822	0.688			0.688	0	0	0.688	10	0	0	0	0	0.688	15.0	10
Property 62	16.117	14.978			14.978	0	0	14.978	225	0	0	0	0	14.978	15.0	225
Property 63	15.312	14.123			14.123	0	0	14.123	212	0	0	0	0	14.123	15.0	212
Property 64	14.552	11.333			11.333	0	0	11.333	170	0	0	0	0	11.333	15.0	170
Property 65	2.448	2.033			2.033	0	0	2.033	30	0	0	0	0	2.033	15.0	30
Property 66	0.489	0.489			0.489	0	0	0.489	7	0	0	0	0	0.489	15.0	7
Property 67	9.030	8.715			8.715	0	0	8.715	131	0	0	0	0	8.715	15.0	131
Property 68	23.275	17.472			17.472	0	0	17.472	262	0	0	0	0	17.472	15.0	262
Property 69*	2.492	1.868			1.868	0	0	1.868	28	0	0	0	0	1.868	15.0	28
Property 70	0.236	0.213			0.213	0	0	0.213	3	0	0	0	0	0.213	15.0	3
Property 71*	0.795	0.795			0.795	0	0	0.795	12	0	0	0	0	0.795	15.0	12
Property 72	0.081	0.081			0.081	0	0	0.081	1	0	0	0	0	0.081	15.0	1
Property 73	16.555	12.848			12.848	0	0	12.848	193	0	0	0	0	12.848	15.0	193
Property 74	0.387	0.384			0.384	0.384	5	0	0	0	0	0	0	0.384	12.0	5
Property 75	2.074	1.998			1.998	1.998	24	0	0	0	0	0	0	1.998	12.0	24
Property 76	0.291	0.000			0.000	0.000	0	0	0	0	0	0	0	0.000	0.0	0
Property 77	2.028	1.548			1.548	1.548	19	0	0	0	0	0	0	1.548	12.0	19
Property 78	2.270	2.097			2.097	2.097	25	0	0	0	0	0	0	2.097	12.0	25
Property 79	2.736	2.399			2.399	2.399	29	0	0	0	0	0	0	2.399	12.0	29
Property 80	2.349	1.656			1.656	1.656	20	0	0	0	0	0	0	1.656	12.0	20
Property 81	2.029	0.831			0.831	0.831	10	0	0	0	0	0	0	0.831	12.0	10
Property 82	2.024	1.652			1.652	1.652	20	0	0	0	0	0	0	1.652	12.0	20
Property 83	2.014	1.658			1.658	1.658	20	0	0	0	0	0	0	1.658	12.0	20
Property 84	2.471	2.152			2.152	2.152	26	0	0	0	0	0	0	2.152	12.0	26
Property 85	2.068	2.068			2.068	2.068	25	0	0	0	0	0	0	2.068	12.0	25
Property 86	2.028	2.028			2.028	2.028	24	0	0	0	0	0	0	2.028	12.0	24
Property 87	2.073	2.042			2.042	2.042	25	0	0	0	0	0	0	2.042	12.0	25
Property 88	2.107	1.266			1.266	1.266	15	0	0	0	0	0	0	1.266	12.0	15
Reserve Road	1.575	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Sparrowvale Road	3.046	0.000			0.000	0	0	0.000	0	0	0	0	0	0.000	0.0	0
Charlemont Road	1.216	0.000			0.000</											



The land use budget is based on the following assumptions:

- Existing road reserves have been taken out of the net developable area and therefore excluded from the public open space calculations;
- The existing uses at 382 Torquay Road (Alan David Lodge) and 410 Torquay Road (Narana Creations) have been taken out of the net developable area and therefore excluded from the public open space calculations.
- Drainage lines are nominated as encumbered space
- The Barwon Water sewer easement of 16 metres width is classified as encumbered land.



## **APPENDIX 3**

### **INDICATIVE STREET TREE PLANTING**

## ARMSTRONG CREEK HORSESHOE BEND PSP - Preferred Street Tree Species List


Road / Area Type	Botanical Name	Common Name	Minimum planting space requirements (Naturestrip width)	Not in naturestrips
Arterial Road	<i>Angophora costata</i>	Smooth-barked Apple Myrtle	3m	
	<i>Brachychiton populneus</i>	Kurrajong	3m	
	<i>Corymbia eximia</i>	Yellow Bloodwood	3m	
	<i>Corymbia ficifolia</i>	Flowering Gum	2m	
	<i>Corymbia maculata</i>	Spotted Gum	4m	
	<i>Lophostemon confertus</i>	Queensland Brush Box	3m	
	<i>Platanus acerifolia</i>	London Plane	4m	
	<i>Quercus robur</i>	English oak	4m	
	Collector Road	<i>Acacia melanoxylon</i>	Blackwood	3m
<i>Brachychiton populneus</i>		Kurrajong	2m	
<i>Corymbia ficifolia</i>		Flowering Gum	2m	
<i>Eucalyptus mannifera ssp maculosa</i>		Red Spotted Gum	Open Space Area	x
<i>Eucalyptus mannifera ssp mannifera</i>		Brittle Gum	Open Space Area	x
<i>Eucalyptus melliodora</i>		Yellow Box	Open Space Area	x
<i>Eucalyptus sideroxylon</i>		Red Ironbark	2m	
<i>Eucalyptus scoparia</i>		Wallangarra White Gum	2m	
<i>Quercus robur</i>		English oak	4m	
<i>Ulmus parvifolia 'Todd'</i>		Upright Chinese Elm	2m	
Industrial Area	<i>Acacia implexa</i>	Lightwood	2m	
	<i>Acacia melanoxylon</i>	Blackwood	3m	
	<i>Angophora costata</i>	Smooth-barked Apple Myrtle	3m	
	<i>Brachychiton acerifolia</i>	Illawarra Flame Tree	2m	
	<i>Brachychiton populneus</i>	Kurrajong	3m	
	<i>Callistemon salignus</i>	Willow Bottlebrush	2m	
	<i>Corymbia citriodora</i>	Lemon-scented Gum	4m	
	<i>Corymbia maculata</i>	Spotted Gum	4m	
	<i>Eucalyptus melliodora</i>	Yellow Box	Open Space Area	x
	<i>Platanus acerifolia</i>	London Plane	4m	
	<i>Quercus palustris</i>	Pin Oak	3m	
<i>Tristaniopsis laurina</i>	Kanooka	2m		
<i>Ulmus glabra Lutescens</i>	Golden Elm	3m		
Residential Area	<i>Acacia implexa</i>	Lightwood	2m	
	<i>Acacia melanoxylon</i>	Blackwood	3m	
	<i>Angophora costata</i>	Smooth-barked Apple Myrtle	3m	
	<i>Brachychiton populneus</i>	Kurrajong	3m	
	<i>Banksia marginata</i>	Silver Banksia	2m	
	<i>Corymbia citriodora</i>	Lemon-scented Gum	4m	
	<i>Corymbia maculata</i>	Spotted Gum	4m	
	<i>Corymbia eximia 'nana'</i>	Dwarf Yellow Bloodwood	2m	
	<i>Corymbia ficifolia</i>	Flowering Gum	2m	
	<i>Eucalyptus mannifera 'Little Spotty'</i>	Little Spotty Gum	2m	
	<i>Eucalyptus melliodora</i>	Yellow Box	Open Space Area	x
	<i>Eucalyptus sideroxylon Rosea</i>	Red flowering Ironbark	3m	
	<i>Eucalyptus scoparia</i>	Wallangarra White Gum	2m	

Road / Area Type	Botanical Name	Common Name	Minimum planting space requirements (Naturestrip width)	Not in naturestrips
	<i>Lagerstroemia indica</i> cultivars	Crepe Myrtle	Garden beds only	x
	<i>Lophostemon confertus</i>	Queensland Brush Box	3m	
	<i>Magnolia grandiflora</i> 'Greenback'	Magnolia	3m	
	<i>Pyrus calleryana</i> 'Capital'	Upright Ornamental Pear	2m	
	<i>Pyrus calleryana</i> 'Chanticleer'	Ornamental Pear	2m	
	<i>Quercus palustris</i>	Pin Oak	3m	
	<i>Robinia pseudoacacia</i> varieties	Golden Robinia	Garden beds only	x
	<i>Tristaniopsis laurina</i>	Kanooka	2m	
	<i>Ulmus glabra</i> <i>Lutescens</i>	Golden Elm	3m	
Activity Centre	<i>Lagerstroemia indica</i> cultivars	Crepe Myrtle	Garden beds only	x
	<i>Magnolia grandiflora</i> 'Exmouth'	Magnolia	3m	
	<i>Pyrus ussuriensis</i>	Manchurian Pear	4m	
	<i>Quercus robur</i> 'fastigiata'	Fustigated English Oak	3m	
	<i>Robinia pseudoacacia</i> varieties	Golden Robinia	Garden beds only	x
	<i>Tristaniopsis laurina</i>	Kanooka	2m	
	<i>Ulmus parvifolia</i> 'Todd'	Upright Chinese Elm	2m	
Conservation Reserve / Open Space Areas	<i>Eucalyptus leucoxylon</i> ssp <i>connata</i>	Melbourne Yellow Gum		
	<i>Eucalyptus leucoxylon</i> ssp <i>Bellerinensis</i>	Bellarine Yellow Gum		
	<i>Acacia implexa</i>	Lightwood		
	<i>Acacia melanoxylon</i>	Blackwood		
	<i>Acacia pycnantha</i>	Golden Wattle		
	<i>Eucalyptus viminalis</i>	Manna Gum		
	<i>Eucalyptus camaldulensis</i>	River Red Gum		
	<i>Eucalyptus melliodora</i>	Yellow Box		
	<i>Eucalyptus ovata</i>	Swamp Gum		
	<i>Allocasuarina verticillata</i>	Drooping Sheoak		
	<i>Melaleuca lanceolata</i>	Moonah		
	<i>Banksia marginata</i>	Silver Banksia		
	<i>Allocasuarina littoralis</i>	Black Sheoak		



## **APPENDIX 4**

### **Community Facilities Delivery Statement**



CoGG, in particular through the Integrated Infrastructure Delivery Plan (IIDP), recognises the importance for healthy community development of the earliest possible provision of community facilities and services. This will be facilitated having regard to the following delivery principles and guidance.

- CoGG through its IIDP working group and the involvement of key developers, will investigate and facilitate opportunities for partnership approaches to support community facility provision objectives.
- Potential funding sources to be considered include:
  - the Horseshoe Bend Precinct Development Contribution Plan (HBPDCP);
  - the CoGG capital works program;
  - the provision of commercial community facilities by private sector proponents;
  - State and Federal Government grants, with funding potential across a broad range of community facilities and services;
  - non-government and voluntary organisation funding and in-kind works, individually or in partnership with one or more of the above.
- Community facility requirements will change over time with changes in delivery models, responsibilities, competing priorities within and outside HBP and the ACUGA and actual available funding. The HBPSP has been designed to be flexible enough to be able to accommodate change over time.
- Opportunities for shared use of clubhouse and pavilion buildings should be facilitated through flexible facility design and management.
- Where facilities are associated with schools, they should be designed to ensure integrated delivery and maximum shared community use.
- The detailed design of the neighbourhood and local activity centres must include a close working relationship between the proponent and CoGG to facilitate the integrated design of the centres including all public facilities and spaces.



## **APPENDIX 5**

### **Public Open Space Guidelines**

Public Open Space Characteristic	Planning and Design Guidelines
All spaces	<ul style="list-style-type: none"> <li>• Spaces should be designed and developed to assist in promoting 'sense of place' and community for people of all ages, providing opportunities to meet and interact in appropriate spaces in suitable ways and times. It should provide popular, 'in-demand' active (with planned recreation opportunities) and passive (including for walking, sitting, contemplating, picnicking and such) spaces and landscapes.</li> <li>• Spaces should be well-designed (that is, fit for their intended purpose, useable and attractive - a place where people want to be).</li> <li>• Active recreation spaces and facilities should be designed to facilitate shared use (school and community; different community user-groups).</li> <li>• Spaces should, as appropriate to their functions, contain shade and shelter, 'kick-about' areas and viewing places.</li> <li>• All spaces should be developed to maximise active and passive surveillance from adjoining areas and uses.</li> </ul>
Common boundary with habitat conservation areas	<ul style="list-style-type: none"> <li>• The design of spaces should not prejudice the biodiversity values of habitat conservation areas and wherever possible should integrate with such areas to enhance recreation / conservation experiences / opportunities.</li> <li>• Spaces abutting habitat conservation areas should be designed to protect those areas from unplanned walking / cycling and vehicular use and from pest weed and plant infestation.</li> </ul>
Common boundary with roads	<ul style="list-style-type: none"> <li>• Spaces (other than easements) should have a road frontage to all boundaries except where addressed directly by purpose-designed active-frontage alternative land uses. Public open space that is linear in nature to provide for an infrastructure easement should be developed to include some variety of boundary finish such as feature fencing to the side or rear of lots, abutting court heads and sections of road frontage.</li> <li>• Design of spaces should ensure safety of users in respect of traffic on adjoining roads.</li> <li>• Streetscape planting and paths should complement and integrate with the abutting open space design.</li> </ul>
Common boundary with residential development	<ul style="list-style-type: none"> <li>• Spaces should be enhanced by careful design of residential, community and commercial development adjacent to it.</li> <li>• The primary frontage of development that immediately abuts open space areas should address and promote use and surveillance of the parkland.</li> <li>• Development abutting open space should be well articulated and facilitate passive surveillance with windows, balconies and pedestrian access points.</li> <li>• Rear fencing and blank walls of abutting development should be avoided. A road at the interface between public open space (and particularly those that form habitat conservation areas) and other land uses can be an appropriate transition mechanism between the two uses.</li> <li>• Where fencing is required it should be low height and permeable to facilitate public safety and surveillance.</li> <li>• Landscaping of adjoining development should complement the</li> </ul>

