



WARRNAMBOOL
CITY COUNCIL

MERRI RIVER LANDSCAPING GUIDELINES

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Council acknowledges the Eastern Maar Nation as the original custodians of the lands of this general area. Council also acknowledges the descendants of the ancestors of Aboriginal nations within the lands forming the Great South Coast and particularly the elders of the indigenous communities within both Warrnambool and this region.

DISCLAIMER

This publication may be of assistance to you, but Warrnambool City Council and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

These guidelines concentrate on the role of vegetation in the riparian zone with consideration to riverbank erosion, aesthetics and safety. A thorough site assessment is still necessary prior to planting and where required, further assessment of vegetation and fauna may be required before any landscaping is undertaken.

PREPARED BY:



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DEFINITIONS

TERM	DEFINITION
Core Riparian Zone	For the purpose of this guideline the Core Riparian Zone is defined as the extent of land set aside for public water frontage. This zone generally has a width in the range of 20 to 60 metres
Ecological Vegetation Class	<i>'Ecological Vegetation Classes (EVC) are the standard unit for classifying vegetation types in Victoria. EVCs are described through a combination of floristics, lifeforms and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating (DELWP, 2020³).'</i>
Direct Seeding	The sowing of seeds, either by hand or machine, directly to a revegetation area. (WCC, 2015)
Hand Planting	Using seedlings that have been raised in nursery tubes and are planted by hand at the prepared site. (WCC, 2015)
Landscaping	Landscaping is the process of improving the aesthetic appearance of an area and/or functional outcomes, which may include planting trees and shrubs for their aesthetic features. The aim of landscaping may also include ecological outcomes, such as habitat improvements.
Novel Ecosystem	Novel ecosystems are human-built. They are not naturally occurring and exist in places that have been altered in structure and function.
Revegetation	The improvement of the habitat value of existing remnant/native vegetation. This may occur through actions such as weed control, grazing exclusion, or reintroduction of missing vegetation elements. (WCC, 2015)
Riparian Zone	The riparian zone is a transition zone between the waterway and adjoining land. The riparian zone is important for maintaining the ecological functions of a watercourse and includes floodplains. There is no set distance for a riparian zone. It may be narrow or wide, up to hundreds of metres.
Toe	The river toe is the zone between the natural/ordinary water level and the top of the bank. This zone is susceptible to erosion due to water fluctuations and sometimes lack of vegetation.

ACRONYMS

AEP	Annual Exceedance Probability (used in definition of flood)
DELWP	Department Environment, Land, Water and Planning
EVC	Ecological Vegetation Class
EVCs	Ecological Vegetation Classes
FO	Floodway Overlay
FZ	Farming Zone
GHCMA	Glenelg Hopkins Catchment Management Authority
GRZ1	General Residential Zone – Schedule 1
HO	Heritage Overlay
PCRZ	Public Conservation and Resource Zone
PPRZ	Public Park and Recreation Zone
UFZ	Urban Floodway Zone
WCC	Warrnambool City Council
WSUD	Water Sensitive Urban Design

1. INTRODUCTION

The Merri River traverses the municipality of Warrnambool from the northern boundary to the ocean, extending approximately 26 kilometres from Woodford to Stingray Bay. The River flows through a mixture of farming, residential, rural living, industrial, recreational and coastal areas. These areas provide for a wide range of values and uses.

Ongoing revegetation and landscaping of the corridor will form an essential action in supporting and improving the environmental, social, cultural and economic values of the river. Revegetation of the corridor is collective effort by the community, local environment groups, Traditional Owners, developers, NGOs, Council, and other government agencies.

The purpose of the guidelines is to ensure a consistent and strategic approach to planting along the Merri River, ensuring that good ecological and social outcomes are achieved. The guidelines recognise that different sections of river and different contexts within a section of river require different approaches.

WHAT DO THESE GUIDELINES INCLUDE?

This document guides landscaping and revegetation along the banks of the Merri River and includes:

- Identification of character zones, ecological vegetation classes (EVCs) and context settings (eg. trails, recreation, farmland, development) along the river;
- Expected landscaping treatment for each character zone and the context settings;
- Plant species suggestions for zones, including photos; and
- Appropriate planting densities.

WHO ARE THESE GUIDELINES INTENDED FOR?

The Merri River Landscaping Guidelines has been prepared to assist staff from the Warrnambool City Council, Glenelg Hopkins Catchment Management Authority (GHCMA), developers, community groups and other individuals/groups planning for, and undertaking landscaping works along the Merri River in Warrnambool. These Guidelines applies to existing public land adjoining the River and also new public open space created next to the river as part of urban development.

Whilst this document provides a guide to landscaping the River, it is important that those involved in landscaping and revegetation works inform themselves of available information, including current strategies, policies and legislation applicable to waterway landscaping, as these are subject to change at any given time.

WHAT INFORMED THE GUIDELINES?

The Merri River Landscaping Guidelines draws on the various strategies, frameworks and policies that have been prepared on river revegetation in recent years and combines this information with an analysis of landscape character areas and contexts to provide a simple to read landscape guide.

It is also informed by the objectives and principles of the *Connecting the Merri – Merri River Parklands Framework*, which applies to the whole river. The Framework was developed by Council utilising feedback from previous community consultation and information in relevant adopted plans and strategies. The Framework ‘sets the vision, objectives and principles to guide future decision making in relation to the planning and management of the river corridor (WCC 2020).’

The relevant plans, policies, strategies and frameworks applicable to landscaping and revegetation of the Merri River include:

- Water for Victoria Water Plan – Victorian State Government
- Regional Riparian Action Plan: Glenelg Hopkins region, and Glenelg Hopkins CMA Regional Waterway Strategy – Victorian State Government
- Warrnambool Planning Scheme
- Warrnambool Council Plan 2017-2021 - WCC
- Warrnambool 2040 Community Plan – WCC
- Warrnambool Open Space Strategy 2014 – WCC
- Merri River Restoration Strategy – WCC (date unknown)
- Warrnambool Coastal Management Plan 2014
- Warrnambool Coastal Vegetation Management Plan 2013
- Green Warrnambool 2018
- A Strategy for Conserving Biodiversity in the Warrnambool Plain Bioregion, Victoria 2002
- Warrnambool City Council Revegetation Policy 2015; and
- Connecting the Merri – Merri River Parklands Framework – WCC 2020

WHAT IS THE PURPOSE OF THE GUIDELINES?

The focus of landscaping works along the Merri River is to enhance public spaces for the people who use them and to improve the natural environment and achieve better ecological outcomes for the river environs.

Aims of landscaping the Merri River:

- *To restore the watercourse.*
- *Create an adequate buffer of vegetation along the watercourse, ultimately improving water quality and helping to minimise erosion.*
- *Create wildlife corridors and increase biodiversity. Noval ecosystems and goals of the planting should be considered when developing a landscaping plan.*
- *Use local native species from the relevant EVCs. In most cases vegetation from the local EVCs should be selected, however this is not always what is present 'on the ground'. A thorough site assessment will need to be undertaken to determine which EVC is most likely. It is acknowledged that some species that are not indigenous to the riparian zone, have been approved for use by the Council and the GHCM.*
- *Ensure safety of park users, through incorporation of passive surveillance and adequate clearance beside paths.*

WHAT AREA IS COVERED BY THE GUIDELINES?

The Guidelines apply to public land or land intended to become public land in the riparian zone along the extent of the Merri River in the municipality of Warrnambool City, as shown on Map 1



HOW TO USE THESE GUIDELINES

Use these sections to help plan your revegetation project and select suitable species for planting.

1. ECOLOGY

- Use Map 2 on page 11 to work out the vegetation type (Ecological Vegetation Classes or 'EVCs') that may have previously occurred at your site.**
- The EVCs help guide appropriate species listed in the Merri River Plant List at Section 6 (pages 65 to 76).

2. CHARACTER ZONES (Pages 16 to 42)

- Use Map 3 and Map 4 on pages 17 and 18 to work out what character zone your site falls in.
- Read the associated character zone description on pages 16 to 42 which provides some site context and considerations when planning to design and carry out planting in the area.

3. CROSS SECTIONS (Pages 45 to 50)

- Refer to the cross section that matches the character zone you have identified for your site.
- This indicates an example of how a planting should look based on the context e.g. open areas next to paths, more open vegetation adjoining the river in viewlines etc.
- There may be more than one cross-section depending on whether your site includes important view-lines to preserve.

4. SPECIES SELECTION

- This section gives advice on selecting appropriate species plus a selection of photos of common species suitable for the Merri River corridor.
- Use in conjunction with the Merri River Plant List at pages 65 to 76.

5. MERRI RIVER PLANT LIST (Pages 65 to 76)

- This list guides what plants are suitable for a site based on the determined Character Zone, relevant EVCs, and whether the site includes a view-line or not.

6. LANDSCAPING AND REVEGETATION CHECKLIST

- A checklist for landscaping and revegetation proposals on public land (or land that will become publicly owned) within the Merri River corridor is provided at Appendix 1. Please make sure you have completed this checklist before submitting your proposal to Council for consideration.

NOTE ABOUT SELECTION OF EVCs:

**In many situations it will be appropriate to select more than one EVCs For example, when selecting EVCs for Woodford it would be appropriate to select EVC 53 which is shown running along the watercourse and the adjacent EVC 666. This is because there is naturally cross-over between two adjacent EVCs.

2. ECOLOGY

The Warrnambool Plain Bioregion covers most of Warrnambool City and the Victorian Volcanic Plain Bioregion is found to the north of Dennington.

Since European settlement, the vegetation in Warrnambool City has been substantially modified and today there is limited remnant vegetation remaining.

According to the Warrnambool City Council Revegetation Policy 2015,

‘there is less than 10% native vegetation remaining. Many of these areas provide necessary habitat for the regions threatened species.’

According to the State Government’s modelled data (DELWP, 2020), there are seven ecological vegetation classes (EVCs) that were likely to have been present prior to the 1750s along the Merri River environs, including:

- Damp Sands Herb-rich Woodland (EVC 3), Swamp Scrub (EVC 53) and Plains Grassy Woodland (EVC 55), Riparian Shrubland/Escarpment Shrubland/Grassy Woodland Mosaic (EVC 666) in inland areas; and
- Swamp Scrub/Aquatic Herbland Mosaic (EVC720), Damp Sands Herb-rich Woodland (EVC 3), Estuarine Wetland (EVC 10) and Coastal Dune Scrub (EVC 160) near the coastline.

Map 2 shows the modelled location of Ecological Vegetation Classes EVCs prior to the 1750s. (DELWP, 2020) (DELWP¹, 2020).