Public Open Space Characteristic	Planning and Design Guidelines
Multi-use recreation and drainage	<p>open space landscape design.</p> <ul style="list-style-type: none"> <li>Walking / cycling links and other recreation opportunities should be incorporated with the drainage system to maximise land use sustainability.</li> <li>Pedestrian bridges and boardwalks should be incorporated into the path network to facilitate permeability of neighbourhoods.</li> <li>Paths, bridges, boardwalks and structures should be designed to be at least above a minimum of the Q10 flood event to the satisfaction of the relevant authority.</li> </ul>
Structures	<ul style="list-style-type: none"> <li>Structures should be sited above the Q100 flood event and designed to integrate with and complement rather than dominate the landscape.</li> <li>Structures should be sited to frame spaces or punctuate vistas and should avoid disrupting usable and effective spaces.</li> <li>Structures should be attractive in design with planned solar orientation, materials choices, design detailing and plant and equipment, maximising total life-cycle sustainability.</li> <li>Material choices should complement the proposed landscape character.</li> </ul>
Public safety	<ul style="list-style-type: none"> <li>Open spaces should be designed to be safe and comfortable places that encourage use by a wide range of people.</li> <li>The use of the design principles known as 'Crime Prevention through Environmental Design' (CPTED) should guide the design of spaces and the infrastructure they contain.</li> <li>Surrounding land uses should provide passive surveillance of adjoining open space and planting design should promote a highly visible public realm.</li> <li>The detailed design of spaces that immediately abut development should complement and enhance the function and safety of that development.</li> <li>Paths should facilitate clear, direct and easy movement to and from key destinations.</li> <li>Lighting in open spaces should be encouraged along key walking / cycling links for safe pedestrian movement throughout the network but discourage inappropriate use of main parkland areas after dark.</li> <li>Light fittings should be energy efficient and 'cut-off' type to direct light where it is required and reduce unnecessary spill to sides or above.</li> <li>Light fittings should be compact fluorescent or similar that emit white light.</li> </ul>
Landscape character	<ul style="list-style-type: none"> <li>A predominantly indigenous and Australian native planting theme supporting the biodiversity values of HBP should characterise the open space network.</li> <li>Exotic species may be appropriate in locations with the approval of the Responsible Authority.</li> <li>Species chosen should be appropriately robust to perform adequately in the local urban environment and micro-climate.</li> <li>Exotic and Australian native species should be considered to achieve particular planting effects in HBP such as highlight planting at entries and key focal points as well as avenues.</li> <li>Advice should be sought from CoGG staff regarding suitability of</li> </ul>

Public Open Space Characteristic	Planning and Design Guidelines
	proposed species before confirming plant schedules.
Other elements and infrastructure	<ul style="list-style-type: none"> <li>• The design and siting of landscape elements and infrastructure should complement the area.</li> <li>• Infrastructure such as playgrounds, shelters, barbeques, picnic tables, toilets and such, should be clustered in nodes. Park planting themes should enhance and complement these nodes.</li> <li>• Park seating should be provided about every 400 metres along key paths.</li> <li>• Public toilet facilities should be integrated (where appropriate) with pavilions and clubhouses.</li> <li>• Use of bollards and fencing should be functional in the particular circumstances, should not restrict surveillance and should be kept to a minimum.</li> <li>• Where car parking is required within spaces, it should be designed with shade trees to minimise large areas of open, unshaded hard surfaces.</li> <li>• Safe pedestrian access should be integrated within car park designs.</li> <li>• Opportunities should be considered for appropriate urban art.</li> </ul>
Signs and furniture	<ul style="list-style-type: none"> <li>• Parks and sports fields should be signed clearly, if required.</li> <li>• Generally, signs within parks should be kept to a minimum with locations focused on key access or heritage interpretation points and major pedestrian / cycle routes.</li> <li>• Furniture and materials should be co-ordinated and should complement the overall landscape design theme.</li> </ul>
Water sensitive urban design	<ul style="list-style-type: none"> <li>• The design and layout of spaces should maximise water use efficiency, stormwater quality and long term health of vegetation through the use of water sensitive urban design (WSUD) initiatives.</li> <li>• WSUD principles should include excess run-off water from within or where appropriate external to the space, being directed to support watering regimes rather than being diverted to drains.</li> <li>• Warm season grasses should be used within passive reserves and sports fields to minimise recycled, harvested and potable water use.</li> <li>• Opportunities for water harvesting / reuse should be maximised where possible within or abutting public open space.</li> </ul>

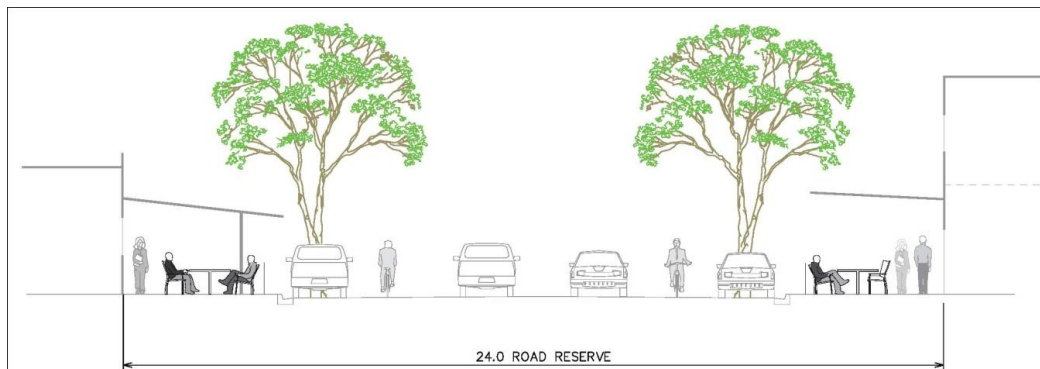


## **APPENDIX 6**

### **Neighbourhood Activity Centre Urban Design Framework Guidelines**

Design Issue	Planning and Design Guidelines
Overall centre design and public realm	<ul style="list-style-type: none"> <li>• Development must address appropriately the topography and physical features of the site and surrounds.</li> <li>• Development should complement and enhance the planned character of the surrounding area as reflected in this HBPSP.</li> <li>• The detailed design and structure of the centre should ensure a future 'main street' layout and structure that will provide a permeable (within the centre and beyond) network of streets, walking / cycling links and public spaces.</li> <li>• Key view lines into and out of the centre should be incorporated in the detailed planning of the layout and overall design.</li> <li>• Streets, walking / cycling links and public spaces should be installed with lighting that promotes surveillance and enhances public safety.</li> <li>• Building design and construction should include co-ordinated (design, height and materials) verandahs or covered pedestrian ways to provide attractive and functional weather protection.</li> <li>• Public art should be incorporated into the design of the public realm and should be supported by a Public Art Masterplan for the NAC.</li> <li>• Public toilets should be provided in locations that are safe and accessible.</li> <li>• All public spaces should respond appropriately to the principles of design for mobility access.</li> </ul>
Built form	<ul style="list-style-type: none"> <li>• Design guidelines should ensure that the design of each building contributes to a planned cohesive and legible character for the centre as a whole.</li> <li>• Building design guidelines should include suggestions on siting, appearance principles, architectural features, heights and materials.</li> <li>• Built form in the centre should be aligned with the property boundary of the 'main street'.</li> <li>• Street facades and any exposed side or rear facades should be visually rich and interesting. Extensive building facades without openings, articulation, activity or visual interest, should be avoided.</li> <li>• Plant structures on the roof should be included within roof lines or otherwise hidden.</li> </ul>
Building / street interface	<ul style="list-style-type: none"> <li>• Developments / buildings fronting streets and public spaces should be designed to ensure maximum engagement with the street, with outward-looking active facades that contribute to the vibrancy and visual attraction of the centre public realm.</li> <li>• The design of buildings and in particular their facades, should respond appropriately to all abutting streets.</li> <li>• Preferred uses and built-form of key sites should be identified. Sites in prominent locations should be identified for significant buildings, structures, urban art or a public square or equivalent.</li> <li>• Landscaping should be of a high but sustainable standard.</li> <li>• Corner sites, where the 'main street' meets an arterial road: <ul style="list-style-type: none"> <li>○ should be designed to provide built form that anchors the 'main street' to the arterial road, which could be achieved, for example, through the use of a substantial volume building located at the corner;</li> <li>○ should not be developed for standard single-storey fast food outlets;</li> <li>○ should be developed to have a ground floor retail space component to the 'main street' frontage.</li> </ul> </li> </ul>

Occupancies and centre activation	<ul style="list-style-type: none"> <li>• Developments and uses should facilitate convenience, variety and choice through a viable mix of retail, recreation and community facilities.</li> <li>• Ground floor use should address streets and in particular the 'main street', to maximise exposure to passing trade, promote active frontages and facilitate social interaction, surveillance and safety and active meeting places.</li> <li>• Shops should have a variety of widths and floorspaces to promote a diversity of occupancies and start-up opportunities.</li> <li>• A variety of employment and business opportunities should be planned and encouraged (including, retail, non-retail commercial, community and residential uses) to maximise the popularity of the centre and thus promote its activation.</li> </ul>
Supermarkets and other large floorplate occupancies	<ul style="list-style-type: none"> <li>• Supermarkets and other large floorplate occupancies should be located and designed to assist with the planned movement of people to activities and destinations within and outside the centre.</li> <li>• Supermarkets and other large floorplate occupancies with street frontages and in particular frontage to the 'main street' must use clear glazing to ensure views into and out of the building from the street. (Planning permits for buildings and works must include conditions against the use of white washed windows and excessive window advertising).</li> <li>• The design and siting of supermarkets and other large floorplate occupancies should provide an appropriate response to the entire public realm, including car parking areas, walking / cycling links, streets and other public places.</li> <li>• Supermarkets and other 'anchor' stores should have a key access point that addresses directly the 'main street' so that the use integrates with and promotes activity within the 'main street'. A high proportion of the perimeter of such supermarkets and other stores should be 'veneered' behind speciality shops and other uses.</li> <li>• Secondary access to supermarkets and other stores from car parking areas is appropriate where it does not diminish the role of a key access from the 'main street'.</li> <li>• Entrance foyers that are primarily to provide access to a supermarket / other large floorplate occupancies may form part of the overall design. Such access foyers may have a limited number of internalised shops provided that the supermarket entry is clearly visible from the footpath.</li> <li>• Extensive use of internal malls is prohibited.</li> </ul>
Movement, access and parking	<ul style="list-style-type: none"> <li>• Retail and other commercial or community anchors or secondary anchors within the centre should be located to be removed from one another and ideally at opposite ends of the centre, to promote pedestrian traffic that maximises movement along the length of the 'main street'.</li> <li>• The detailed design of the centre should incorporate access, movement and linkages principles contained in this HBSP.</li> <li>• Footpath widths should allow for comfortable movement and access for pedestrian including those with restricted mobility, outdoor seating and eating spaces including any hoarding or temporary enclosure fencing, approved footpath display and sales areas and access to parked vehicles, along the 'main street' frontages. The main street cross-section should be generally in accordance with Figure C.</li> </ul>



**Figure H Neighbourhood Activity Centre Main Street Cross Section**

- Roads and traffic plans should maximise pedestrian convenience and safety including:
  - the 'main street' being designed, constructed and managed to give priority to pedestrian movement;
  - the 'main street' being designed with a speed environment of 40 kilometres per hour;
  - bus stops and taxi bays being in locations that promote the efficient and safe movement of pedestrians to and from key destinations within the centre and waiting at stops.
- Parking areas should be located to the rear and/or side of street based retail frontages.
- Car parks must be bordered by the surrounding street network on at least one, preferably two, sides.
- Car parking areas should be designed to accommodate alternative temporary uses at specified non-peak parking times.
- Streets should include on-street parallel short-stay parking to encourage easy access and activity.
- Car parking entry / exit points and areas should be:
  - limited in accordance with an approved traffic and parking study for the centre;
  - designed to minimise pedestrian / vehicle (including delivery and service) conflict;
  - landscaped appropriately to provide shade and visual relief.
- Heavy vehicle movements associated with loading / unloading should be concentrated to the rear and / or side of street based retail frontages.
- Bicycle parking facilities should be provided in safe, convenient and accessible locations and in numbers, in accordance with the Scheme to the satisfaction of the Responsible Authority.

Public transport

- Bus stops (for V-line and local services) should be provided in accessible and safe locations and in accordance with the Department of Transport guidelines.
- Convenient and sufficient taxi waiting bays should be provided.
- Access to bus stops and taxi bays within the 'main street' should be designed to incorporate the public transport network outlined in Plan 11 in consultation with the Department of Transport.
- Bus stops within activity centres should be designed to accommodate a

	<p>spatial allowance commensurate with patron numbers.</p>
Service areas	<ul style="list-style-type: none"> <li>• Service areas should be internalised wherever possible.</li> <li>• Where not internalised, the design, location and screening (acoustic and visual) of service areas (such as loading bays, trolley storage and waste holding / collection areas) should minimise amenity impacts and should be removed from the 'main street'.</li> <li>• Service areas should be designed wherever possible to separate manoeuvring and access of heavy delivery and service vehicles from car park access lanes and entry / exit points.</li> </ul>
Advertising Signage	<ul style="list-style-type: none"> <li>• Advertising sign areas and locations should be designed to be incorporated in the design of buildings and should not be added later. .</li> <li>• Advertising signs must be co-ordinated and minimised for each premises to avoid unnecessary visual clutter and to maximise the architectural merit and theme of the space.</li> <li>• Planning permits for buildings and works must include conditions against the use of white washed windows and excessive window advertising.</li> <li>• Large free-standing pole signs should be minimised preferably to no more than one pole sign for each centre advertising its existence and its traders.</li> </ul>
Sustainable design	<p>An urban design framework should address sustainable design matters and demonstrate how the following considerations have been incorporated into the design of the centre.</p> <ul style="list-style-type: none"> <li>• Use of energy efficient design and construction methods is encouraged for the development of all buildings.</li> <li>• Water sensitive urban design including how stormwater harvesting is linked to the wider recycled water system.</li> <li>• Shade and shelter through a combination of landscape treatment and built form features.</li> <li>• Natural ventilation of all buildings to reduce the reliance on non-renewable energy for heating and cooling.</li> <li>• Passive solar orientation.</li> <li>• Waste collection points grouped to maximise opportunities for efficient recycling.</li> <li>• Solar energy for water and space heating, electricity generation and internal and external lighting.</li> <li>• Other ways that the design of the built form should reduce greenhouse gas emissions associated with the use of the buildings.</li> <li>• The intentions for use of recycled materials to be incorporated into building design.</li> </ul>