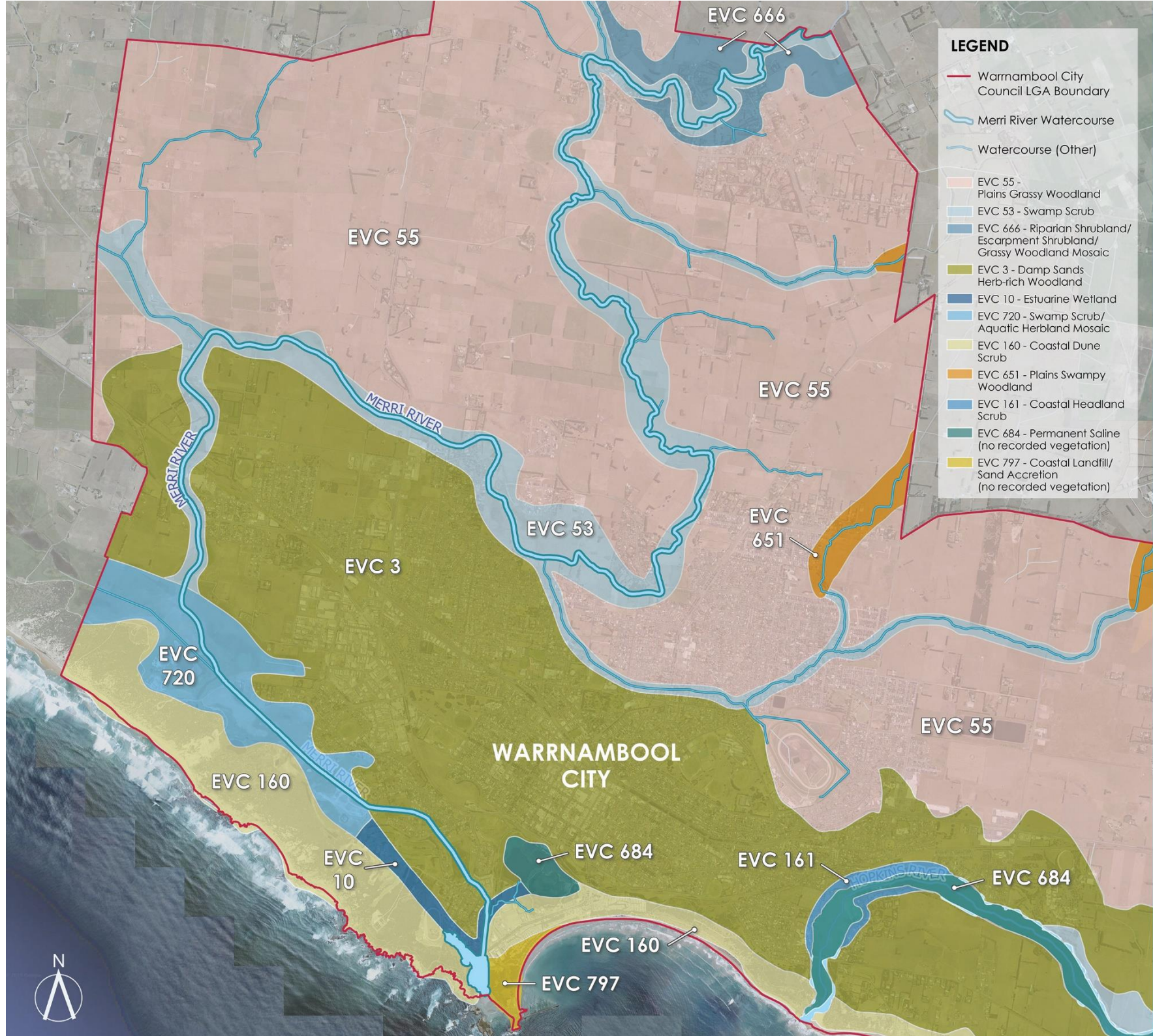
ABOUT THE WARRNAMBOOL PLAIN BIOREGION?

“Warrnambool Plain extends along the coast from Portland to Moonlight Head. It consists of a distinctive cliffed coastline and low calcareous dune formations, dissected by rivers, inlets and swamplands. The Cainozoic sediments and volcanic deposits dominate the area giving rise to sandy soils (Calcarosols and Tenosols and Podisols) on the dunes and cliffline, Brown earths and texture contrast soils (Dermosols, Sodosols) on the flat plain, and texture contrast soils and fertile peats (Hydrosols) in the swamplands. Much of the limestone has been overlain by more recent sediments, and between the limestone dunes, areas of swamplands are characterised by highly fertile peats and seasonal inundation. The area east of Warrnambool is characterised by deeper soils of volcanic origins overlying limestone, which are dissected by streams. (DELWP¹, 2020)”

Average annual rainfall ranges from 700-1000 mm (varying across the bioregion) and falls mainly during winter and spring. The average maximum temperatures range from the about the 20°C on the coast to about 27°C inland. In winter the average maximum temperatures are about 13°C along the coast and 10°C inland.

Vegetation is dominated by Lowland Forest and Herb-rich Foothill Forest ecosystems, and in the swamplands, Damp Sands Herb-rich Woodland/Damp Heathland/Damp Heathy Woodland, Damp Heathland/Damp Heathy Woodland, Damp Heath Scrub, Damp Sands Herb-rich Woodland and Swamp Scrub ecosystems.

Significant wetlands include the Yambuk and Lower Merri wetlands. The bioregion also encompasses the lower portions of the Surrey, Fitzroy, Eumeralla, Hopkins and Gellibrand Rivers (DELWP¹, 2020).”



MAP 2: MODELLED PRE-1750s ECOLOGICAL VEGETATION CLASSES

MERRI RIVER EVCs

According to the modelled pre-1750s EVC mapping, there were four EVCs that most likely lined the banks of the Merri River in Warrnambool. They include:

10 - ESTUARINE WETLAND

This EVC grows on anaerobic peat-rich muds at the edge of estuarine creeks, rivers and lagoons. The salinity of the water varies from fresh to brackish to salty depending on river flood and marine tide events.

Species typical of this EVC include graminoids and salt tolerant plants (halophytes), including Sea Rush (*Juncus kraussii* ssp. *australiensis*), Coast Tussock-grass (*Poa poiformis*), Twig-sedge (*Baumea juncea*) and Large Bindweed (*Calystegia sepium*). The landward edge of this EVC is often fringed by a layer of Swamp Paperbark (*Melaleuca ericifolia*). (DELWP¹, 2020)

53 - SWAMP SCRUB

This EVC is likely to have been the most common EVC along the inland length of the Merri River. The soil types vary in this EVC including loams, silts and peats. These soils are often inundated during the wetter months.

This EVC is characterised primarily by low-medium shrubs, up to 8m tall. Although sometimes trees such as Swamp Gum (*Eucalyptus ovata*) may emerge.

The vegetation is dominated by either Woolly Tea-tree (*Leptospermum lanigerum*), Scented Paperbark (*Melaleuca squarrosa*), Blackwood (*Acacia melanoxylon*) and Manuka

(*Leptospermum scoparium*). These shrubs often form a thick impenetrable thicket, but where light does penetrate the ground, there are a variety of species, including Common Beard-Heath (*Leucopogon virgatus*), various sedges, reeds and herbs and Soft Water-fern (*Blechnum minus*). (DELWP¹, 2020)

160 - COASTAL DUNE SCRUB

This EVC grows on the secondary dunes along the ocean and bay beaches and lake shores. Vegetation in this EVC is subject to salt spray and strong winds.

The shrubs, herbs, graminoids and climbers in this EVC tolerate the siliceous and calcareous sands found on the secondary dunes. This EVC is characterised primarily by low growing vegetation, up to 3m tall, including shrubs such as Seaberry Saltbush (*Rhagodia candolleana* ssp. *candolleana*) and Coast Wattle (*Acacia longifolia* ssp. *sophorae*) and understorey herbs and graminoids including Knobby Club-sedge (*Ficinia nodosa*) and the edible Karkalla (*Carpobrotus rossii*) and Bower Spinach (*Tetragonia implexicoma*). Bower Spinach is used as a valuable leaf vegetable by Traditional Owners. (DELWP¹, 2020)

720 - SWAMP SCRUB/AQUATIC HERBLAND MOSAIC

This EVC grows in and around wetlands on the landward side of the Coastal Dune Scrub. It is a mosaic of two EVCs, being Swamp Scrub (EVC 53) and Aquatic Herbland (EVC 653).

The Aquatic Herbland is dominated by sedges and/or aquatic herbs. Typical soils are fertile with a heavy clays beneath organic accumulations. Herbs commonly found in the Aquatic Herbland include Yellow Bladderwort (*Utricularia australis*) and Amphibious Water-milfoil (*Myriophyllum simulans*), Jointed Twig-sedge (*Baumea articulata*).

The Swamp Scrub is typically located at the edges of the wetlands and subject to inundation. (DELWP¹, 2020)

MERRI RIVER ENVIRONS EVCs

According to the modelled pre-1750s EVC mapping, there are also a number of EVCs that were probably located in close proximity to the Merri River, including:

3 - DAMP SANDS HERB-RICH WOODLAND

This EVC is dominated by Eucalypt forest or open woodland up to 15 m tall with a large shrub and ground layer. This EVC grows on moderately fertile, relatively well-drained sand or loamy topsoils over heavier subsoils. The Damp Sands Herb-rich Woodland is located close to the coastline, separating the Coastal Dune Scrub and Swamp Scrub/Aquatic Herbland from the inland Plains Grassy Woodland.

The Eucalypt overstorey generally covers up to 15% of the area and consists of Manna Gum (*Eucalyptus viminalis*), Swamp Gum (*Eucalyptus ovata*) and Blackwood (*Acacia melanoxylon*).

Understorey is a diverse range of shrubs, herbs and graminoids including Prickly Tea-tree (*Leptospermum continentale*), Silver Banksia (*Banksia marginata*), Common Heath (*Epacris impressa*), Running Postman (*Kennedia prostrata*), Tall Rush (*Juncus procerus*), Velvet

Tussock-grass (*Poa rodwayi*), Tasman Flax-lily (*Dianella tasmanica*), Kangaroo Grass (*Themeda triandra*) and many more. (DELWP¹, 2020)

55 - PLAINS GRASSY WOODLAND

This EVC is an open, Eucalypt forest. It grows on poorly drained, fertile soils at low elevations. The Eucalypt overstorey generally covers up to 10% of the area and includes Manna Gum (*Eucalyptus viminalis* ssp. *viminalis*) and Black Wattle (*Acacia mearnsii*).

The understorey is a sparse covering of shrubs over a grass and herbaceous ground cover. The shrub mix includes Golden Wattle (*Acacia pycnantha*) and Hedge Wattle (*Acacia paradoxa*). The understorey includes Creeping Bossiaea (*Bossiaea prostrata*), Kidney-weed (*Dichondra repens*) and Bristly Wallaby-grass (*Austrodanthonia setacea*).

666 - RIPARIAN SHRUBLAND/ESCARPMENT SHRUBLAND/GRASSY WOODLAND MOSAIC

This EVC is found near Woodford on rocky escarpments and creeks, in steep valleys and gorges. It is a mosaic of three EVCs, being Riparian Shrubland (EVC 19), Escarpment Shrubland (EVC 895) and Plains Grassy Woodland (EVC 55).

The mixed overstorey ranges from between 15-40% and includes a range of large shrubs and trees, including Blackwood (*Acacia melanoxylon*), Drooping Sheoak (*Allocasuarina verticillata*), Black Wattle (*Acacia mearnsii*), Sweet Bursaria (*Bursaria spinosa*) and Manna Gum (*Eucalyptus viminalis* ssp. *Viminalis*). This mosaic has a broad range of shrubs, herbs and graminoids in the understorey.

Table 1 shows the conservation status of each ecological vegetation class.