## **APPENDIX 7**

### **Road Design and Delivery Characteristics**

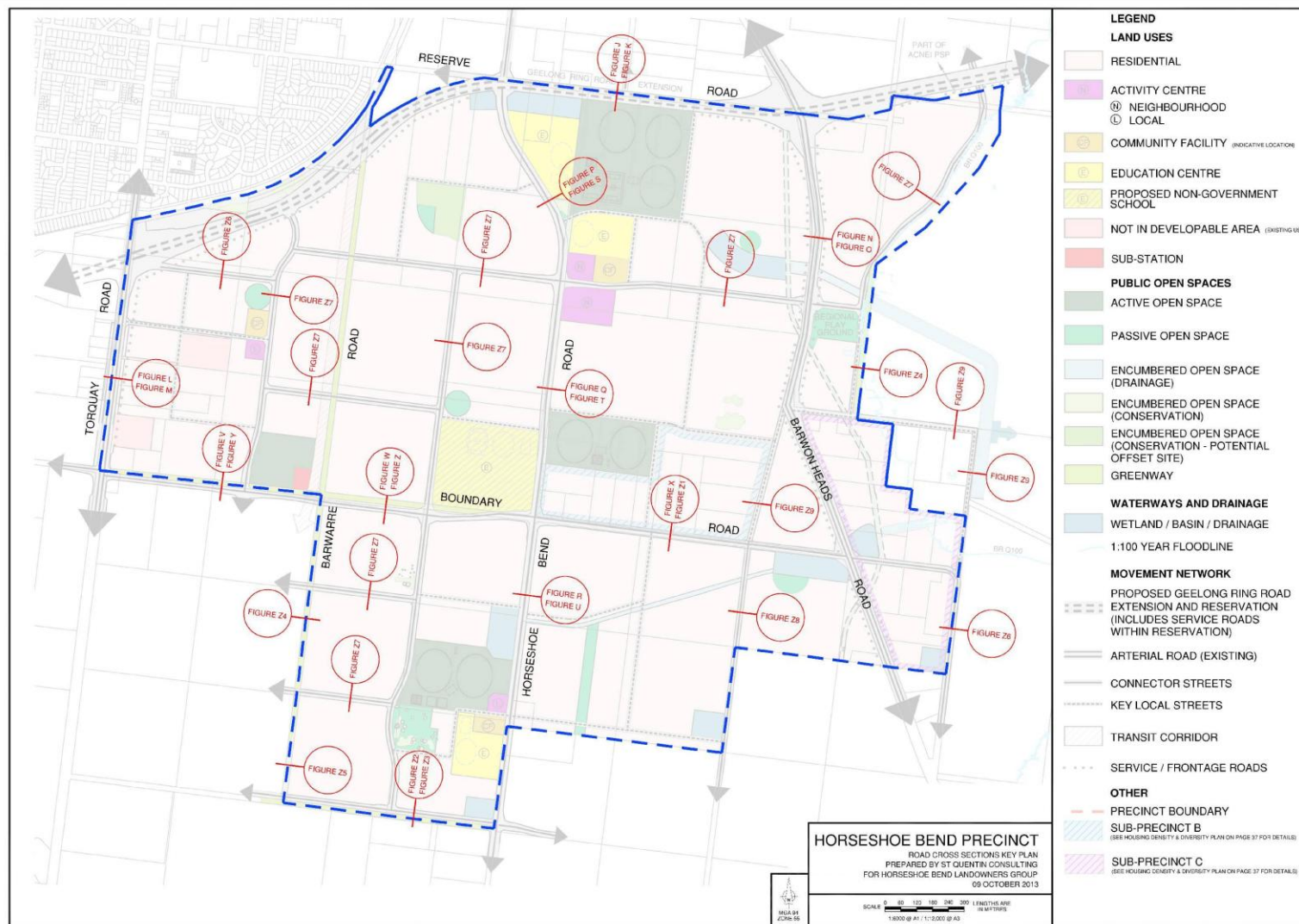
Category	Related Cross Section in HBSP	Road / Street	Existing Reserve (metres)	Ultimate Reserve (metres)	Access Management Policy	Indicative Vehicles per Day (VPD maximum)	Traffic Lanes	Dedicated Parking Lanes	Median	Speed Limit (Maximum)	Bus Compatible	Property Access	On Road Cycle Lane	Shared Path (2.5 metres)	Footpath (1.5 metres)	Construction Responsibility *	Funding Responsibility	Trigger for construction
Proposed Arterial	Figure K	Armstrong Creek East-West Link Road	NA	Varies	AMP2*	20,000 to 25,000	4 (plus potential dedicated bus lane)	0	Yes	80	Yes	No	Yes x2	Yes	No	Roads Corporation	Roads Corporation / ACHB DCP	As required
Existing Arterial	Figure L-M	Surf Coast Highway	40	40	AMP2*	50,000 to 65,000	6	0	Yes	80 (interim) 60/70 (ultimate)	Yes	No	Yes x2	No	As required	Roads Corporation	Roads Corporation	As required
Existing Arterial	Figure N-O	Barwon Heads Road	20-40	40	AMP2*	20,000 to 25,000	4	0	Yes	80	Yes	No	Yes x2	No	As required	Roads Corporation	Roads Corporation	As required
Existing Road	Figure P-U	Horseshoe Bend Road Ultimate	20	30.5-35.5	N/A	12,000-17,500	4	As required	Yes	60	Yes	Yes	Yes x2	Yes	Yes	Developer / CoGG (duplication)	Developer / CoGG (duplication)	As abutting development occurs
Existing Road	Figure V, W, Y & Z	Boundary Road West Section (Surfcoast Highway – Horseshoe Bend Road)	20-21.3	39-7-44.5	N/A	14,000	2	Yes 2	No	60	Yes	Yes	No	Yes	No	Developer	Developer	As abutting development occurs
Existing Road	Figure X & Z1	Boundary Road East Section (Horseshoe Bend – Barwon Heads Roads)	20	27.5	N/A	10,800	2	Yes 2	No	60	Yes	Yes	No	Yes (Bike-way)	Yes	Developer	Developer	As abutting development occurs
Existing Road	Figure Z2 & Z3	Burvilles Road Ultimate	20	43	N/A	11,100	2	Yes 2	No	60	Yes	Yes	No	Yes x1	Yes x1	Developer	Developer	As abutting development occurs
Existing Road	Figure J	Reserve Road Interim (Prior to Armstrong Creek East-West Link Road Duplication)	20	42	N/A	9,200	2	Yes 1	No	60	Yes	Yes	No	Yes (Bike-way)	No	Developer	Developer	As abutting development occurs
Existing Road	Figure Z4	Barwarre / Sparrovale Greenway Sections			N/A													
Typical Connector Street	Figure Z7	Typical Connector Street 'A-F'	N/A	24.4	N/A	3,000-10,000	2	Yes 2	No	60	Yes	Yes	Yes	Yes (as nominated)	Yes x2	Developer	Developer	As abutting development occurs
Typical Connector Street	Figure Z6	Typical Connector Street 'G'	N/A	23.0	N/A	1,000-9,000	2	Yes 2	No	60	Yes	Yes	Yes	Yes	Yes x2	Developer	Developer	As abutting development occurs

Category	Related Section in HBSP	Road / Street	Existing Reserve (metres)	Ultimate Reserve (metres)	Access Management Policy	Indicative Vehicles per Day (VPD maximum)	Traffic Lanes	Dedicated Parking Lanes	Median	Speed Limit (Maximum)	Bus Compatible	Property Access	On Road Cycle Lane	Shared Path (2.5 metres)	Footpath (1.5 metres)	Construction Responsibility *	Funding Responsibility	Trigger for construction	
Local Connector Street	Figure Z8	Batten Road (south of Boundary Road)	20.0	20.5	N/A	<3,000	2	2	No	50	Yes	Yes	No	Yes x 1	Yes x 1	Developer	Developer	As abutting development occurs	
Local Access Street	Figure Z10A	Typical Local Street	0	16.0	N/A	<1,000	2	0	No	50	No	Yes	No	No	Yes x 2	Developer	Developer	As abutting development occurs	
Local Access Street	Figure Z10B	Typical Local Street with Shared Path	0	17	N/A	<1,000	2	0	No	50	No	Yes	No	Yes x 1	Yes x 1	Developer	Developer	As abutting development occurs	
Service Road	Figure Z12	Service Roads to Surf Coast Highway / Barwon Heads Road and Armstrong Creek East-West Link Road**	0	10	NA	<1,000	1	1	No	50	No	Yes	No	No	Yes x 1	Developer	Developer	As abutting development occurs	
Local Access Street	Figure Z11	Adjacent to open space / greenway / conservation	0	13.5	NA	<300	2	0	No	50	No	Yes	No	No	Yes x 1	Developer	Developer	As abutting development occurs	
Access Lane	Figure Z13	Access Lane	0	6-8	N/A	<100	2	0	No	10	No	Yes (rear access only)	No	No	No	Developer	Developer	As abutting development occurs	
<b>NOTES</b>			<p>* VicRoads Access Management Policies, May 2006 Version 1.02.</p> <p>** excludes service roads; no individual property access allowed.</p> <p>*** Refer to Precinct Infrastructure Plan (Table 5) for apportionment.</p>																

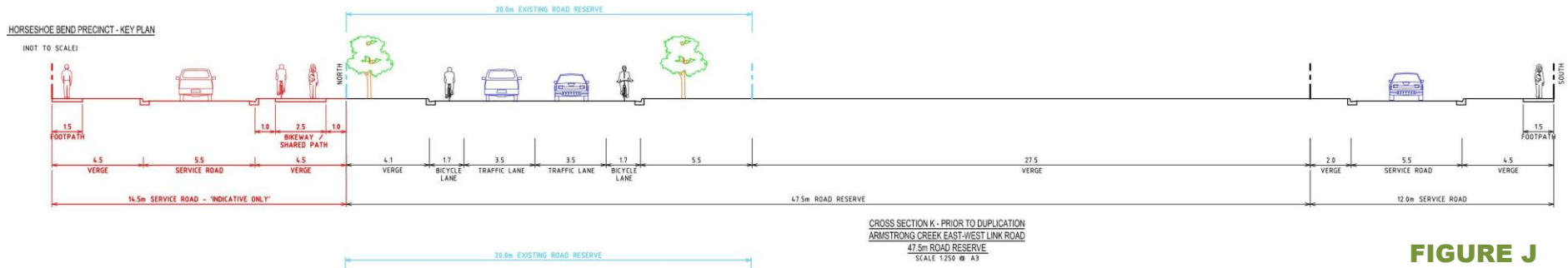


## **APPENDIX 8**

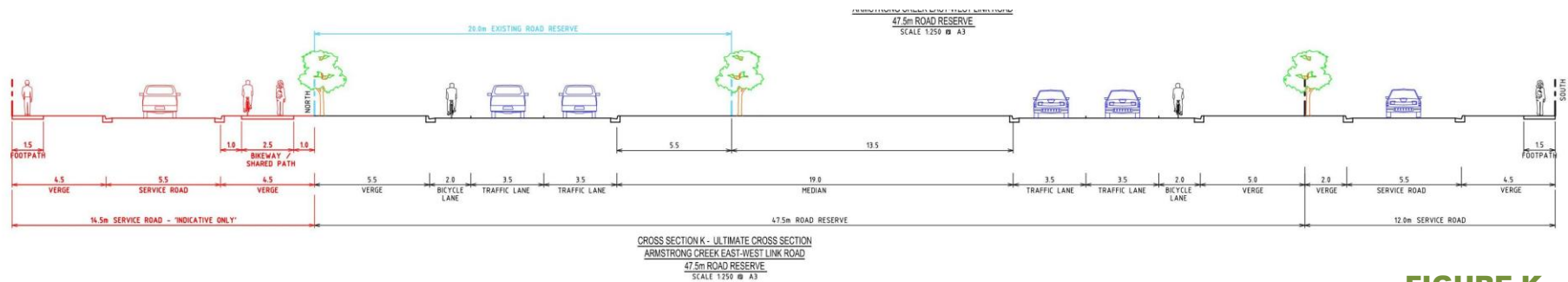
### **ROAD CROSS SECTIONS**



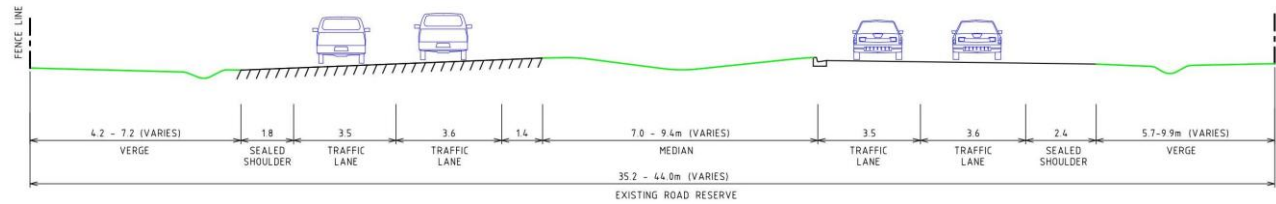
**FIGURE I**  
**ROAD CROSS SECTIONS KEY PLAN**