Table 1 – Conservation status of vegetation types that occurred in the South of Merri Open Space Precinct pre-1750

ECOLOGICAL VEGETATION CLASS (EVC)	EVC NUMBER	BIOREGIONAL CONSERVATION STATUS	CRITERIA FOR STATUS
DAMP SANDS HERB-RICH WOODLAND	3	Endangered in Warrnambool Plain	Less than 10% pre-European extent remains; or combination of depletion, degradation, current threats and rarity is comparable overall to the above. (DSE, date unknown)
RIPARIAN SHRUBLAND (PART OF EVC 666)	19	Endangered in Central Victorian Uplands*	
SWAMP SCRUB (FOUND BY ITSELF AND AS PART OF EVC 720)	53	Endangered in Warrnambool Plain	
PLAINS GRASSY WOODLAND (FOUND BY ITSELF AND AS PART OF EVC 666)	55	Endangered in Warrnambool Plain	
AQUATIC HERBLAND (PART OF EVC 720)	653	Endangered in Warrnambool Plain	
ESCARPMENT SHRUBLAND (PART of EVC 666)	895	Endangered in Victorian Volcanic Plain and Central Victorian Uplands*	
ESTUARINE WETLAND	10	Depleted in Warrnambool Plain	Greater than 30% and up to 50% pre-European extent remains; or combination of depletion, degradation and current threats is comparable overall to the above and greater than 50% pre-European extent remains and moderately degraded over a majority of this area. (DSE, date unkown)
COASTAL DUNE SCRUB	160	Depleted in Warrnambool Plain	
*Note: Riparian Shrubland (EVC19) and Escarpment Shrubland (EVC895) are listed within mosaics in the Warrnambool Plain Bioregion, but are not listed individually in the Warrnambool Plain Bioregion.			

IMPROVING THE ENVIRONMENT THROUGH PLANTING

There is a great opportunity through planting along the banks of the Merri River to expand the area of habitat for native fauna and flora and increase the length of wildlife corridor throughout Warrnambool.

The Merri River supports a diverse range of birds, mammals, amphibians and invertebrate communities, including Platypus (*Ornithorhynchus anatinus*), Rakali or Native Water-rat (*Hydromys chrysogaster*), the ‘vulnerable’ Hairy Burrowing Crayfish (*Engaeus sericatus*), Royal Spoonbill (*Platalea regia*), Golden Perch (*Macquaria ambigua*) and Hooded Plover (*Thinornis rubricollis*) and the ‘endangered’ Great Egret (*Ardea alba*) (GHCMA, 2019) (WCC, date unknown).

As described in the Merri River Restoration Strategy:

*‘Riparian habitat has been extensively removed from along the Merri River within Warrnambool. However, if reestablished, riparian areas would enable re-colonization by a number of species no longer common within Warrnambool. The establishment of riparian vegetation will create a ‘wildlife corridor’ along the river attracting once common species such as the Sugar Glider (*Petaurus breviceps*), Agile Antechinus (*Antechinus agilis*) and Southern Brown Bandicoot (*Isodon obesulus*) as well as smaller reptiles such as lizards.’* (WCC, date unknown)

There has been a significant amount of revegetation completed along the edge of the Merri River in recent years.

‘As part of the restoration of the river, Glenelg Hopkins CMA is working with landholders and community groups in Warrnambool to improve river health through riparian and instream habitat improvement (GHCMA, 2019).’

It is important that native plants are selected for landscaping and where possible, vegetation from the local EVCs should be selected.

3. CHARACTER ZONES

The Merri River offers a variety of public open space along its edges, including:

- Jubilee Park at Woodford
- St James Park, Queens Road Reserve, Platypus Park and Manuka Drive Reserve in Warrnambool
- GG Payne Reserve at Dennington; and
- Thunder Point Coastal Reserve in Warrnambool

Public land along the edges of the Merri River mostly falls into the categories of Crown land water frontage (government owned public land) or public reserve or coastal reserve. Along the length of the Merri River, public water frontage land generally has a width in the range of 20 to 60 metres. However, it does widen in some southern parts of the River, such as at the estuary transition zone where it is subject to influx from tides.

To help guide future landscaping along the Merri River, the River has been divided into six character zones. They are:

1. Rural Living
2. Rural
3. Urban
4. Peri-urban
5. Coastal
6. Coastal-Urban

These six zones are based on the existing character type, landscape and adjacent land uses. The Character Zones are identified on Map 3 (page 17). The locations of nearby public open space are shown on Map 4 (page 18).



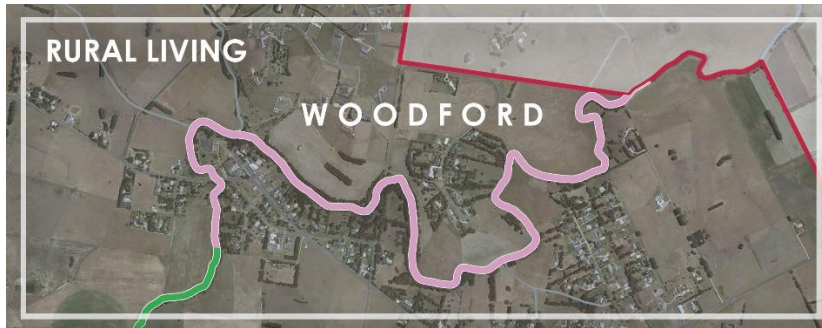


MAP 3: CHARACTER ZONES



MAP 4: PUBLIC OPEN SPACE LOCATIONS

CHARACTER ZONE 1: RURAL LIVING



In the Rural Living Character Zone, the river meanders from the south-east of Woodford to the south-west of Woodford. The natural features of this length of river make it a valuable asset and highly desirable place for local Woodford residents and visitors. The river is adjoined by low density and rural living residential lots along both sides. Jubilee Park and Jellie's Reserve are also located next to the river.

There is some well-established native revegetation along this section of river. There are also lengths of river which have very sparse vegetation.

Some of the existing vegetation is native and some is exotic vegetation. There is a significant amount of exotic vegetation located in and around Jubilee Park. There are also stands of Willows and other weed species along the river which have not yet been removed.

Any future landscaping works in this zone should consider maintaining key views to and from public roads and open space and should also consider fire risk to adjacent properties.

Local EVCs: 53 Swamp Scrub, 55 Plains Grassy Woodland (which forms part of 666) and 666 Riparian shrubland/escarpment shrubland/grassy Woodland Mosaic

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 1 RURAL LIVING:

SELECTING PLANT SPECIES

Identify appropriate species to plant in the Rural Living Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION

An example cross section for the Rural Living Character Zone is provided at Cross Section 2, Cross Section 2a and Cross Section 2b (pages 46-48).

DETERMINING KEY VIEWLINES

In the rural living area it is important that key viewlines from public areas are considered when designing planting areas along the river. When planting is proposed in newly developed areas a viewline analysis will need to be undertaken.

In addition to the Cross Section examples, Plan 1 on page 31 shows how key viewlines can be maintained through careful plant selection.

Photograph 1: Jubilee Park. A combination of exotic and native vegetation. Example where revegetation works have taken place on the Jubilee Park side of the river only. The opposite side is mostly weed species. Scouring and erosion are occurring on the side where revegetation along the Merri River has not occurred.



Photograph 2: View of the Merri River running between Jellie's Reserve and Jubilee Park. A number of rural residential properties are adjacent to the river, some are developed with dwellings and others are vacant.



Photograph 3: Jubilee Park Woodford. A combination of exotic and native vegetation. Many weed species remain along this stretch of river.



CHARACTER ZONE 2: RURAL



In the Rural Character Zone, the river meanders through agricultural farmland from the south-west of Woodford to the northern residential edge of Warrnambool City. Much of this section of river has previously been cleared of native vegetation.

Some revegetation work has taken place along this section of river, but there are also sections which are mostly void of vegetation and others where weed species dominate the landscape.

Future planting along this section of river should focus on revegetation of the Swamp Scrub that was likely present pre-1750's and establishing a wildlife corridor from Woodford to Warrnambool. EVC 55 Plains Grassy Woodland was likely to have occurred next to the swamp scrub and it is appropriate for species from this EVC to be planted along this length of river too.

Given the private use of the adjacent land for agriculture, preservation of views is not critical along this section of the river.

Local EVCs: 53 Swamp Scrub and 55 Plains Grassy Woodland

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 2 RURAL:

SELECTING PLANT SPECIES

Identify appropriate species to plant in the Rural Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION

An example cross section for the Rural Character Zone is provided at Cross Section 1 on page 45.

DETERMINING KEY VIEWLINES – Not applicable in the Rural Zone

Photograph 4: A view of the Merri River Rural Character Zone looking south from Woodford.



Photograph 5: A view of the Merri River Rural Character Zone looking south from Woodford from the transition of the rural living zone to rural zone. There is a visible difference between the heavily vegetated section of river near Woodford compared to the rural zone section which has sparse vegetation and few overstorey trees.



CHARACTER ZONE 3: URBAN



In the Urban Character Zone, the river meanders through the northern residential area of Warrnambool City. Typically, there is residential development occurring on both sides of the River. However, some areas identified as future residential land are not yet developed.

In this zone, the Merri River is separated from residential development by an Urban Floodway Zone buffer, which serves the purpose of carrying the active flood flows. There are also a number of large public open space reserves located adjacent to the river throughout this zone, including St James Park, Queens Road Reserve and Platypus Park.

Whilst most of this section of River has been cleared of native vegetation in the past, there is some established native revegetation along this section of river which is a result of revegetation works.

Native indigenous plants should be used along this stretch of river, but the focus should not solely be based on revegetation. Planting also needs to create people-friendly environments. Any future planting in this zone needs to balance the enhancement of natural values and biodiversity with the existing and planned residential uses.

The aesthetics and function of this section of river are important considerations. Key considerations for planting include maintaining key views to and from public roads and open space, enhancing safety of park users and minimizing fire risk to adjacent properties.

Swamp Scrub (EVC 53) was likely present pre-1750's along the river in this zone, but it is deemed appropriate that a wider palette of plant species be used in order to achieve the desired aesthetic and functional outcomes. The planting palette can be expanded to include the nearby Plains Grassy Woodland (EVC 55), Damp Sands Herb-rich Woodland (EVC 3) and any other species identified in the Merri River Plant List at Table 2.

Local EVCs: 3 Damp Sands Herb-rich Woodland, 53 Swamp Scrub, 55 Plains Grassy Woodland

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 3 URBAN:

SELECTING PLANT SPECIES

Identify appropriate species to plant in the Urban Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION

An example cross section for the Urban Character Zone is provided at Cross Section 2, Cross Section 2a and Cross Section 2b (pages 46-48).

DETERMINING KEY VIEWLINES

In the urban area it is important that key viewlines from public areas are considered when designing planting areas along the river.

Map 5 on page 30, shows the key viewlines for urban land on the south side of the Merri River. These were identified during preparation of the South of Merri Open Space Precinct Plan. The land to the north of the Merri River has not been fully developed, so it is not possible to located all key viewlines from public spaces at this time. However, the plan shows where low vegetation should be planted to ensure clear viewlines are maintained between the south and north side of the river. Plan 1 on page 31 also shows how key viewlines can be maintained through careful plant selection.