**FIGURE J**  
**ARMSTRONG CREEK EAST-WEST LINK ROAD/RESERVE ROAD**  
**(INTERIM)**

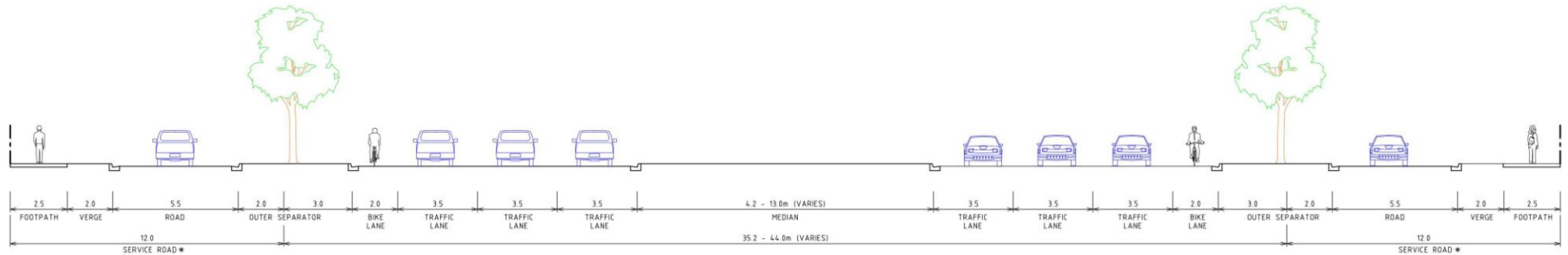


**FIGURE K**  
**ARMSTRONG CREEK EAST-WEST LINK ROAD/RESERVE ROAD**  
**(ULTIMATE)**



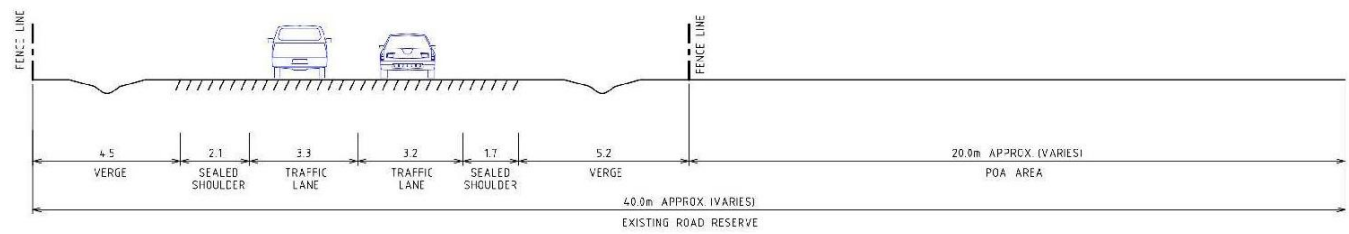
EXISTING SURF COAST HIGHWAY MID BLOCK CROSS SECTION  
N.T.S

**FIGURE L**  
**SURF COAST HIGHWAY**  
**(EXISTING)**

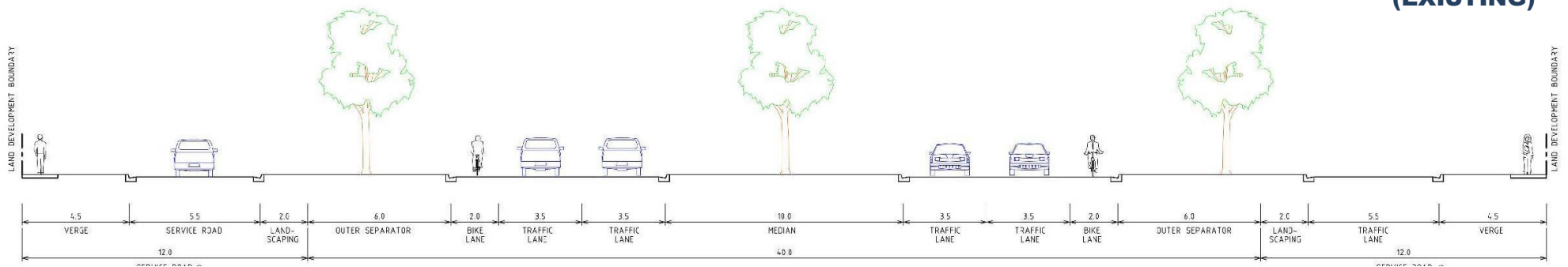


ULTIMATE SURF COAST HIGHWAY MID BLOCK CROSS SECTION \* WHERE PROVIDED  
N.T.S

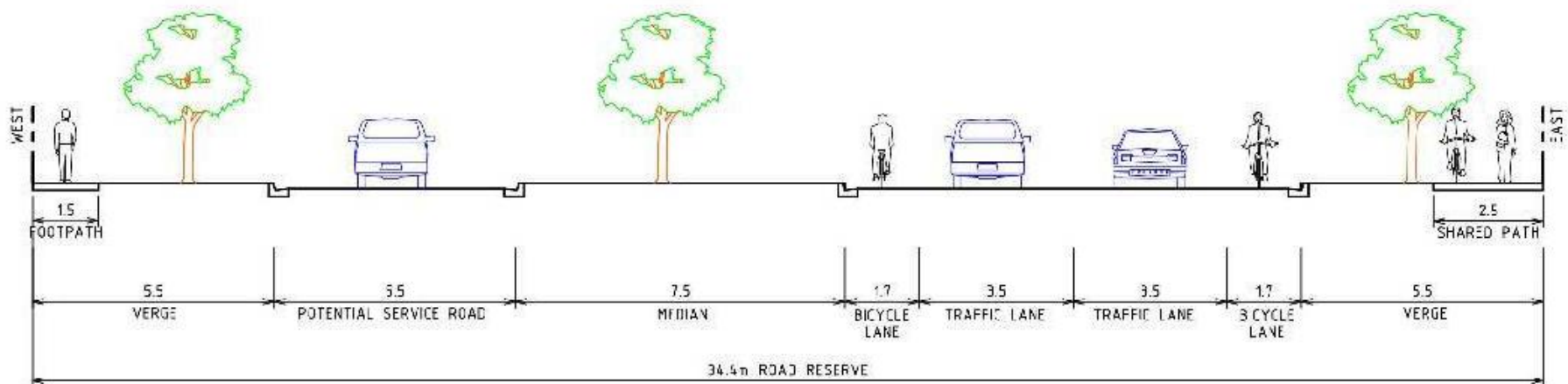
**FIGURE M**  
**SURF COAST HIGHWAY**  
**(ULTIMATE)**



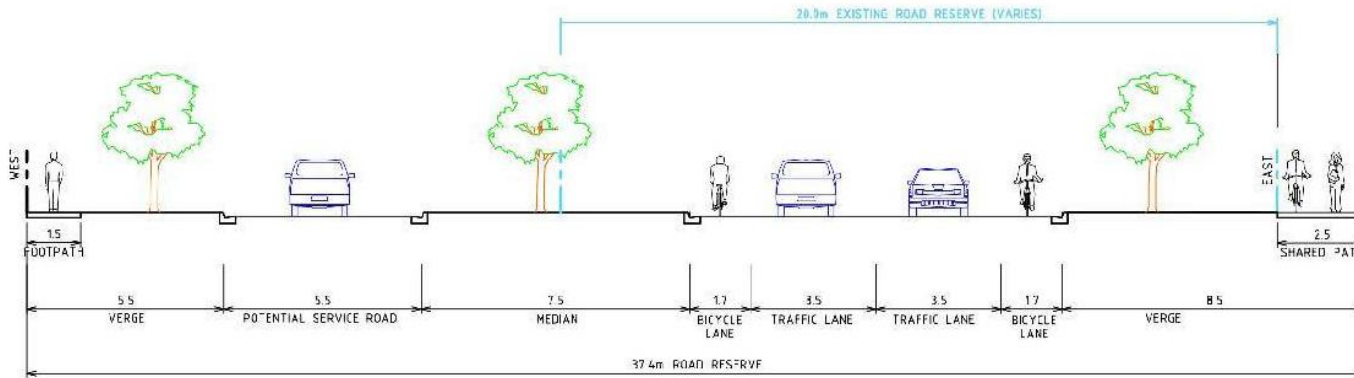
**FIGURE N**  
**BARWON HEADS ROAD**  
**(EXISTING)**



**FIGURE O**  
**BARWON HEADS ROAD**  
**(ULTIMATE)**

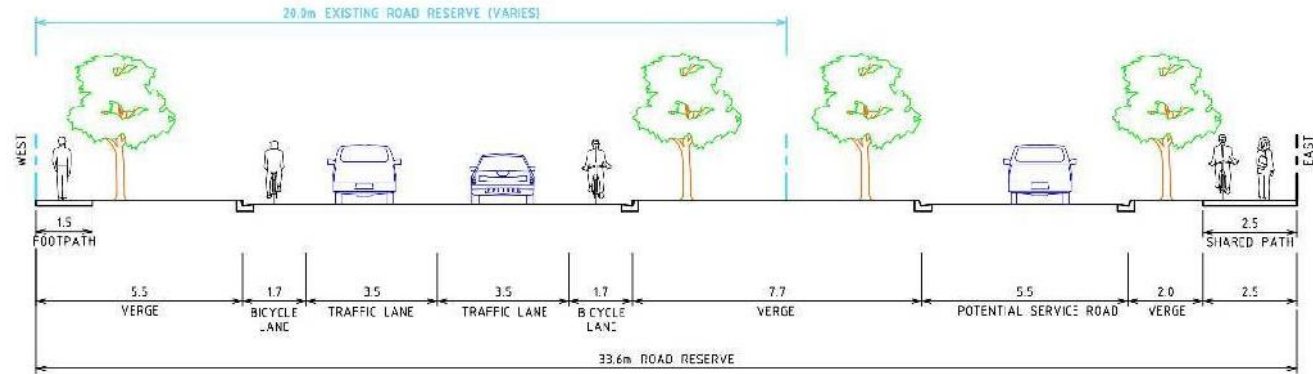


**FIGURE P**  
**HORSESHOE BEND ROAD – SOUTH OF RESERVE ROAD TO NEIGHBOURHOOD ACTIVITY CENTRE**  
**(INTERIM)**



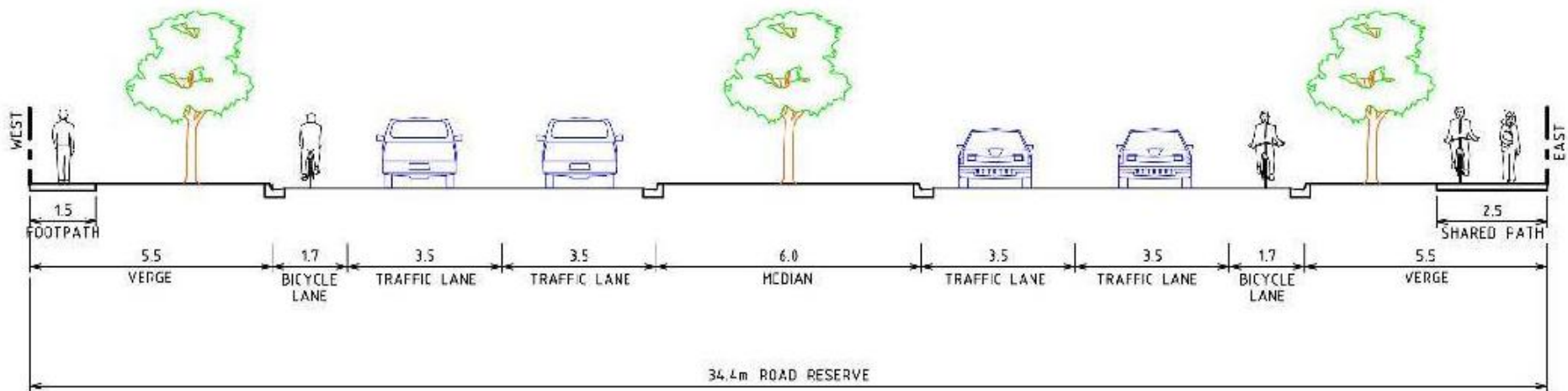
**FIGURE Q**

**HORSESHOE BEND ROAD – NORTH: NEIGHBOURHOOD ACTIVITY CENTRE TO CATHOLIC SCHOOL SITE (INTERIM)**

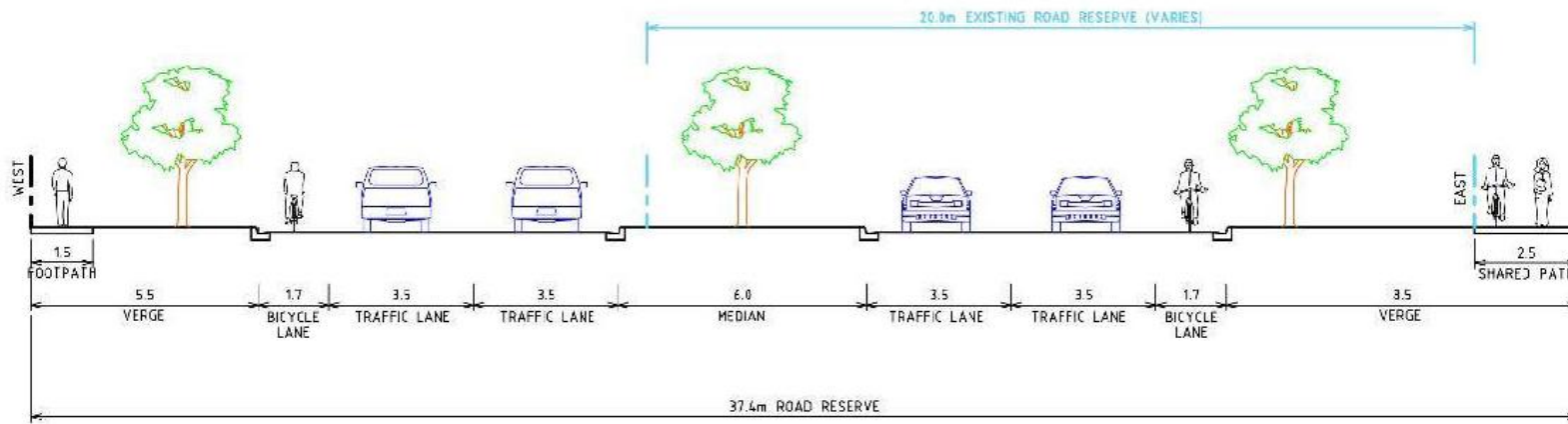


**FIGURE R**

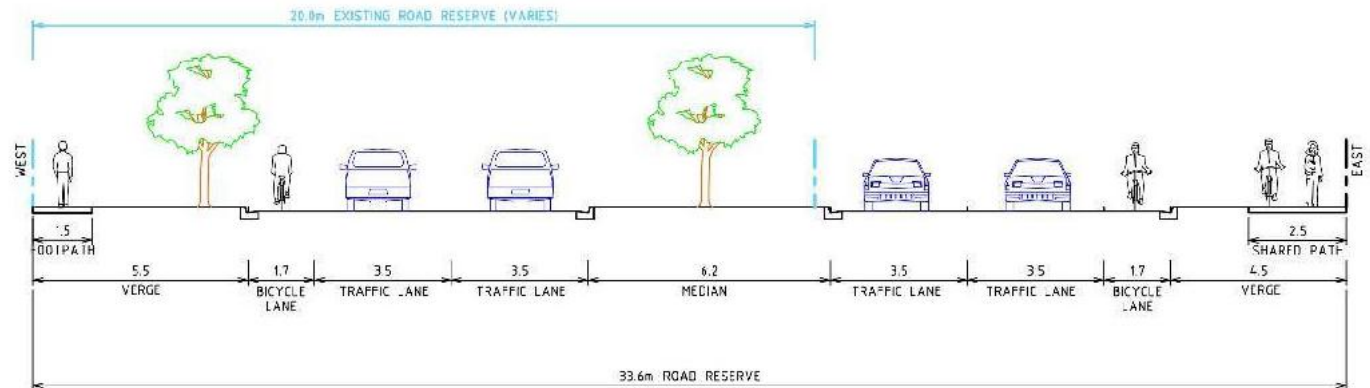
**HORSESHOE BEND ROAD – SOUTH: CATHOLIC SCHOOL SITE TO BURVILLES ROAD (INTERIM)**



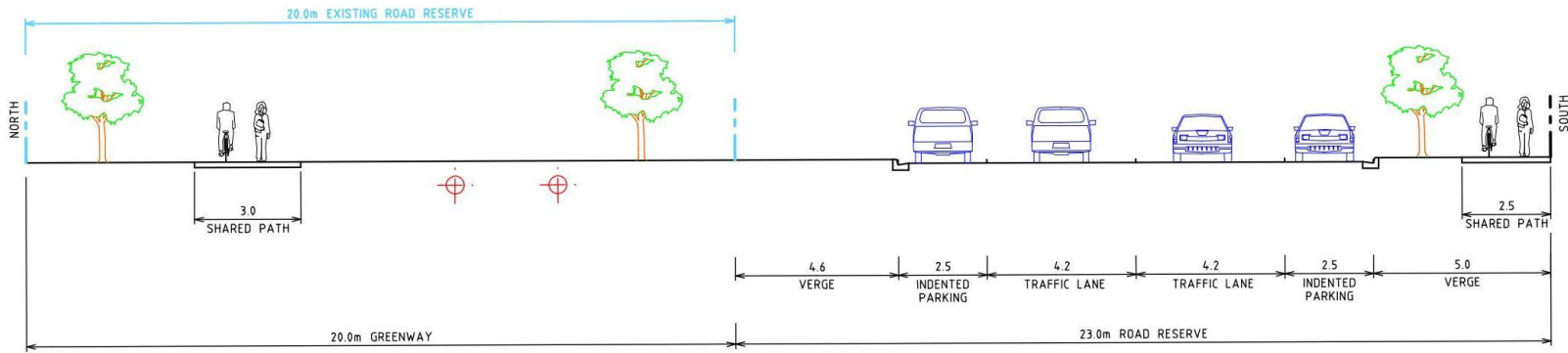
**FIGURE S**  
**HORSESHOE BEND ROAD – SOUTH OF RESERVE ROAD TO NEIGHBOURHOOD ACTIVITY CENTRE**  
**(ULTIMATE)**



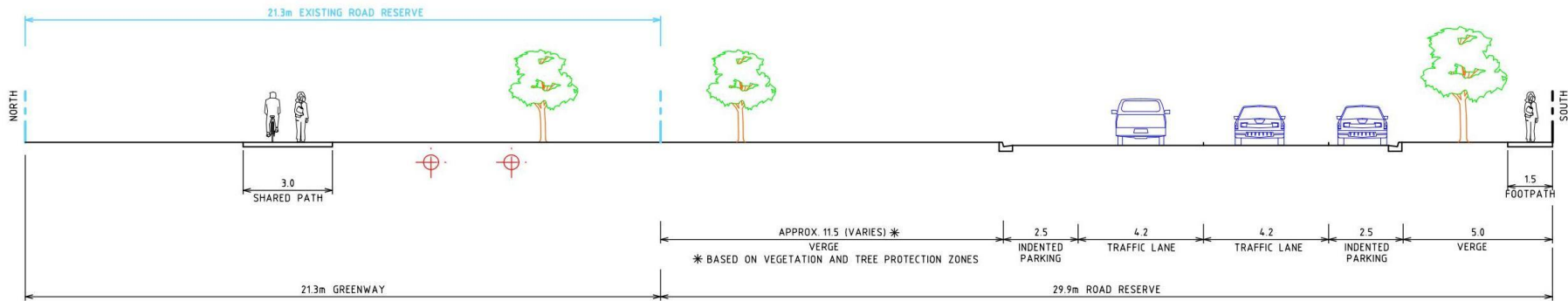
**FIGURE T**  
**HORSESHOE BEND ROAD – NORTH: NEIGHBOURHOOD ACTIVITY CENTRE TO CATHOLIC SCHOOL SITE (ULTIMATE)**



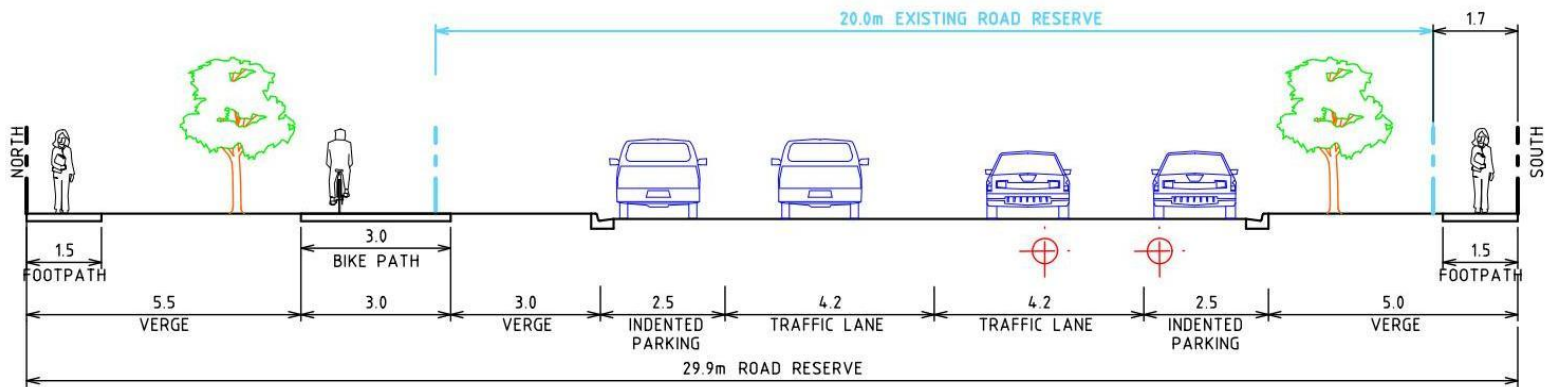
**FIGURE U**  
**HORSESHOE BEND ROAD – SOUTH: CATHOLIC SCHOOL SITE TO BURVILLES ROAD (ULTIMATE)**



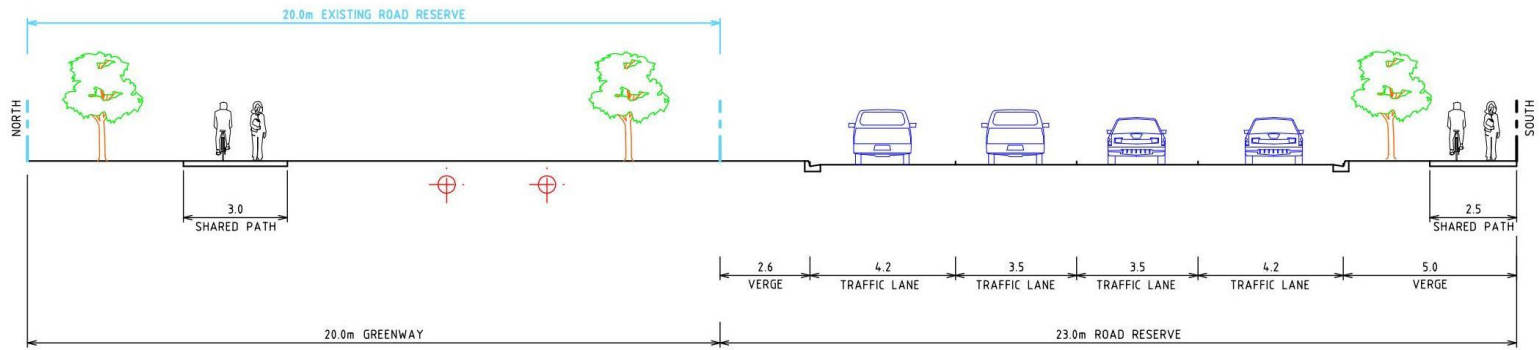
**FIGURE V**  
**BOUNDARY ROAD: SURFCOAST HIGHWAY TO BARWARRE ROAD**  
**(INTERIM)**



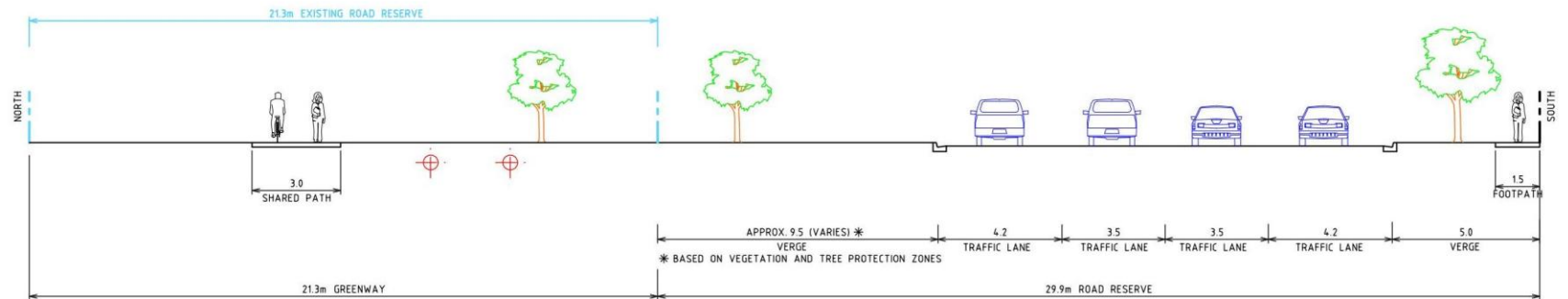
**FIGURE W**  
**BOUNDARY ROAD: BARWARRE ROAD TO HORSESHOE BEND ROAD**  
**(INTERIM)**



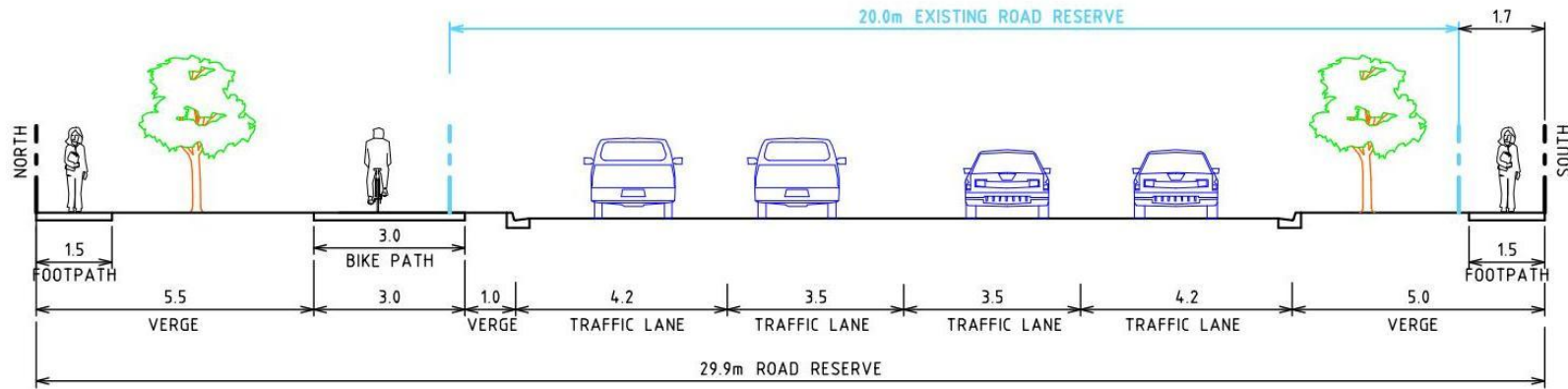
**FIGURE X**  
**BOUNDARY ROAD: HORSESHOE BEND ROAD TO BARWON HEADS ROAD**  
**(INTERIM)**



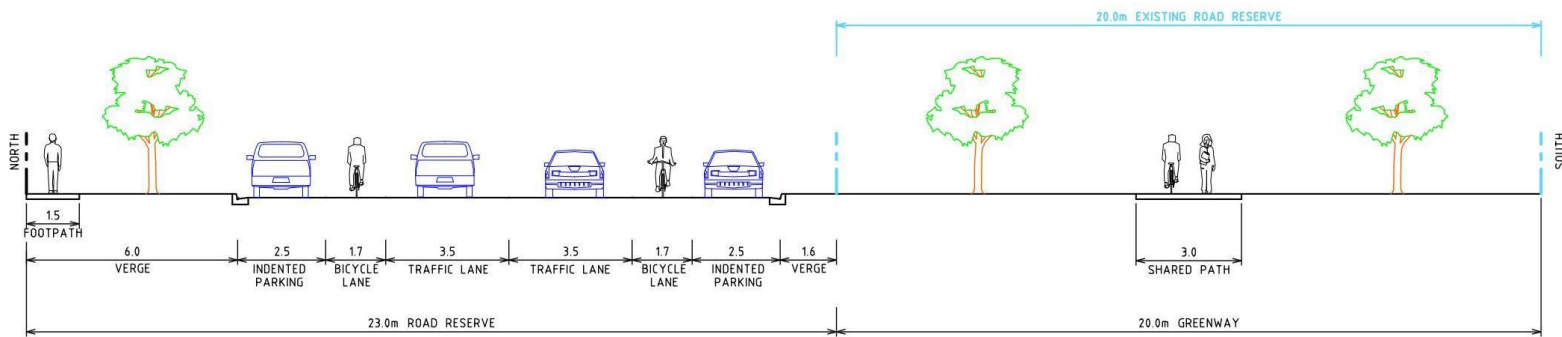
**FIGURE Y**  
**BOUNDARY ROAD: SURFCOAST HIGHWAY TO BARWARRE ROAD**  
**(ULTIMATE)**



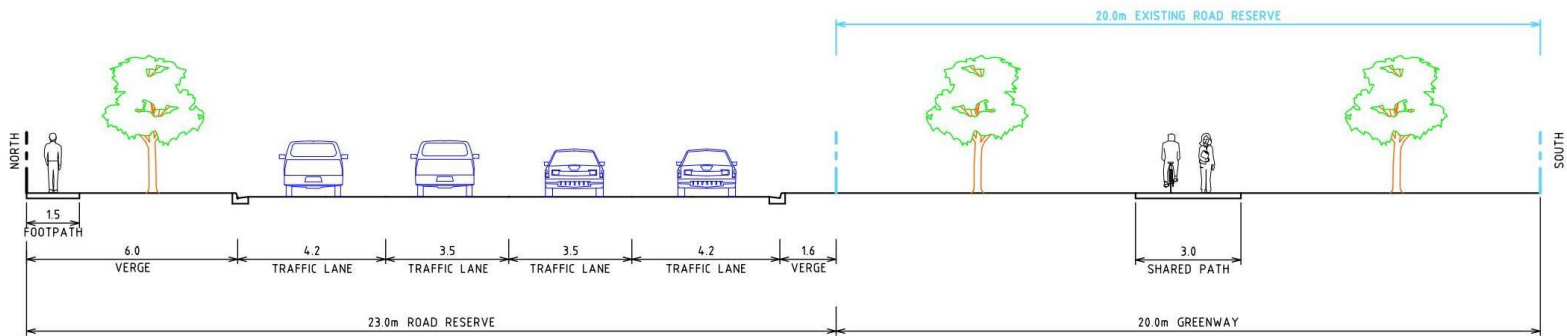
**FIGURE Z**  
**BOUNDARY ROAD: BARWARRE ROAD TO HORSESHOE BEND ROAD**  
**(ULTIMATE)**



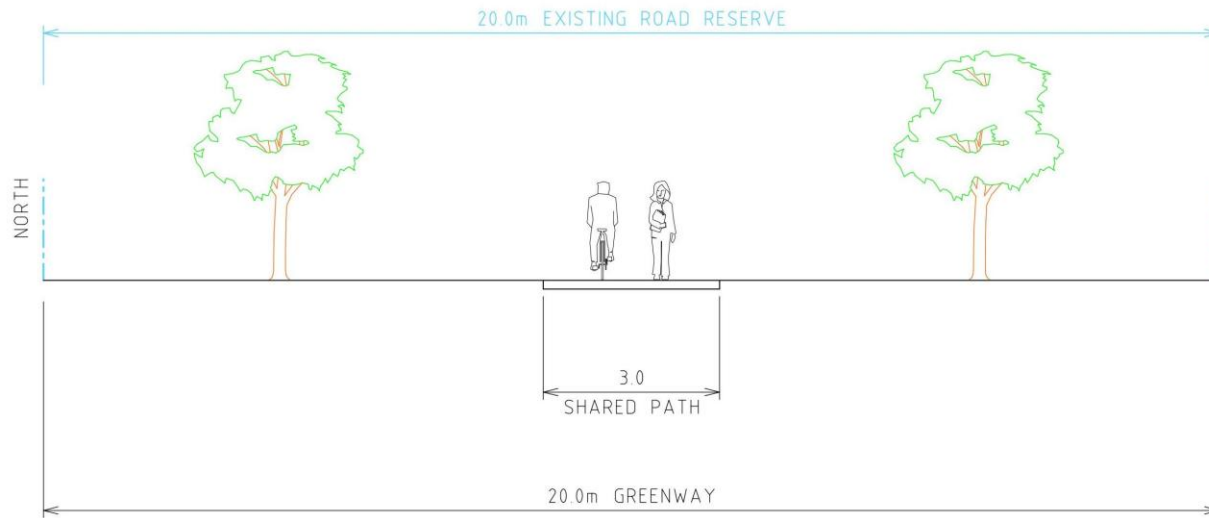
**FIGURE Z1**  
**BOUNDARY ROAD: HORSESHOE BEND ROAD TO BARWON HEADS ROAD**  
**(ULTIMATE)**