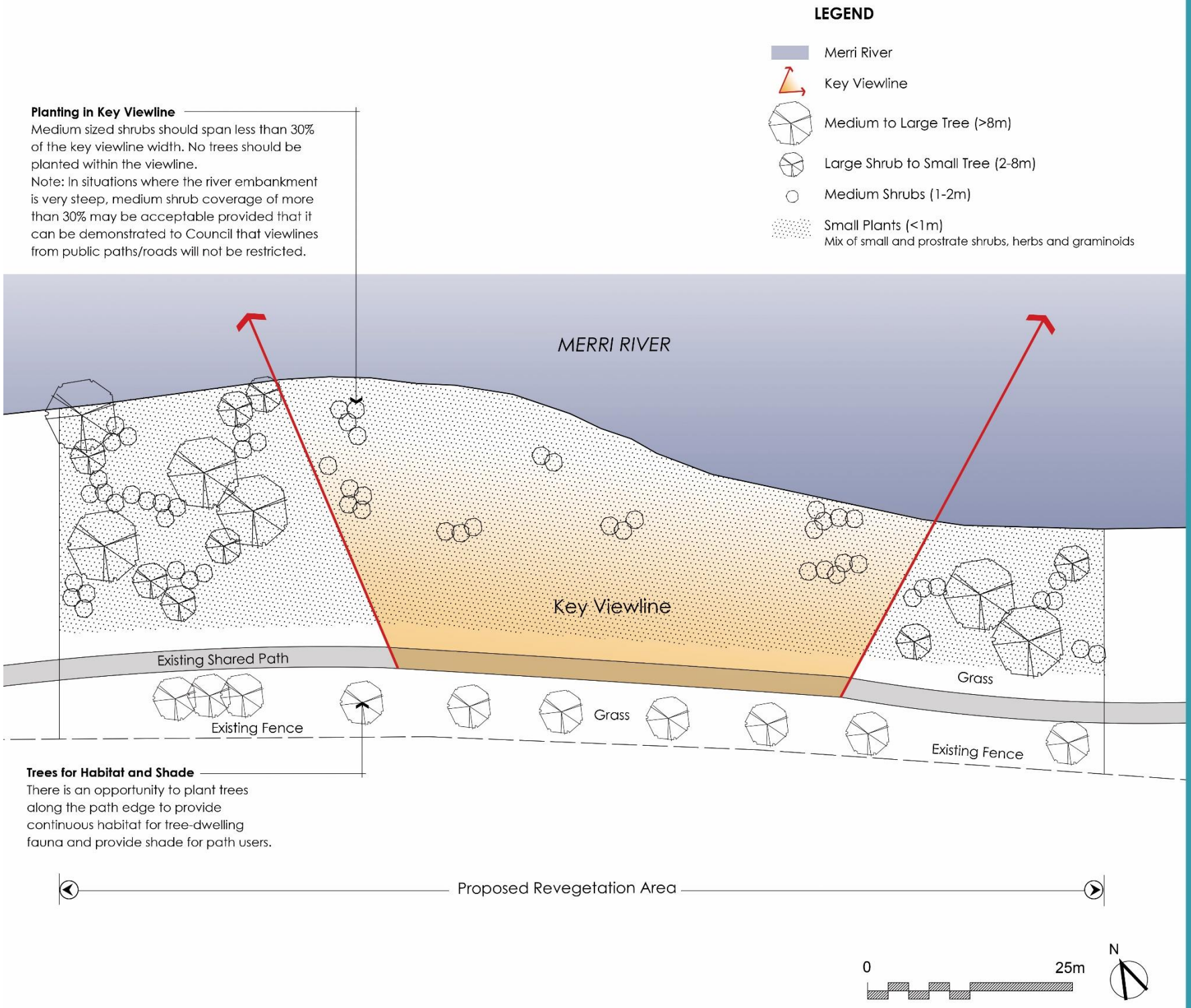
When planting is proposed in newly developed areas a viewline analysis will need to be undertaken.

Photograph 6: A view of the Merri River where it passes Platypus Park and residential properties.

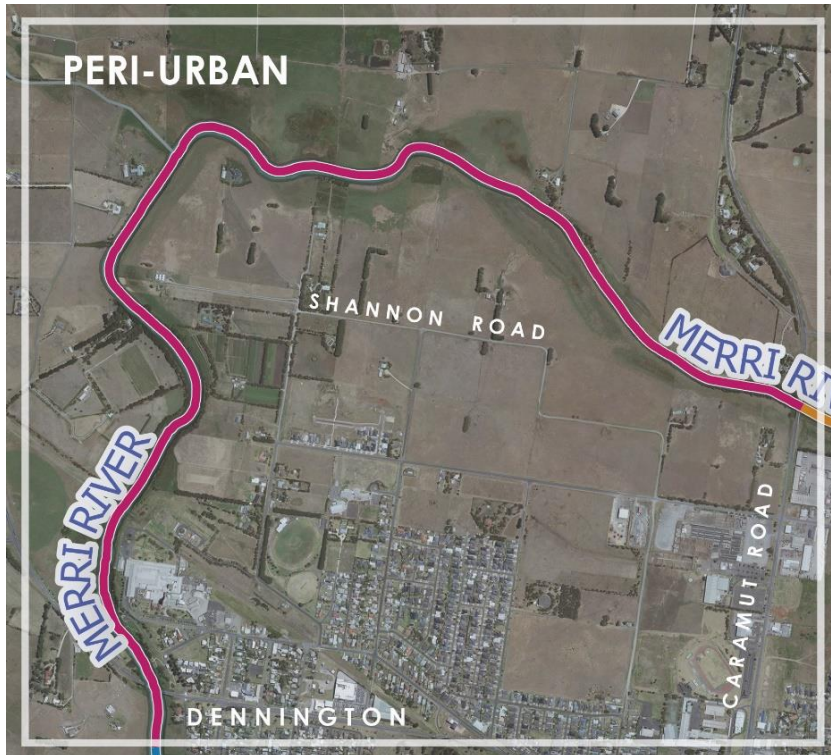




MAP 5: EXISTING VIEWS - URBAN CHARACTER ZONE



CHARACTER ZONE 4: PERI-URBAN



Here the river meanders along the north-western edge of Warrnambool City. This is an urban transition zone. Currently most of the land on both sides of the river is used as farmland. However, a significant area of land will be developed for residential purposes on the city side of the river in the future.

In this zone, the Urban Floodway Zone has been applied on the city-side of the River to provide a flood buffer between future residential development.

Similar to the urban character zone, it is important that native indigenous plants be used along this stretch of river, but the focus should not solely be based on revegetation, particularly on the urban-side of the river. Any future planting in this zone should consider fire risk to adjacent properties and existing and planned adjoining uses and maintaining key views to and from public roads and open space.

Swamp Scrub (EVC 53) was likely present pre-1750's along the river in this zone, but it is deemed appropriate that a wider palette of plant species be used, not solely Swamp Scrub, in order to achieve the desired aesthetic and functional outcomes. The planting palette can be expanded to include the nearby Damp Sands Herb-rich Woodland (EVC 3), Plains Grassy Woodland (EVC 55) and a selection of other native species deemed appropriate by the GHCMA and Council.

Local EVCs: 3 Damp Sands Herb-rich Woodland, 53 Swamp Scrub, 55 Plains Grassy Woodland

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 4 PERI-URBAN:

SELECTING PLANT SPECIES

Identify appropriate species to plant in the Peri-Urban Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION

An example cross section for the Peri-urban Character Zone is provided at Cross Section 3 on page 49.

DETERMINING KEY VIEWLINES

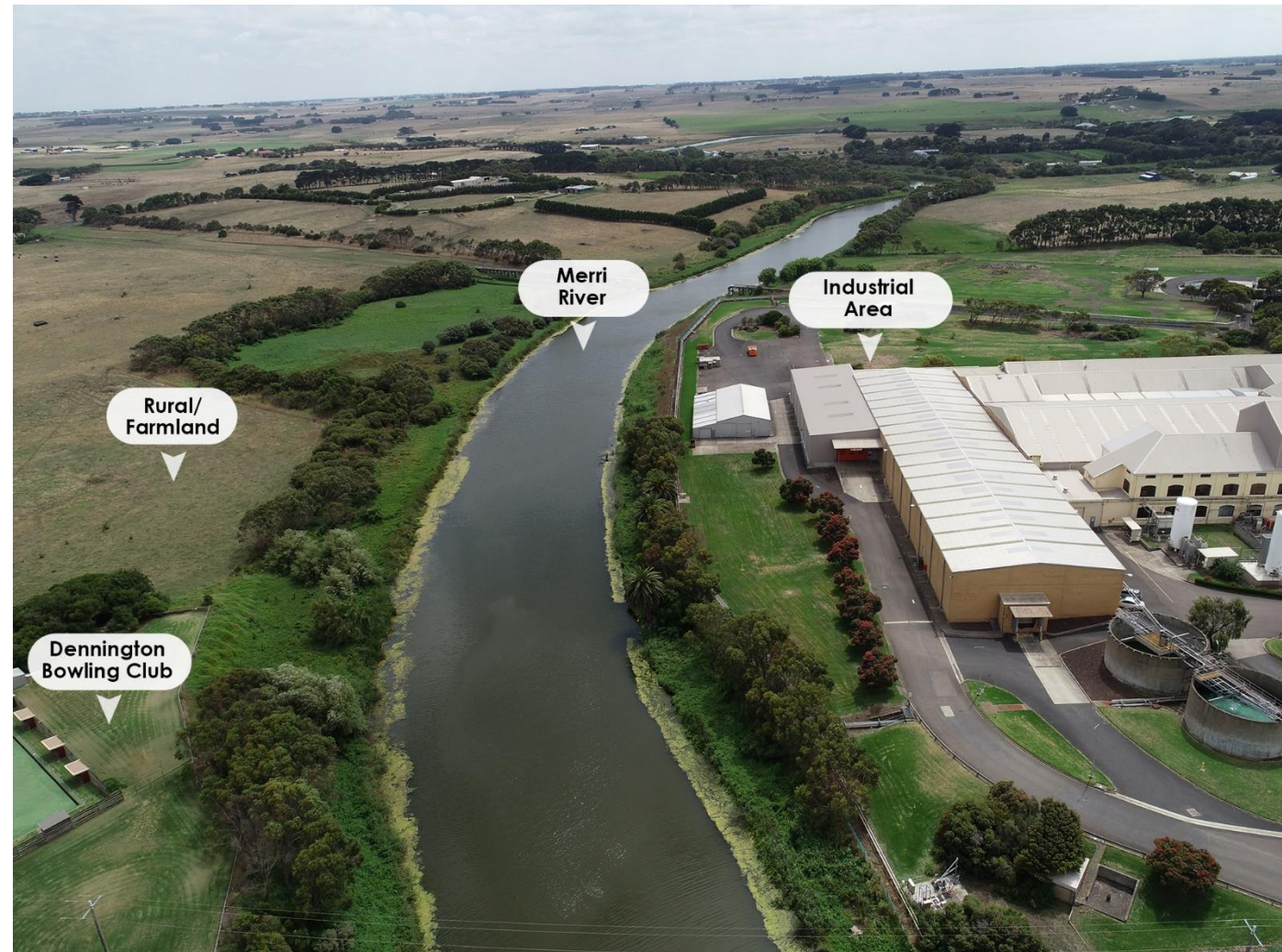
In the peri-urban area it is important that key viewlines from public areas are considered when designing planting areas along the river. When planting is proposed in newly developed areas a viewline analysis will need to be undertaken.

In addition to the Cross Section examples, Plan 1 on page 31 shows how key viewlines can be maintained through careful plant selection.

Photograph 9: View of Merri River west of Caramut Road. Land is currently used as farming. Some land on the south side of the Merri River will remain as farming and some will transition to residential in the future.



Photograph 10: View of Merri River looking north from the boat ramp at Dennington. Industrial development is located on the east side of the river with rural land to the west.



CHARACTER ZONE 5: COASTAL



In the Coastal Character Zone, the Merri River meanders around the south-western edge of Warrnambool City. This section of river is located away from the urban area and runs through land zoned urban floodway zone and farming zone.

It is important that native indigenous plants be used along this stretch of river, with a focus on revegetation.

Any future planting in this zone should consider fire risk to adjacent properties and existing and planned adjoining uses and maintaining key views to and from public roads and open space.

The three Pre-1750s EVCs located along this zone include Damp Sands Herb-rich Woodland (EVC 3), Swamp Scrub (EVC 53) and Swamp Scrub /Aquatic Herbland Mosaic (EVC720).

Local EVCs: 3 Damp Sands Herb-rich Woodland, 53 Swamp Scrub and 720 Swamp Scrub/Aquatic Herbland Mosaic.