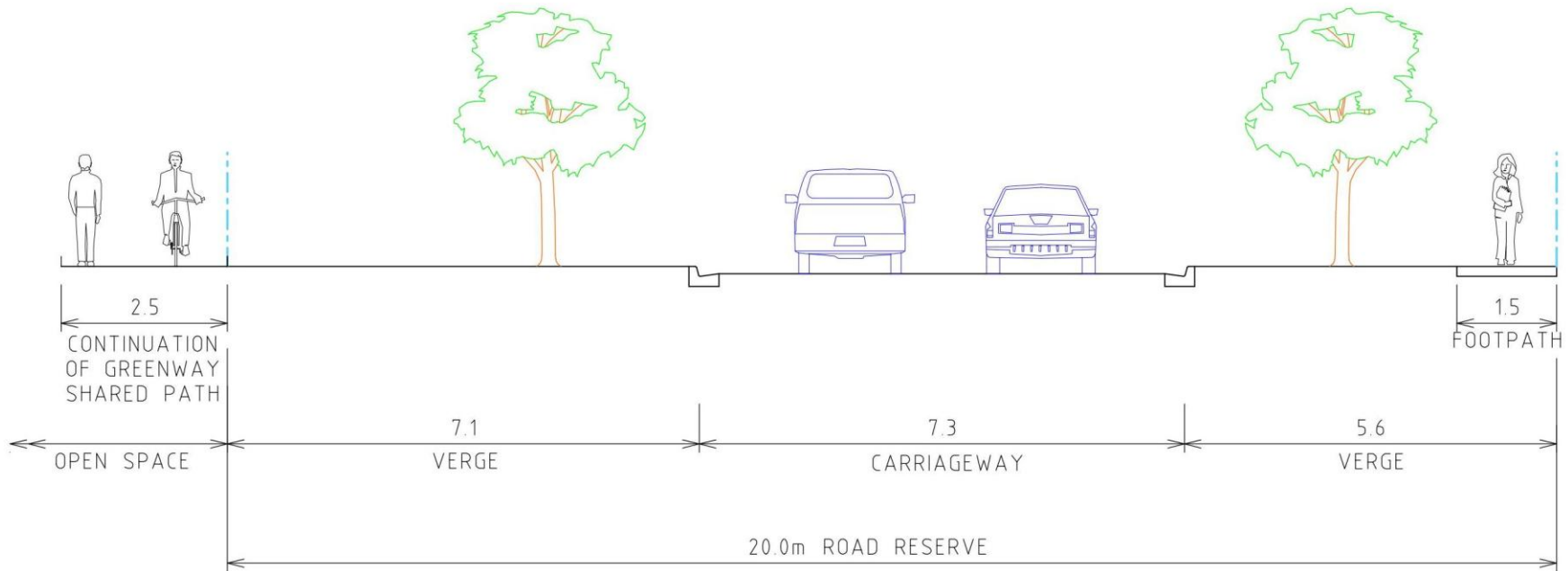
**FIGURE Z2**  
**BURVILLES ROAD**  
**(INTERIM)**



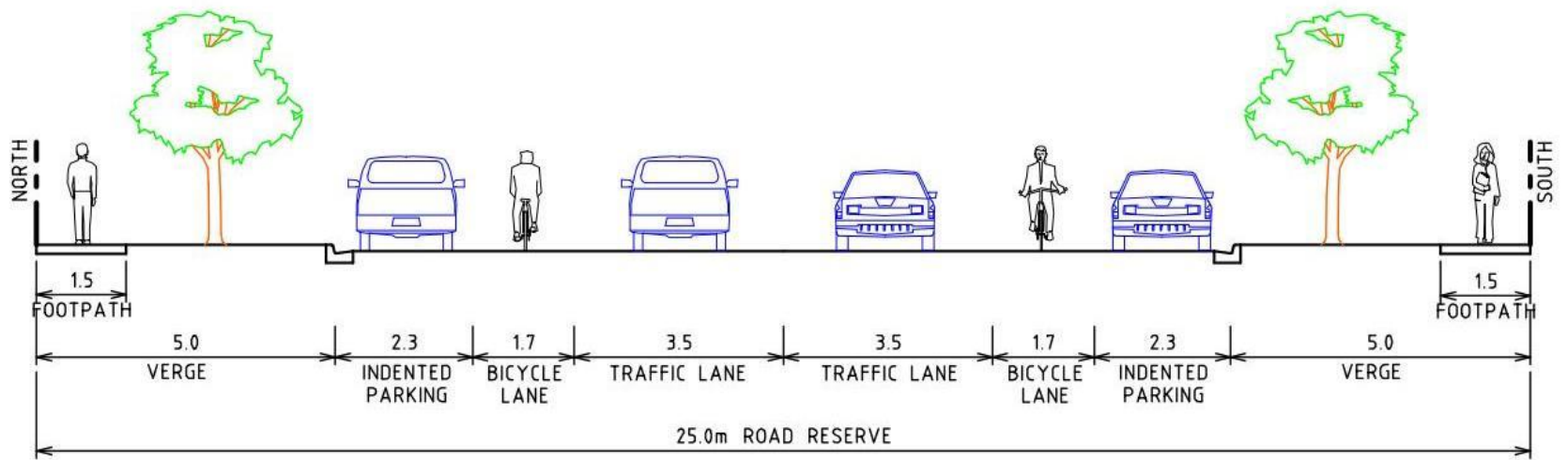
**FIGURE Z3**  
**BURVILLES ROAD**  
**(ULTIMATE)**



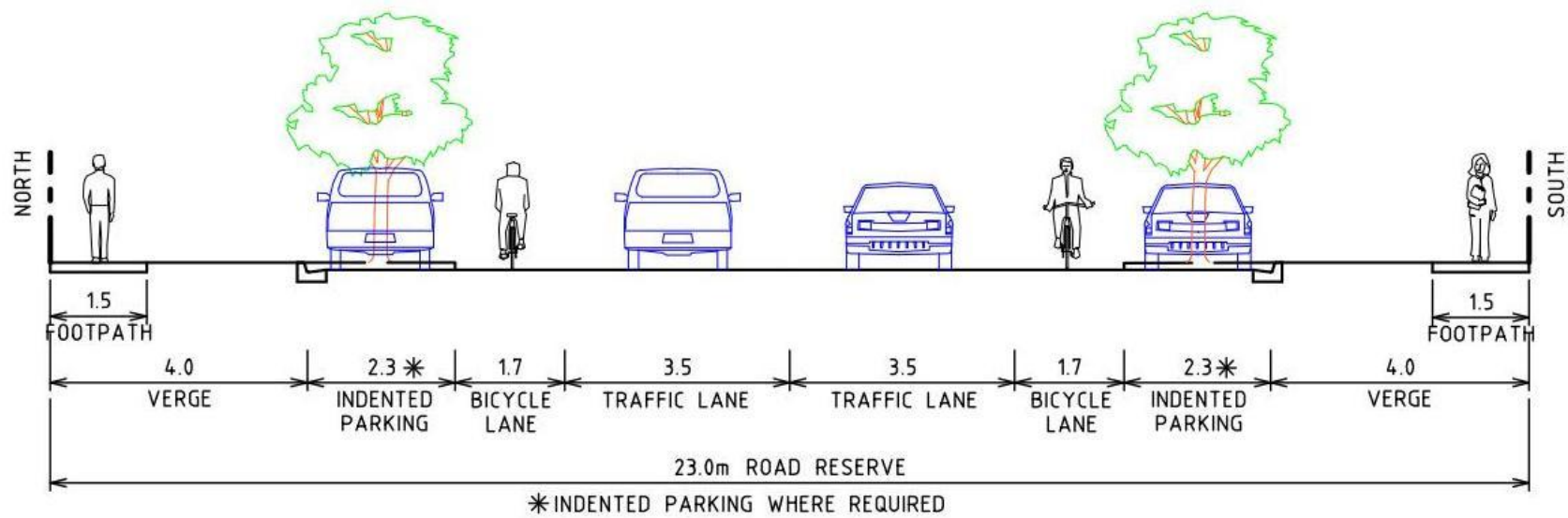
**FIGURE Z4**  
**BARWARRE ROAD/SPARROVALE ROAD GREENWAY**



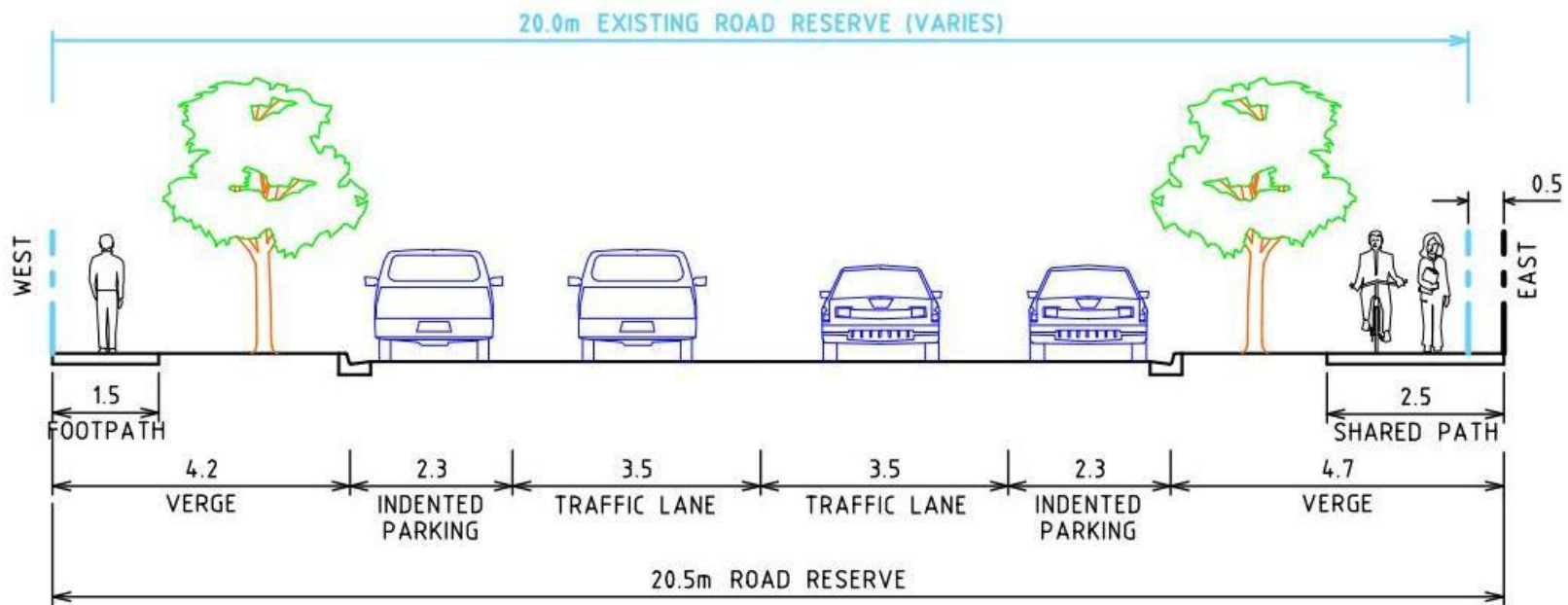
**FIGURE Z5**  
**BARWARRE ROAD: SOUTH OF GREENWAY**



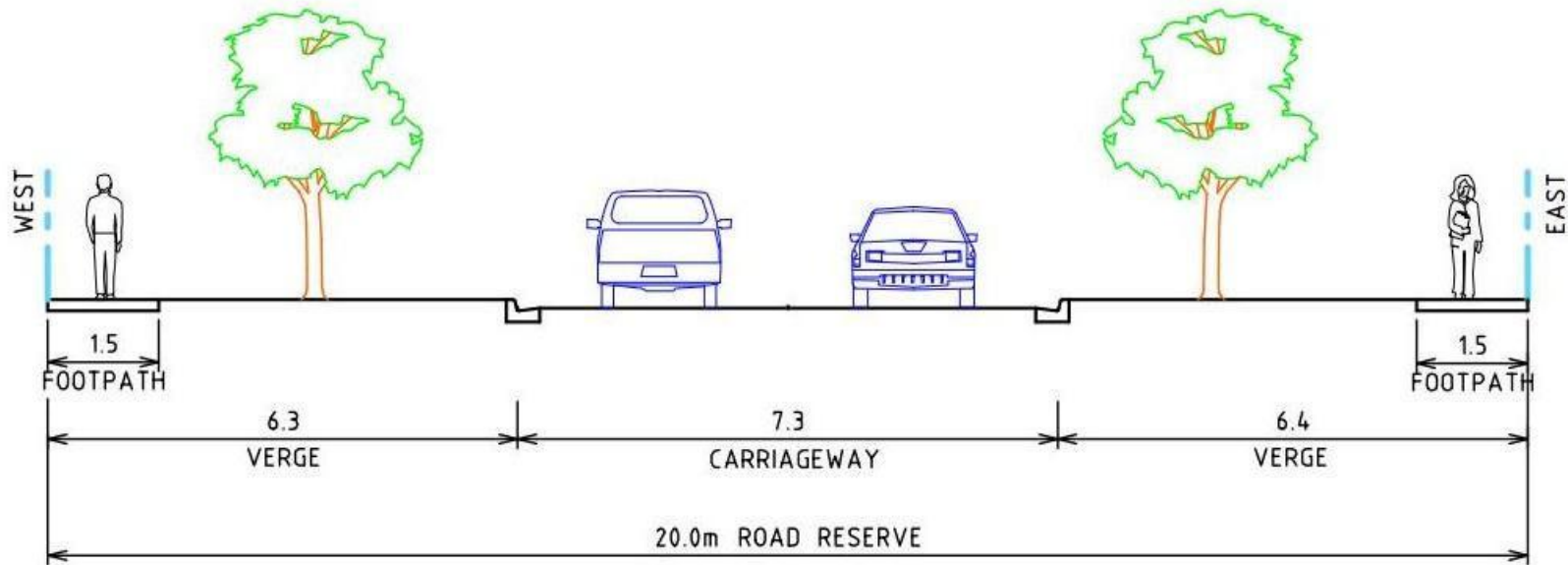
**FIGURE Z6**  
**TYPICAL CONNECTOR ROAD (A – F)**