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 5 COASTAL:

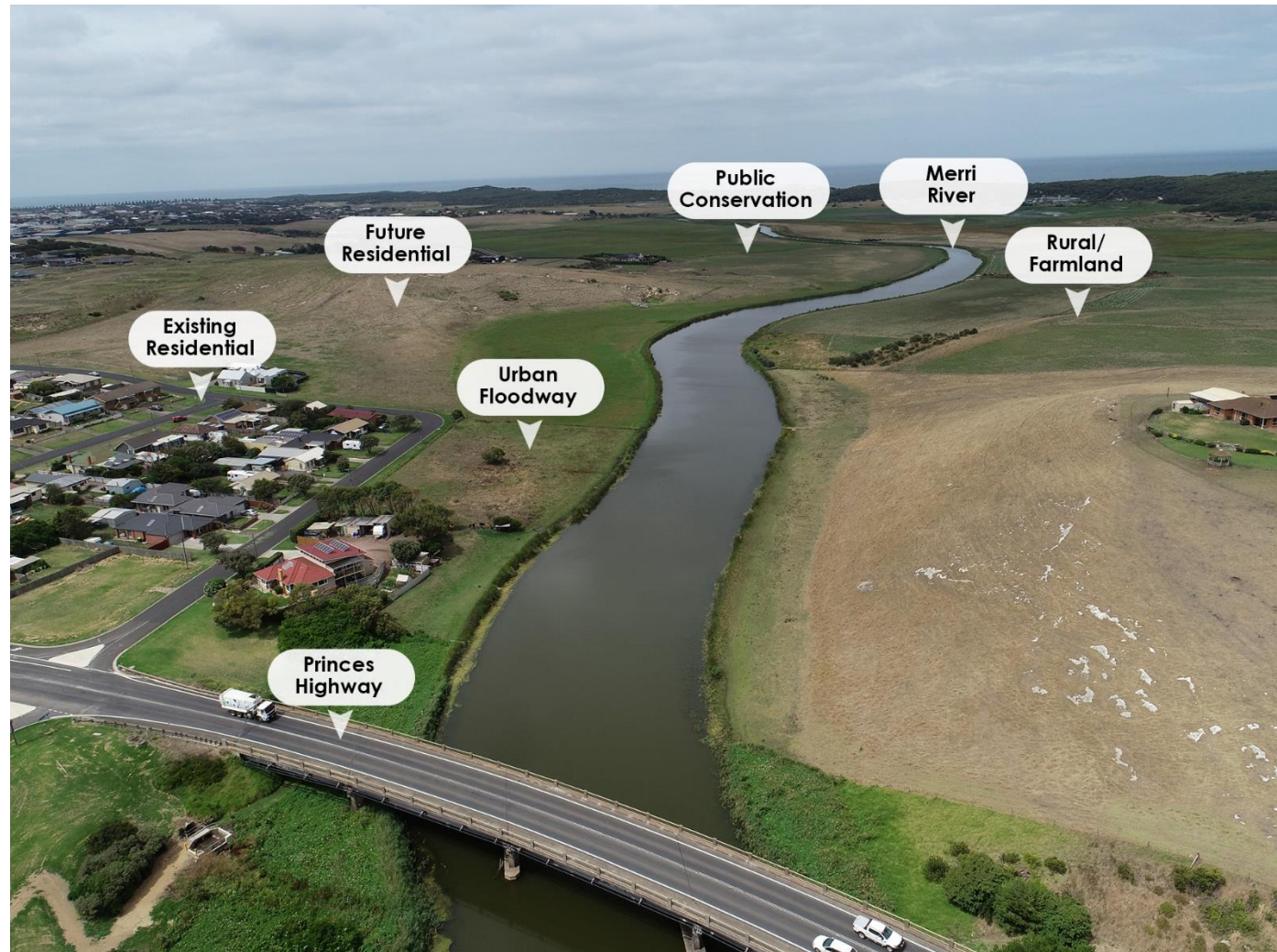
SELECTING PLANT SPECIES - Identify appropriate species to plant in the Coastal Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION - An example cross section for the Coastal Character Zone is provided at Cross Section 4 on page 50.

DETERMINING KEY VIEWLINES - In the coastal area it is important that key viewlines from public areas are considered when designing planting areas along the river. When planting is proposed in newly developed areas a viewline analysis will need to be undertaken.

In addition to the Cross Section examples, Plan 1 on page 31 shows how key viewlines can be maintained through careful plant selection.

Photograph 11: View of Merri River south of Princes Highway, Dennington



Photograph 12: View north-west from Crowes Bridge, Swinton Street



Photograph 13: View south-east from Crowes Bridge, Swinton Street



CHARACTER ZONE 6: COASTAL – URBAN



Here the river meanders around the southern-western edge of Warrnambool City. This section of river is located along the edge of the urban area and runs out to sea at Stingray Bay near Pickering Point.

Adjoining land use zones along this section of the River include urban floodway zone, general residential zone, public conservation and resource zone and public park and recreation zone. The Warrnambool Golf Club is located nearby.

Similar to the urban character zone, it is important that native indigenous plants be used along this stretch of river, but the focus should not solely be based on revegetation. Any future planting in this zone should consider existing uses and maintaining key views to and from roads and open space.

The three Pre-1750s EVCs located along this zone include Damp Sands Herb-rich Woodland (EVC 3), Estuarine Wetland (EVC10), Coastal Dune Scrub (EVC 160) and Swamp Scrub /Aquatic Herbland Mosaic (EVC720).

Local EVCs: 3 Damp Sands Herb-rich Woodland, 10 Estuarine Wetland, 160 Coastal Dune Scrub and 720 Swamp Scrub/Aquatic Herbland Mosaic.

FURTHER INFORMATION FOR DESIGNING NEW PLANTING AREAS IN ZONE 6 COASTAL - URBAN:

SELECTING PLANT SPECIES - Identify appropriate species to plant in the Coastal-Urban Character Zone using the species selection guide at Section 5 (page 52), and Merri River Plant List (pages 65-76). The EVC map on page 11 can also help guide what EVCs may have been present on your site.

EXAMPLE CROSS SECTION - An example cross section 4 for Character Zone 6: Coastal-Urban is provided at Cross Section 4A on page 51.

DETERMINING KEY VIEWLINES - In the coastal-urban area it is important that key viewlines from public areas are considered when designing planting areas along the river. When planting is proposed in newly developed areas a viewline analysis will need to be undertaken.

In addition to the Cross Section examples, Plan 1 on page 31 shows how key viewlines can be maintained through careful plant selection.

Photograph 14: View of Merri River south of Harris Street, where the river runs through the residential area and out into Stingray Bay



Photograph 15: Merri River and adjoining open space reserve on the western side of Harris Street. A shared trail meanders through the open space beside the Merri River.



Photographs 16 & 17: Harris Street reserve revegetation and landscaping works



4. TYPICAL CROSS-SECTIONS

This section shows a number of cross-sections as typical representations for various character zones and landscape contexts. These typical cross-sections can be used as a guide to assist those designing, planning and selecting plant species for planting along the Merri River.

As discussed, there are six character zones identified along the Merri River in Warrnambool. Within these character zones there are various land uses adjoining the Merri River. For the purposes of this guideline, the land use setting within which the river sits is referred to as the landscape context.

No two cross-sections of the Merri River will be exactly the same, as the width of the river will vary, the topography and existing planting changes along the course of the river as does the land use on each side. For this reason, it is important to carry out a site analysis and complete the checklist at Appendix 1.

In all character zones, except the rural zone, it is important to identify any key views to and from public land adjacent to the river that need to be protected. Key viewlines will change over time as vegetation changes and development occurs. It is important that the site analysis nominates key shared viewlines to be protected.

Photograph 18: Shows some low planting in the reserve at the Harris Street Reserve. This low planting is ideal in public open space locations where surveillance and maintaining key viewlines are important.



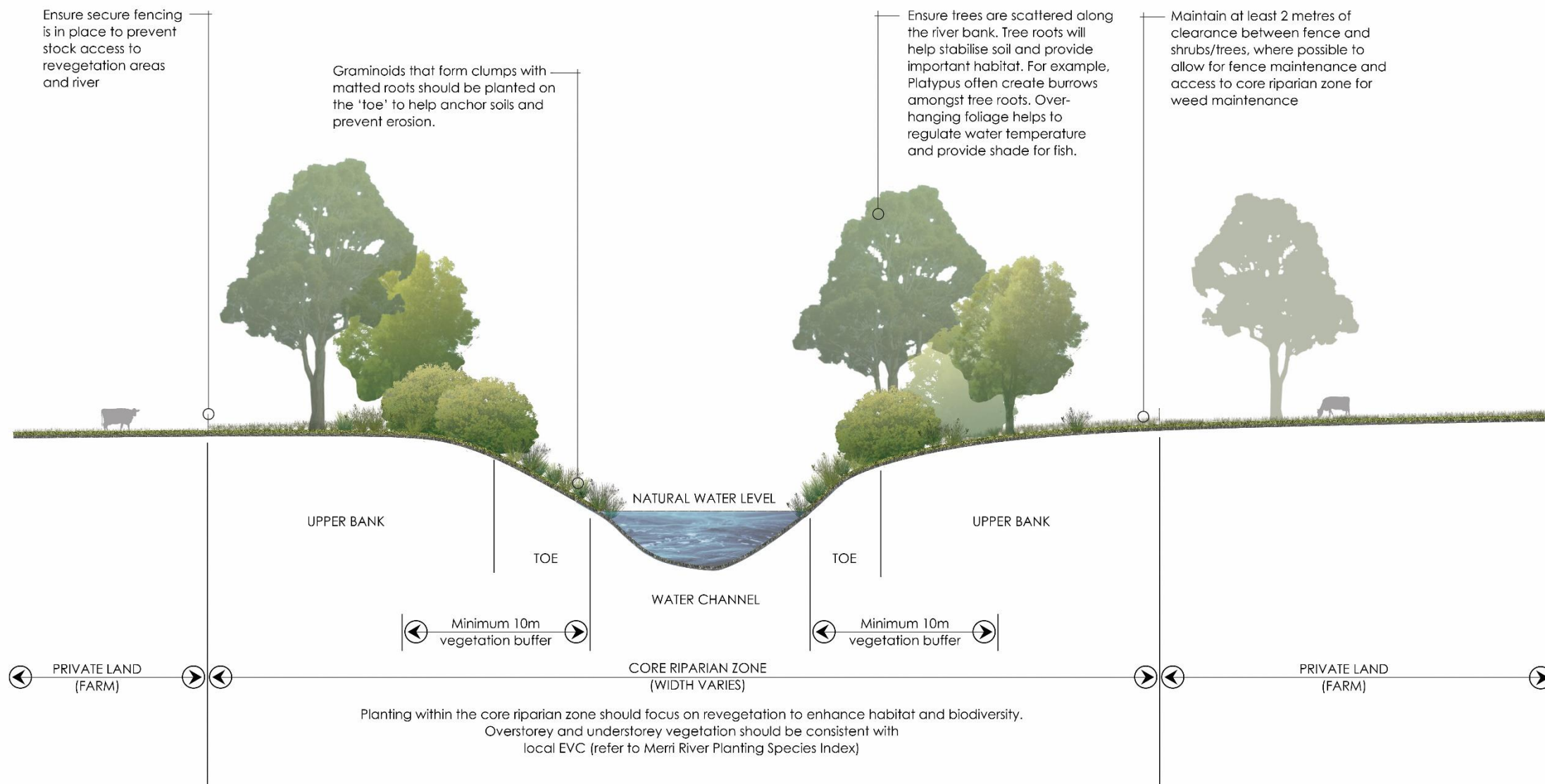
Photograph 19 (below): Shows shrubs greater than 2m in height planted densely together in close proximity to the path. Having a wall of vegetation this close to the path does not enhance the perception of safety for users, blocks viewlines and creates a maintenance issue. Ideally the species selected in urban locations will be low-growing with good separation between the path and plants to enhance the perception of safety and minimise the need for maintenance of plants near paths.



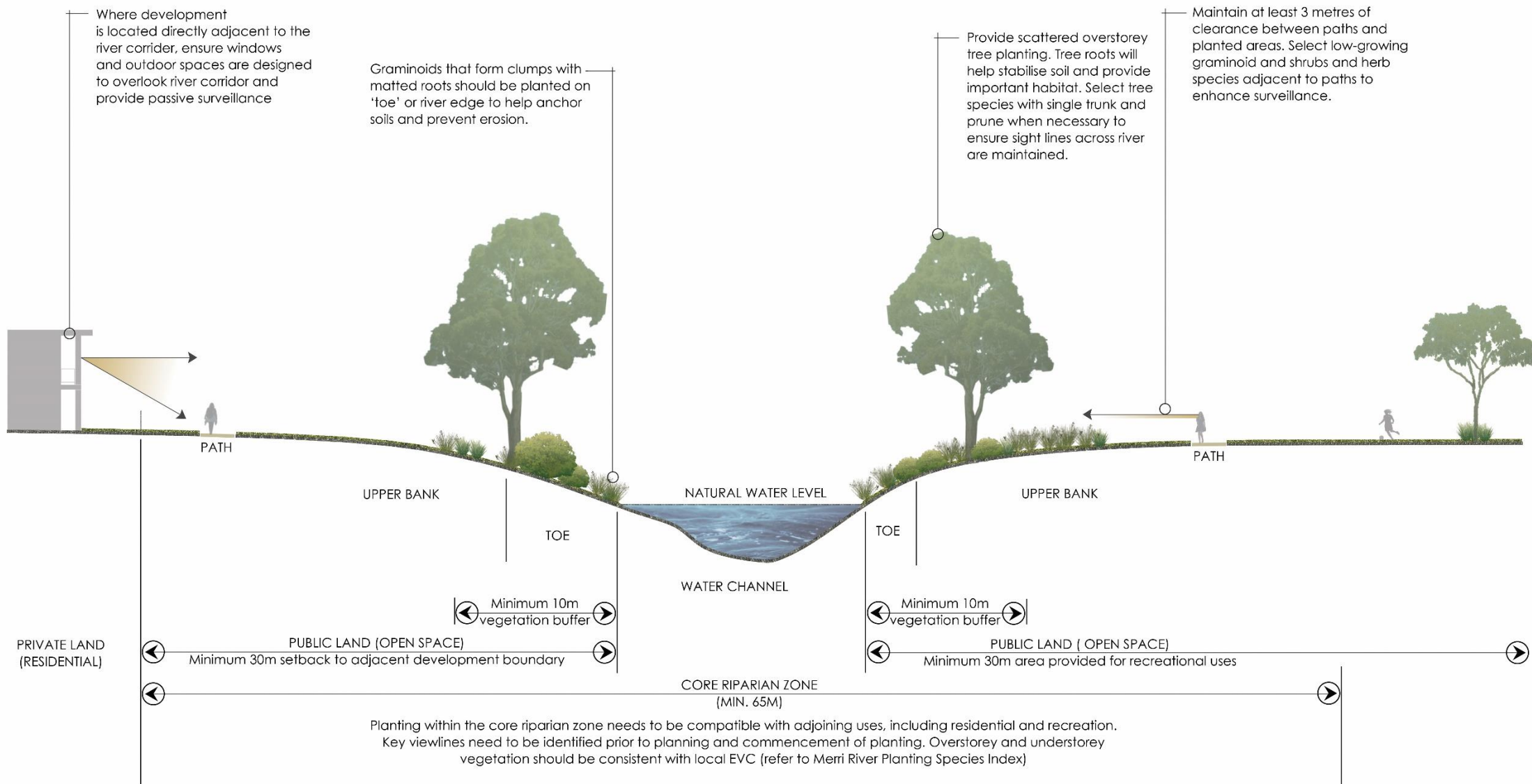
Photograph 20 (below): Shows mixture of trees, small shrubs and graminoids planted in a bed with good separation between the path and planted areas. Lower branches of trees can be pruned to allow views across to the river and ensure that there are no hidden areas, therefore enhancing the perception of safety for walkers. Note that the larger trees would not be appropriate for planting in locations where key viewlines are identified.