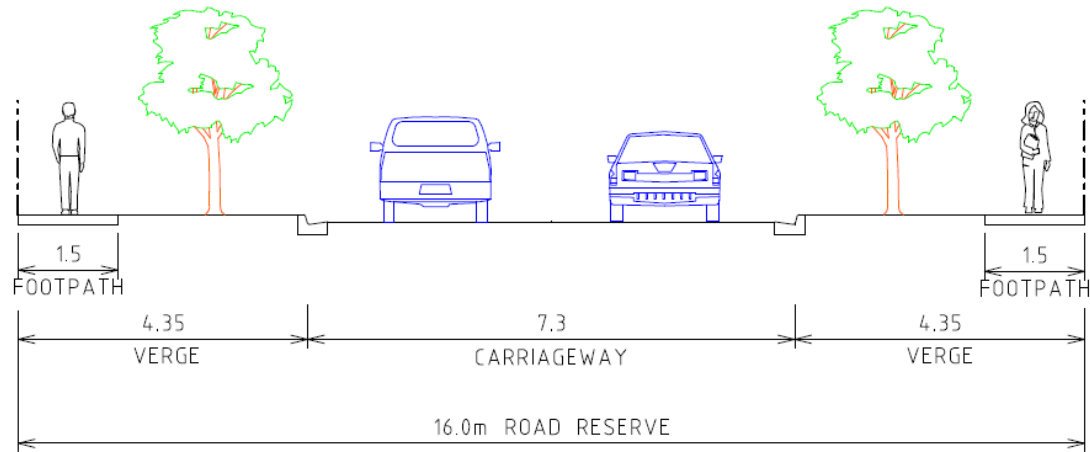
**FIGURE Z7**  
**CONNECTOR ROAD 'G'**



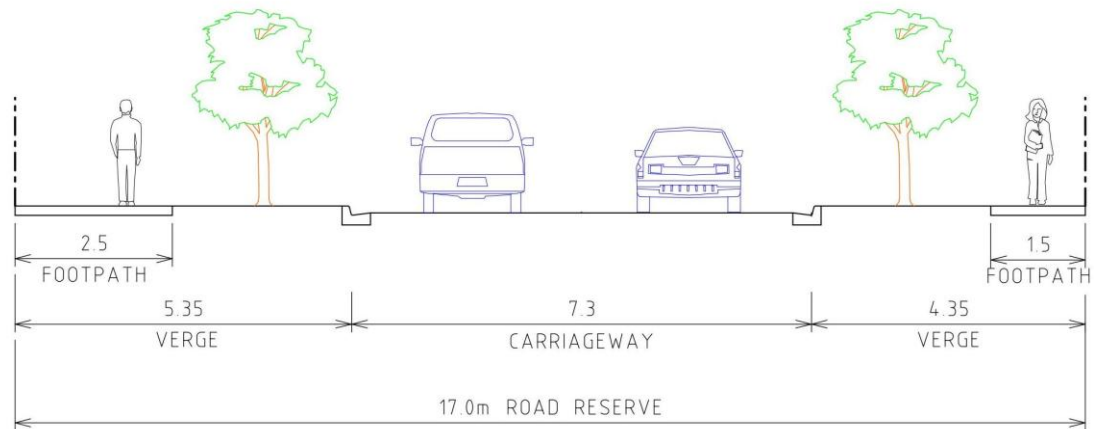
**FIGURE Z8**  
**BATTEN ROAD: SOUTH OF BOUNDARY ROAD**



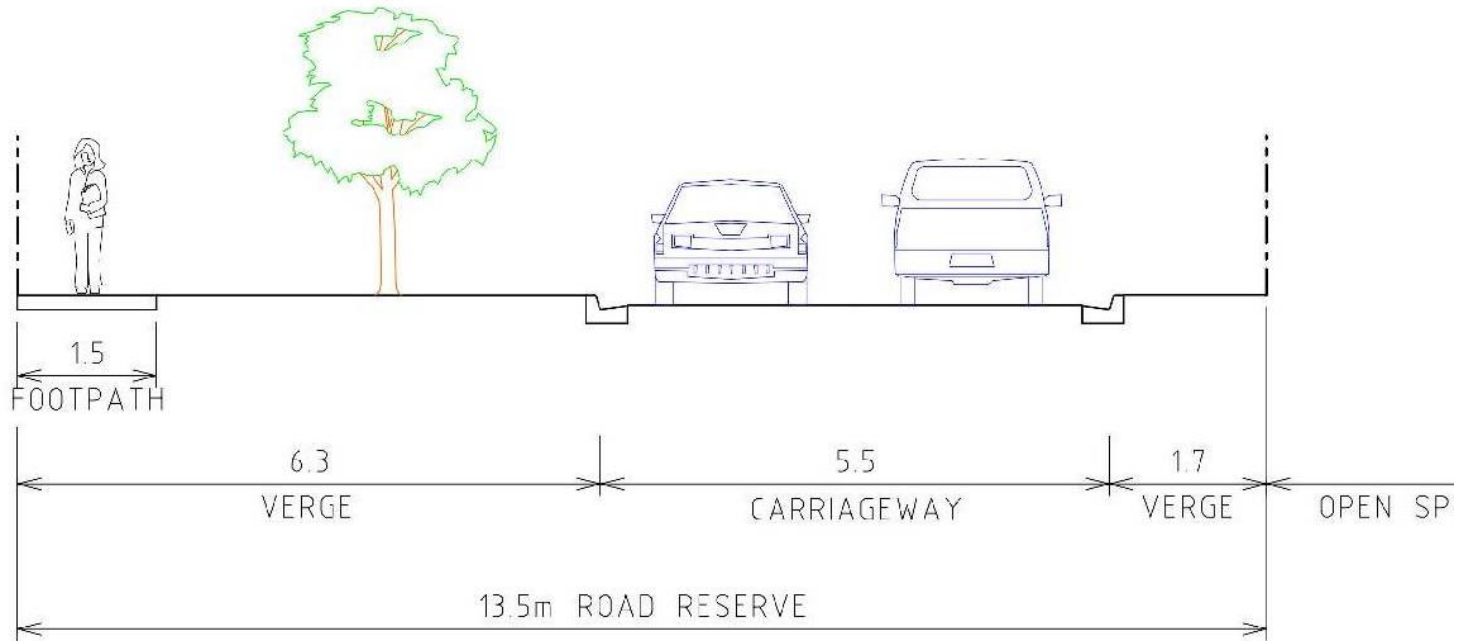
**FIGURE Z9**  
**LOCAL STREET: EXISTING ROAD RESERVE**



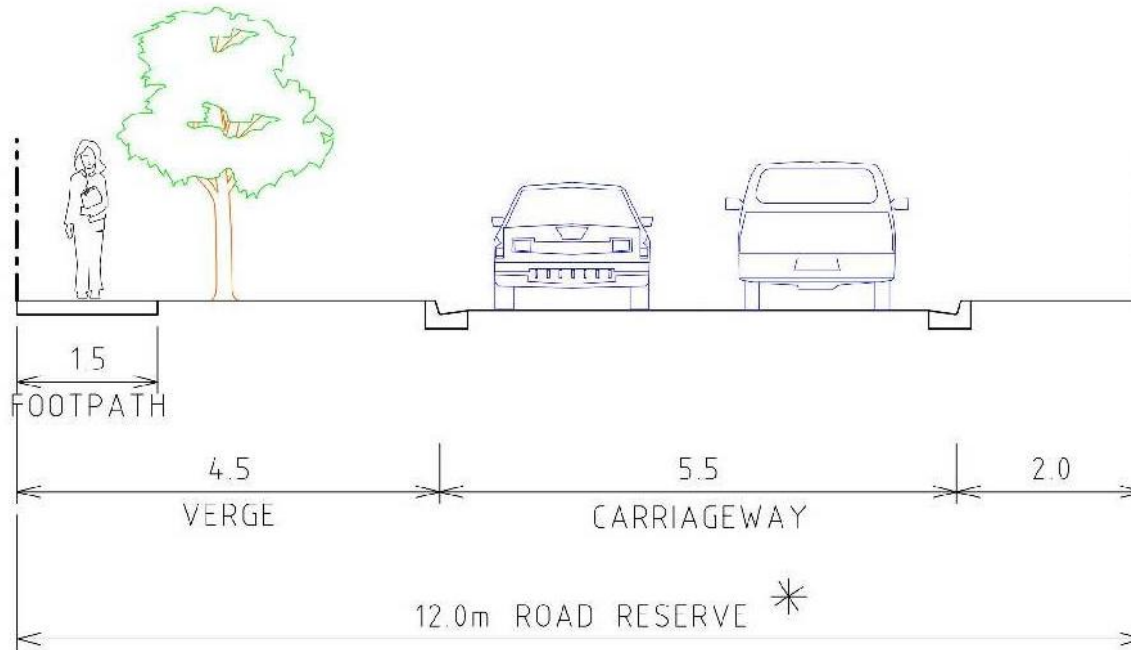
**FIGURE Z10A**  
**TYPICAL LOCAL STREET**



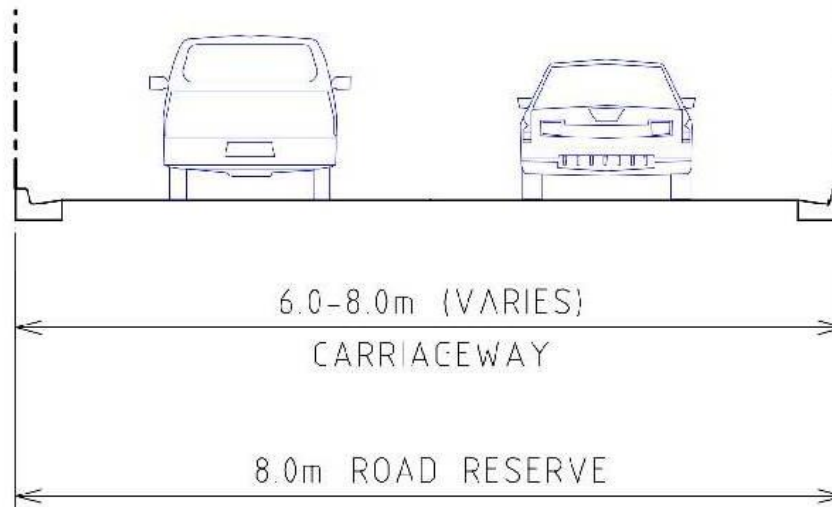
**FIGURE Z10B**  
**TYPICAL LOCAL STREET (WITH SHARED PATH)**



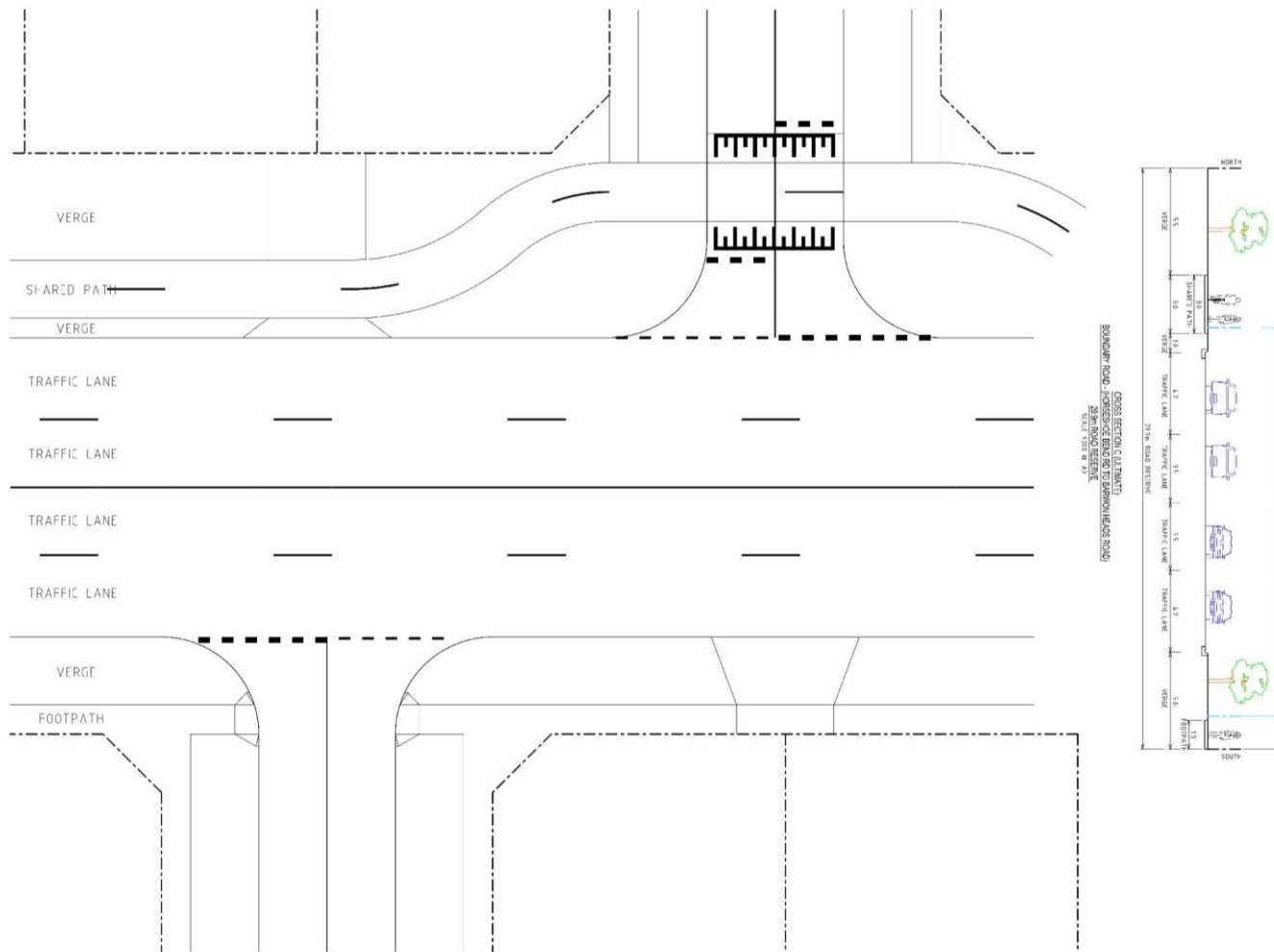
**FIGURE Z11**  
**LOCAL ACCESS STREET: ADJACENT TO OPEN SPACE / GREENWAYS / CONSERVATION**



**FIGURE Z12**  
**TYPICAL LOCAL ACCESS STREET AS SERVICE ROAD TO HIGHWAYS**



**FIGURE Z13**  
**ACCESS LANE CROSS SECTION**



**FIGURE Z14**  
**INTERSECTION PRIORITY FOR OFF-ROAD CYCLE PATHS**



## **APPENDIX 9**

### **HBP STORMWATER MANAGEMENT STRATEGY - IMPLEMENTATION GUIDELINES**

The Horseshoe Bend Precinct Surface Water Management Strategy (HBP SWMS V7, July 2013), sets out the requirements for main drainage and floodplain management across the precinct. A detailed schedule of main drainage assets and waterways that have to be constructed (and design requirements for same) is provided in tabular and plan form (refer also to Plan 18 - Main Stormwater Drainage Network and Plan 18A – Sparrovale Stormwater Management Plan). Costings for main drainage works are included in the DCP.