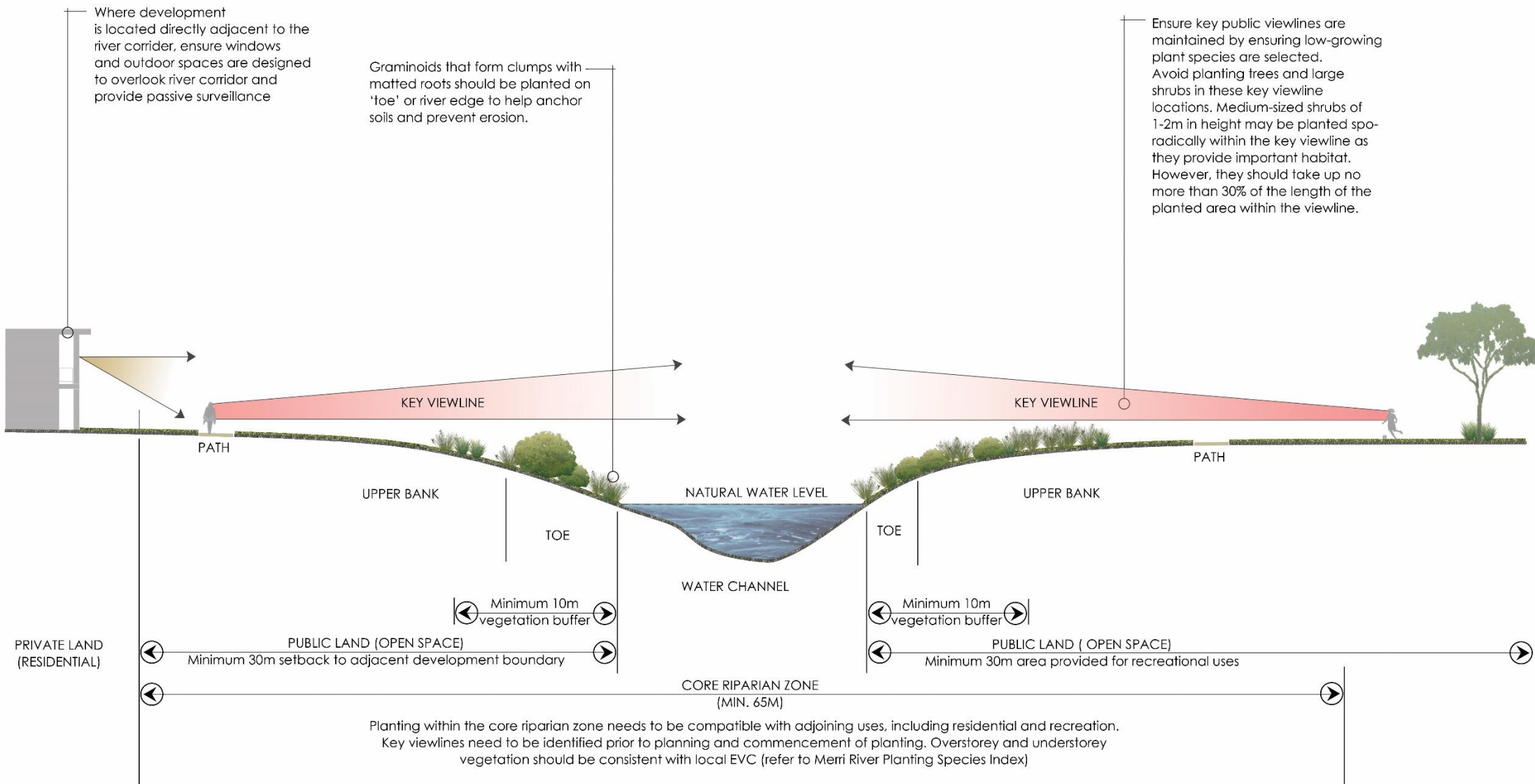
CROSS SECTION 1: RURAL



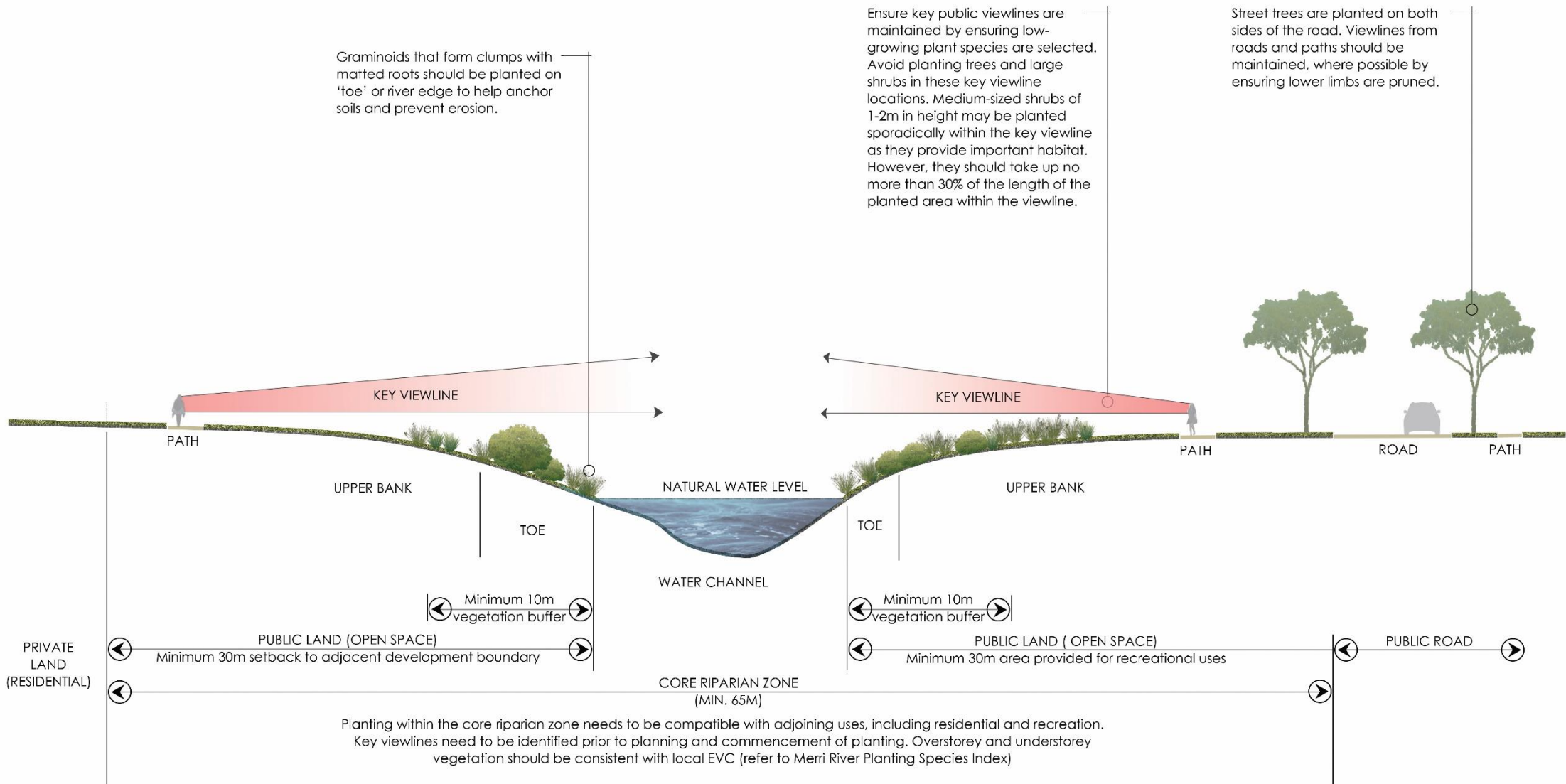
CROSS SECTION 2: URBAN/RURAL LIVING



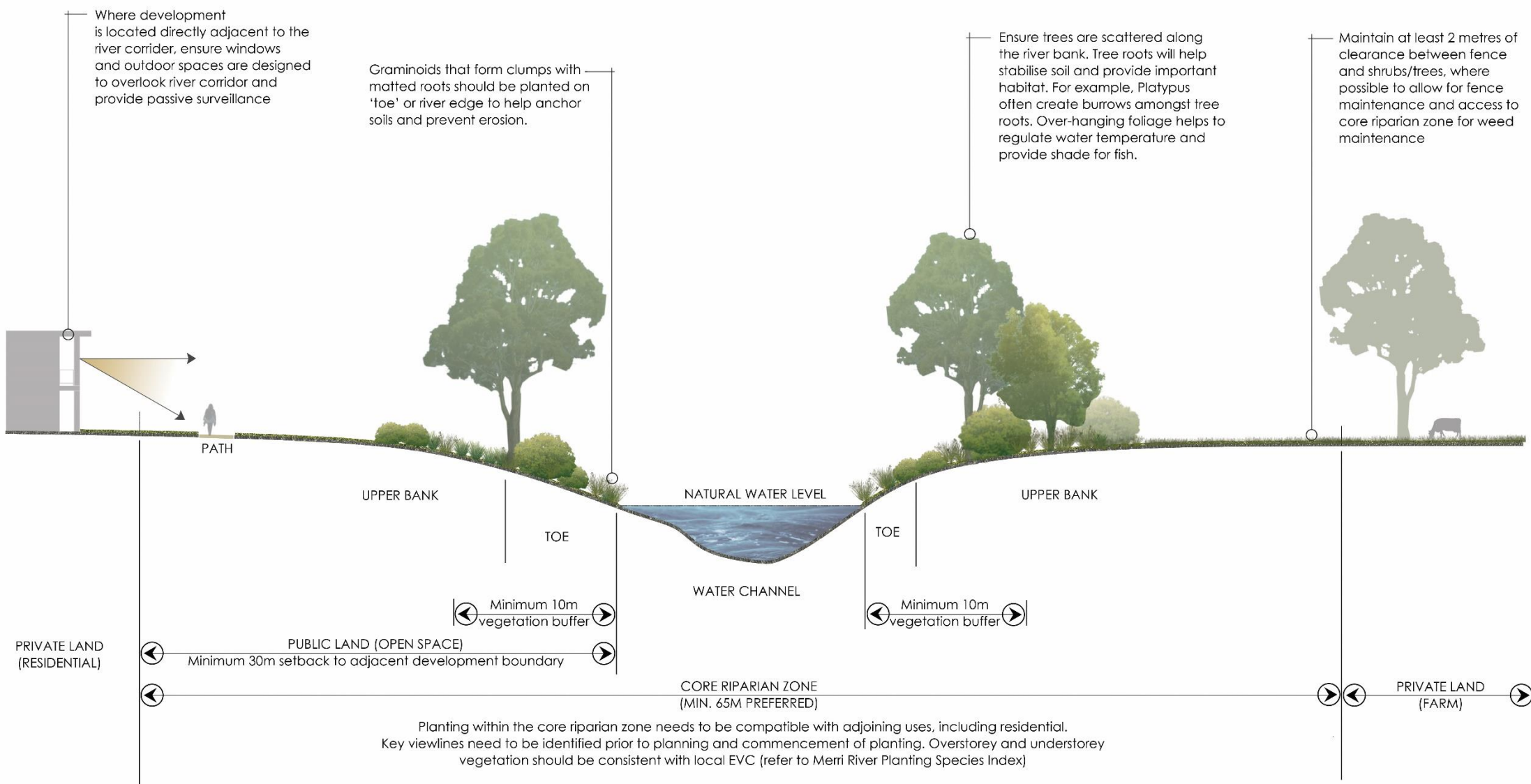
CROSS SECTION 2A: URBAN/RURAL LIVING - KEY VIEWLINE



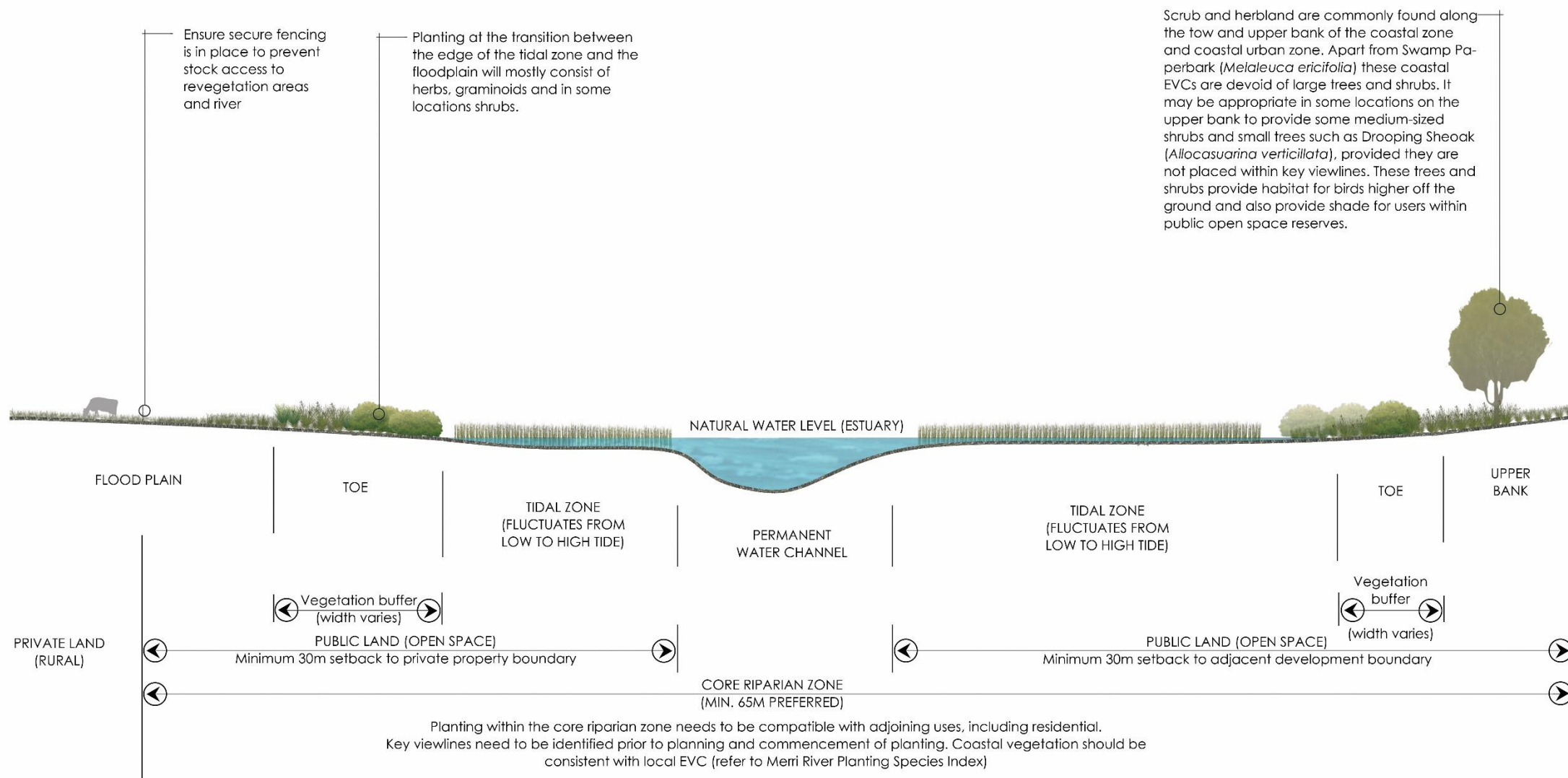
CROSS SECTION 2B: URBAN/RURAL LIVING WITH ROAD EDGE - KEY VIEWLINE



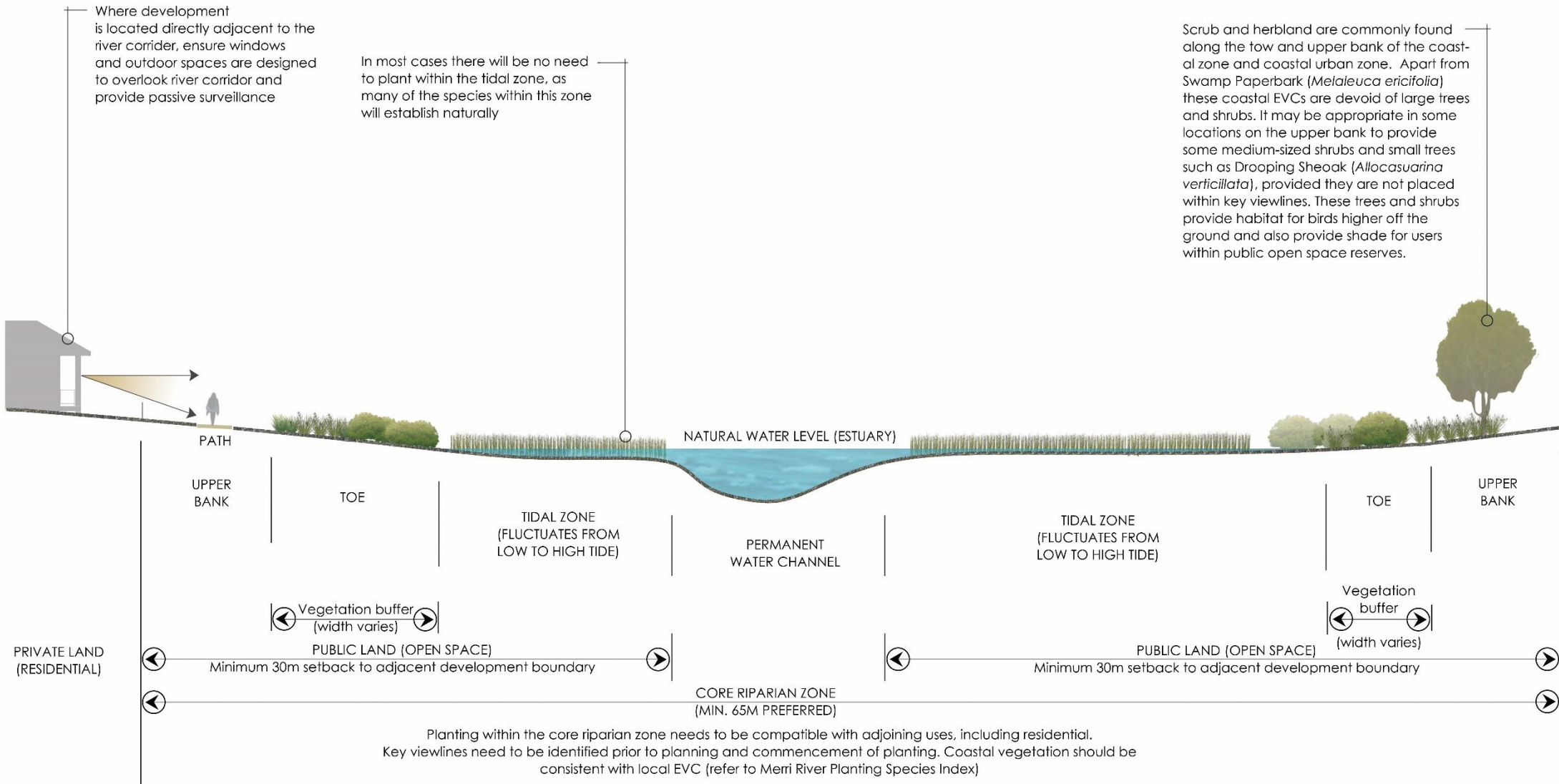
CROSS SECTION 3: PERI-URBAN



CROSS SECTION 4: COASTAL



CROSS SECTION 4A: COASTAL URBAN



5. SPECIES SELECTION

Prior to commencing the design of the area to be landscaped, a thorough assessment of all existing vegetation on and adjoining the site should be undertaken. This assessment should determine the location, significance and habitat values of native flora and fauna.