Applications for development approval for land within the HBP may include construction of permanent works included in the DCP, or temporary works to adequately service 'out-of-sequence' developments and/or to defer major works expenditure.

The following principles will be applied by CoGG in responding to all applications:

- Development proponents must demonstrate how the development proposal affects, or is affected by the requirements of the HBP SWMS.
- Development proponents must provide Stormwater Environmental Management Plans that respond to any relevant issues nominated in the HBSWMS and, more specifically, in accordance with the Application Requirements nominated in Urban Growth Zone – Schedule 5 (UGZ5).
- Where development proposes construction of interim/temporary works or development is to commence prior to the commissioning of the Sparrovale wetlands, the following guidelines are to be applied in addition to the considerations nominated above.

## **1. HBPSWMS - Staging and Implementation Considerations**

There are two scenarios to consider for staging and implementation of development in the HBP:

- Out-of-sequence development;
- Development and management of water quality prior to the commissioning of the Sparrovale Wetlands.

Section 6.8 of the SWMS discusses staging/implementation considerations:

- 6.8.1 General Principles;
- 6.8.2 Some Specific Recommendations for the HBP;
- 6.8.3 Development Application Requirements and Compliance.

### **1.1 Principles for Out-of-Sequence Development**

- It is possible to split Sediment Basin and Retarding Basin's (SBRB's) or Wetland Retarding Basin's (WLRB's) into segments to better suit staged or 'out-of-sequence' development, or to resolve property ownership demarcations. Subject to suitable arrangements being put in place to the satisfaction of the Responsible Authority to cover any capital cost or ongoing cost penalties and the same performance standards being met, SBRB's or WLRB's may be split to better suit development layouts or land ownership differences.

- Any temporary drainage management facilities that may be required to service “out-of-sequence” development (to protect downstream undeveloped land and/or the environment) are to be fully funded by the proponents of that development without reimbursement from the DCP, unless they are part of ultimate drainage design works (e.g., partial excavation of a larger SBRB or waterway or wetland that are to be funded as part of the DCP).
- Methodology to be used in design of temporary drainage management assets shall accord with that specified in Section 6.8.3 of the HBP SWMS (repeated at the end of this section).

## **1.2 Development Prior to the Commissioning of the Sparrovale Wetlands**

### **(a) Sparrovale North Catchment:**

- Development west of Horseshoe Bend Road can proceed in advance of works downstream, subject to adequate temporary site management facilities being constructed to the satisfaction of the Responsible Authority in accord with Section 6.8.3 of the HBP SWMS.
- Subject to prior completion of the linear SBRB, upgrading of the culvert outfall under Barwon Heads Road can be deferred until development in the upstream catchment exceeds about 25% of the developable area.
- Upgrade of the culverts under Barwon Heads Road will trigger the need for the works downstream to the proposed Sparrovale Wetland system to be completed in order to gain the necessary lowered invert level. Hence these works must be deferred until the Sparrovale Wetlands are acquired.

### **(b) Sparrovale South Catchment:**

- Development west of Horseshoe Bend Road can proceed in advance of works downstream, subject to adequate temporary site management facilities being constructed to the satisfaction of the Responsible Authority in accord with Section 6.8.3 of the HBP SWMS.
- Upgrade of the culverts under Barwon Heads Road will trigger the need for the works downstream to the proposed Sparrovale Wetland system to be completed in order to gain the necessary lowered invert level. Hence these works must be deferred until the Sparrovale Wetland is commissioned.

### **(c) Reserve Road Catchment**

- If initial stages of land development are sufficiently remote from the Reserve Rd SBRB site then temporary site management facilities may be constructed to the satisfaction of the Responsible Authority in accord with Section 6.8.3 of the HBP SWMS.
- Any development west of Barwarre Road abutting the rail corridor must make provision for and include the diversion pipe capacity from Boundary Road.

- Development east of Barwarre Road near the 4D corridor must include the diversion pipe capacity and will likely trigger the need for the Reserve Road SBRB to be constructed.
- Timing of the main outfall diversion pipeline works from the Reserve Road SBRB back into the Sparrovale North drainage system will be dependent on rate and location of development.
- If development in the Sparrovale North catchment had not proceeded to the point where the Sparrovale North SBRB had been built, then it may be feasible to provide a temporary low flow outlet from the Reserve Road SBRB to the existing drain at Reserve Road/Drews Road intersection.
- Along the 4D alignment frontage it may be necessary to fill to create a barrier against inflow of overland flows from the Trifilos Drain catchment into the HBP development land. Such filling can be created by forming a temporary levee on the boundary (wrapping around the upstream end to create the flood barrier) or it can be formed as general raising of the verge roads/allotments. Such works do not form part of the DCP and are considered as temporary works to facilitate development within the HBP, in advance of the 4D road works.

The permanent drainage management assets in the HBP are focussed on sediment control and peak flow mitigation. They rely on the Sparrovale Wetlands for delivery of stormwater nutrient removal to achieve best practice standards.

- While the Sparrovale Farm wetland system and appropriate downstream drainage infrastructure is not in place, development must provide temporary drainage infrastructure that complies with specified best practice requirements for water quality and quantity/rate of stormwater discharge to the satisfaction of the Responsible Authority, in accord with Section 6.8.3 of the HBP SWMS.

## **2. Methodology for Design of Temporary Drainage Management Assets**

Best practice water quality performance is to be demonstrated using the MUSIC model.

For hydrologic assessments (flow and storage computations), the RORB model or equivalent is to be used.

For hydraulic modelling of one-dimensional flow systems the HEC-RAS model will suffice for water level, velocity and channel shear stress computations. For more complex hydraulic situations (generally wider floodplains), two-dimensional hydrodynamic models are to be used such as TuFlow or Mike 21 or their equivalents.

Where no gauged streamflow data exists to allow peak flows for existing rural conditions to be derived, the Rational Method may be applied for this purpose using Adams equation for estimation of time of concentration with matched runoff coefficients, all in accord with the recommendations set out in Australian Rainfall and Runoff (ARR). The 10 year ARI runoff coefficients provided in Volume 2 of ARR should be used and not those listed in other references such as VicRoads Design Manuals.



Unless specifically directed otherwise by CoGG:

- temporary drainage management works are to be sized to maintain existing conditions peak flows for all events up to and including 10 years ARI.
- best practice water quality objectives must be achieved prior to water exiting from the boundaries of the relevant development. This allows for options such as overland flow dispersal across vegetated areas within a larger development to be implemented.

Bioretention or infiltration systems will not be accepted as temporary sediment management works for any development application.



## **APPENDIX 10**

### **ACRONYMS AND GLOSSARY**

OAAV	The Office of Aboriginal Affairs Victoria
ABS	Australian Bureau of Statistics
HBNVPP	Armstrong Creek Horseshoe Bend Native Vegetation Precinct Plan
HBP	Horseshoe Bend Precinct
HBPDCP	Horseshoe Bend Precinct Development Contributions Plan
HBPSP	Horseshoe Bend Precinct Structure Plan
ACUGA	Armstrong Creek Urban Growth Area
ACUGP	Armstrong Creek Urban Growth Plan, Volume 1, May 2010 (amended September 2012)
CCMA	Corangamite Catchment Management Authority
CoGG	City of Greater Geelong
DEECD	Department of Education and Early Childhood Development
DEPI	Department of Environment and Primary Industries (formerly the Department of Sustainability and Environment)
DPCD	Department of Planning and Community Development
EVC	Ecological Vegetation Class
G21	Geelong Region Alliance
GDA	Gross Development Area
IIDP	Armstrong Creek Integrated Infrastructure Delivery Plan, March 2009
LOT	Large Old Tree
MOT	Medium Old Tree
NDA	Net Developable Area
PPTN	Principal Public Transport Network
PSP	Precinct Structure Plan
RDA	Residential Development Area
SIIDP	Armstrong Creek Social Interagency Infrastructure Delivery Plan, February 2009
SOT	Small Old Tree
Sparrovale Wetlands	109-215 Sparrowvale Road Conewarre (Lot 1 TP 6739X Vol 9966 Fol 239) 1-87 Groves Road Conewarre (Lot 1 LP 200409Q Vol 09629 Fol 685)
VLOT	Very Large Old Tree

Term	Definition
<b>Active public open space</b>	Land set aside for the specific purpose of active recreation, including playing fields and courts and their associated buildings and infrastructure.
<b>Affordable Housing</b>	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 the income of that household.
<b>Bulk earthworks</b>	The general shaping of land to levels suitable as a base for the construction of ovals and other planned recreation activities.
<b>Co-location</b>	Locating land uses adjoining each other or very nearby to enable complementary programs, activities and services and shared use of resources and facilities.
<b>Community facilities</b>	Infrastructure provided by government or non-government organisations for accommodating a range of community support services, programs and activities. This includes facilities for education and learning (such as childcare, pre-schools, government and non-government primary and secondary schools, universities, adult learning centres), health and community services (such as maternal and child health, hospitals, aged care, doctors, dentists, family and youth services, specialist health services); community (such as civic centres, libraries, neighbourhood houses), arts and culture (such as galleries, museums, performance space), sport, recreation and leisure (such as public open space, swimming pools and other recreation), justice (such as law courts), voluntary and faith (such as places of worship) and emergency services (such as police, fire and ambulance stations).
<b>Conventional Density Housing</b>	Housing with average density of 10 to 15 dwellings per net developable hectare.
<b>Developer</b>	The proponent for the proposed development of land or the planning permit applicant for a proposed new land use or development.

Term	Definition
<b>Development</b>	Includes: a) the construction or exterior alteration or exterior decoration of a building; and b) the demolition or removal of a building or works; and c) the construction or carrying out of works; and d) the subdivision or consolidation of land, including buildings or airspace; and e) the placing or relocation of a building or works on land; and f) the construction or putting up for display of signs or hoardings;
<b>Development Contributions Plan</b>	Document that sets out the contributions expected from each individual landowner to fund infrastructure and services. Refer to Part 3B of the Planning and Environment Act 1987.
<b>Equalisation – unencumbered land for public open space</b>	Each property owner in HBP must provide land or cash-in-lieu equal to 10 per cent of the net developable area of HBP, at a pro-rata rate equivalent to the net developable area of that property. Plan 19 and the land use budget in section Appendix 1 of this HBPSPP provide jointly the relevant details for each property. A property with greater than 10 per cent unencumbered public open space will receive compensation for the value of the land above 10 per cent. A property with less than 10 per cent unencumbered public open space will be required to pay cash-in-lieu equal to the value of the land less than 10 per cent.
<b>Encumbered public open space</b>	Land for public open space that is constrained for development purposes by easements for electricity transmission lines, sewers or gas, by retarding basins or wetlands, by landfill and by habitat conservation areas. This land may be used for a range of activities including walking / cycling trails and active recreation.
<b>Framework Plan</b>	Armstrong Creek Urban Growth Plan - Framework Plan May 2010
<b>Frontage</b>	The road alignment at the front of a lot. If a lot abuts two or more roads, the one to which the building or proposed building has its main

Term	Definition
	pedestrian entry.
<b>Gross residential density</b>	Gross residential density means the number of dwellings per hectare of land excluding encumbered land, arterial roads and other roads with four or more lanes.
<b>High Density Housing</b>	Housing with an average density of more than 30 dwellings per net developable hectare.
<b>Job year</b>	The estimated number of jobs over the life of the construction project plus continuing multiplier effects, for the equivalent of one year.
<b>Linear public open space network</b>	Corridors of public open space such as along waterways that link nodes of public open space or other activity areas or community facilities.
<b>Native vegetation precinct plan</b>	A plan relating to native vegetation within HBP that must be implemented in conjunction with the HBSP. The ACHBNVPP is incorporated into the Scheme and listed in the schedule to Clause 52.16.
<b>Medium density housing</b>	Housing with an average density of 16 to 30 dwellings per net developable hectare.
<b>Net development area</b>	Total amount of land within HBP that is made available for development of housing and employment buildings, including lots, local and connector streets. Total HBP area minus community facilities, schools and educational facilities and open space, arterial roads and encumbered land. Small local parks defined at subdivision stage are included in the net developable area. Net developable area may be expressed in terms of hectare units (that is, net developable hectare (NDHa)).
<b>Net residential area</b>	As for net developable area but excludes neighbourhood activity centres, non-government schools and other existing or permitted non-residential land uses (such as golf course sites). Net residential area may be expressed in terms of hectare units (that is, net residential hectare (NRHa)).

Term	Definition
<b>Passive public open space</b>	Public open space that is set aside for parks, gardens, linear corridors, habitat conservation, natural systems, nature reserves, public squares and community gardens that are made available for passive recreation, play and unstructured physical activity including walking, cycling, hiking, revitalisation, contemplation and enjoying nature.
<b>Practical Retention</b>	Vegetation that is approved for removal, but needs to be considered for retention as part of a design response at subdivision level.
<b>Q10 flood event</b>	In relation to land, is the area that may be flooded by the Barwon River or Armstrong Creek topping their banks in a rainfall event that has a 10 per cent chance statistically of occurring in any year or, looking at it another way, is the area that statistically would be affected by such a flood on a once in 10 years average return interval.
<b>Q100 flood event</b>	In relation to land, is the area that may be flooded by the Barwon River or Armstrong Creek topping their banks in a rainfall event that has a 1 per cent chance statistically of occurring in any year or, looking at it another way, is the area that statistically would be affected by such a flood on a once in 100 years average return interval.
<b>Ramsar</b>	A convention on wetlands, which is a global inter-governmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975.
<b>Scheme</b>	Greater Geelong Planning Scheme
<b>Social Housing</b>	Non-profit housing owned and managed for the primary purpose of meeting social objectives such as affordable rents, responsible management, security of tenure and good location in relation to employment services. The term encompasses public housing and includes housing owned or managed by the community.

Term	Definition
<b>Sparrovale wetlands</b>	The name given to land at 109-215 Sparrowvale Road (Sparrovale Farm – 436 hectares) and 1-87 Groves Road (Cold Winds – 87 hectares) Armstrong Creek. The land forms part of the Barwon River floodplain.
<b>Water Sensitive Urban Design</b>	A sustainable water management approach that aims to provide water-quality treatment, flood management to reduce the pollution carried to our waterways and more sustainable urban landscapes. Key principles include minimising water resistant areas; recharging natural groundwater aquifers (where appropriate) by increasing the amount of rain absorbed into the ground; encouraging onsite re-use of rain; encouraging on-site treatment to improve water quality and remove pollution and using temporary rainfall storage (retarding basins / wetlands) to reduce the load on drains and improve landscape viability.