Choosing the right plants for the right place is essential if they are to grow and perform well. It is important to understand that there are many variations between different locations along the river. There can also be significant differences between the microclimates within a particular section.

A thorough site analysis of the subject site in which the plants are to be planted is the best starting point for selecting appropriate species.

Plants must not only be selected for their ability to tolerate the site conditions, they must also have other desirable characteristics that make them suitable for the zone they are planted in and the surrounding uses. For example, in urban zones they should not only provide environmental improvements but also enhance the visual appearance of the area. The following should be given consideration when selecting plants:

FUNCTION - Are there any site conditions which require plants to perform a specific function, such as erosion control/prevention?

FORM AND SIZE - Are there any shared public viewlines that should be protected?

SUITABILITY TO THE ENVIRONMENT - Consider aspect, slope, existing vegetation, existing shade/exposure, salt spray and flammability where close to houses.

HABITAT - Are there any fauna species found at the location or nearby which require particular requirements to create a safe habitat for them, ie. some bird species may need branches up off the ground for nesting, continuous groundcover encourages ground dwelling species, etc.

The Merri River Plant Species List at Section 6 (page 65) aims to make plant selection decisions easier. Many of the plants listed in the planting list are already planted along waterways and public open space in Warrnambool and are indigenous to the area. The list also indicates where the species is appropriate for use in the various zones.

Many of the plant species listed are available from local nursery suppliers, but some may need to be ordered ahead of time.

A checklist of the criteria to be used when selecting plants and designing landscaped areas along the Merri River is provided at Appendix 1.

The following list of species and photographs show some of the native indigenous species approved for planting along the Merri River. Many of these species, but not all, are found in the seven EVCs near the Merri River. Note that not all species may be commercially available for planting.

NOTES ABOUT PLANT SPECIES:

*Native species found in the Warrnambool Bioregion which are not typically found in the EVC immediately adjacent the Merri River, but are approved for use by Warrnambool City Council and the GHCMA. (WCC, date unknown, p. 26)

**Native species not found in the Warrnambool Bioregion, but are approved for use by Warrnambool City Council and the GHCMA. (WCC, date unknown, p. 26)

MEDIUM TO LARGE TREES (TYPICALLY >8M)



Eucalyptus ovata (Swamp Gum)

A medium-sized, evergreen tree up to 20m high. Bark is smooth to rough and varied in colour. Tolerates a range of soil conditions but mostly found in moist soils. (RBGV, date unknown)

The juvenile leaves are ovate and the adult leaves are ovate to lanceolate. Has white flowers.

Found in most EVCs along the Merri River, including EVCs 720, 3, 53, 55 and 666.



Acacia melanoxylon (Blackwood)

A medium-sized fast-growing evergreen tree typically 12-15m high, but can grow up to 30m.

Prefers well-drained soils with lots of organic matter and does not like compacted soils. Grows best in a moist sheltered position.

Leaves are green, phyllodineous. Leaf blades about 8-13 cm long. A small gland is normally present on the upper side of the leaf blade-petiole junction. Mass of pale yellow flowers from late winter to early spring.

The hard wood of this wattle made strong spear-throwers, boomerangs, clubs and shields in parts of Victoria. (ANBG, date unknown)

Found in EVC 3 Damp Sands Herb-rich Woodland and EVC 53 Swamp Scrub.



Eucalyptus viminalis
(Manna Gum)

A tall evergreen tree growing between 30 and 50 metres high. Grows in a range of soil conditions.

The bark sheds in long ribbons during summer months. This shedding reveals smooth bark in the upper trunk and branches with rough bark remaining at the base of the trunk and larger branches. Leaves are up to 20 cm long. The small flowers are cream in colour and usually in a cluster of three. (ANBG, date unknown)

Found in EVC 3 Damp Sand Herb-rich Woodland which also forms part of EVC 666 Riparian Shrubland/Escarpment Shrubland/Grassy Woodland Mosaic.

LARGE SHRUBS AND SMALL TREES (TYPICALLY 2-8M)



Acacia paradox
(Hedge Wattle)

A medium-sized shrub growing approximately 2-3m high by 3-4m wide.

Prefers well-drained soils, but tolerates a range of soil conditions. Responds well to pruning and is a good hedge species.

Has small phyllodes up to 3cm with undulate margins. Stems have spines. The small flowers are yellow balls.

(ANBG, date unknown)

Found in EVC 55 Plains Grassy Woodland



Allocasuarina verticillata
(Drooping Sheoak)

A small evergreen tree which typically grows 5-8 metres high, but sometimes taller. Grows in sandy dry soils and tolerates salt spray.

Trees have long, pendulous branchlets of green foliage. Provides an effective screen. (ANBG, date unknown)

Is a food source and habitat for birds.

Traditional owners used hard wood for making various implements.

Found in EVC 895 Escarpment Shrubland, which forms part of EVC 666 Riparian Shrubland/Escarpment Shrubland/Grassy Woodland Mosaic.

LARGE SHRUBS AND SMALL TREES (TYPICALLY 2-8M)



Banksia marginata (Silver Banksia)

A small evergreen tree which typically grows anywhere from 2-8 metres high and occasionally taller.

It is a relatively fast-growing and long-lived Banksia. It tolerates a wide variety of environmental conditions and prefers a sunny position. It grows well in well-drained soils, but can tolerate some waterlogging.

Yellow flowers can occur throughout the year. (ANBG, date unknown)

Found in EVC 3 Damp Sand Herb-rich Woodland



Bursaria spinosa (Sweet Bursaria)

A large shrub from 5-8 metres high and occasionally taller. Often multi-stemmed with a rhizomatous root system.

It grows in most conditions, but may require watering during establishment when conditions are dry. In moist conditions it has the potential to become invasive and may outcompete other species planted in close proximity, particularly due to its rhizomatous root system which sprouts after disturbance.

Small obovate leaves between 1-5cm. White to cream flowers appear in spring to summer on mass. Flowers are showy and fragrant. The seed capsules that appear after flowering contain seeds which rattle in the wind, which is also why it is sometimes referred to as the Castanet Bush. Often has spines on stems.

Found in EVC 666 Riparian Shrubland/Escarpment Shrubland/Grassy Woodland Mosaic. (ANBG, date unknown)

LARGE SHRUBS AND SMALL TREES (TYPICALLY 2-8M)



*Melaleuca lanceolata***

(Moonah)

A large shrub or small tree from 3-8 metres high. It is a highly ornamental plant with an abundance of white to cream bottlebrush flowers in Spring to Summer.

Can be pruned to maintain a hedge or lower branches can be pruned to promote as a clean stemmed small tree.

(Botanic Gardens of SA, date unknown)



Ozothamnus ferrugineus

(Tree Everlasting)

A large shrub growing approximately 2.5-5m high by 2-3m wide.

Widespread throughout Victoria and common in moist soils. Widespread and common through moist lowland environments in much of the State and regenerating prolifically after disturbance, such as fire.

Leaves are 1.5-6.5cm long and creamy/white flowers appear in Summer to early Autumn. (RBGV, date unknown)

Found in EVC 55 Plains Grassy Woodland



Leptospermum lanigerum (Woolly Tea Tree)

A large shrub growing up to 3m high. Provides good habitat for small birds.

They have a spreading habit, with grey-green leaves to 2cm and small white flowers.

EVC 53 Swamp Scrub and EVC 720 Swamp Scrub/Aquatic Herbland Mosaic.

(Photo credit: Glenelg Hopkins Catchment Management Authority)



*Atriplex cinerea***
(Coastal Saltbush)

A medium-sized shrub growing approximately 1-2m high by 2m wide. Can be erect or spreading.

Tolerates a wide range of soil types, including front-line coastal dunes. Good for stabilising sandy soils.

Silver to grey-green leaves up to 8cm long and 2.5cm wide.

(PlantNET, date unknown)



Leptospermum continentale
(Prickly Tea-tree)

A medium-sized shrub growing approximately 2m high by 2m wide.

Grows in a range of soil conditions and tolerates poorly drained soils. (ANBG, date unknown)

Leaves are up to 1cm long. The small flowers are white or pale pink in colour and appear in late spring to early summer.

Found in EVC 3 Damp Sands Herb-rich Woodland.



*Olearia axillaris***
(Coast Daisy-Bush)

A medium-sized shrub that grows up to a height of 1-2m high and wide. Can be lightly trimmed to maintain a tidy habit.

Prefers a sunny site with well-drained soil, tolerates coastal exposure, strong winds and salt spray.

Dense, small, grey-green foliage and light cream to yellow flowers.



Rhagodia candolleana ssp. *candolleana*
(Seaberry Saltbush)

A medium-sized shrub growing approximately 1m high by up to 2m wide.

Grows in coastal locations on soils with good drainage. Responds well to pruning.

The green flowers are followed by small dark red berries.

Good food source and habitat for small birds and mammals.

Found in EVC 160 Coastal Dune Scrub.

SMALL SHRUB AND PROSTRATE SHRUBS (TYPICALLY <1M)



*Leucophyta brownii**

(Cushion Bush)

It is a perennial coastal shrub that grows up to 1m in height.

It has silver-grey foliage and yellow button-like flowers from late spring to summer.

Is a common species along the south-coast of Australia's mainland.

(ANBG, date unknown)



Carpobrotus rossii
(Karkalla or Pigface)

A perennial succulent groundcover. It grows approximately 0.2-0.4m high and can spread up to 3m wide.

Grows in coastal areas and tolerates drought and salt.

Pink flowers appear in spring and summer.

The pulp of the flowers is edible.

Found in EVC 160 Coastal Dune Scrub.



Acaena novae-zelandiae
(Bidgee Widgee)

A prostrate, spreading herb. Spreads up to 4m wide.

Tolerates a wide range of soils and grows in full-shade, part-shade and full-sun.

Has bright green pinnate leaves up to 4cm long with 7-11 toothed leaflets. Roots from leaf nodes.

Balls of greenish-white flowers. Flowers are followed by balls of reddish fruits covered in burrs. Flowers October to January.

Useful plant for erosion control through soil binding.

Found in EVC 55 Plains Grassy Woodland and EVC 666 Mosaic.

(Cardinia Shire, 2020)



Dianella tasmanica (Tasman Flax-lily)

A rhizomatous, perennial herb. Grows up to 1m in height.

Leaves are leathery and long. The flower stalks rise above the foliage on tall stems. Flowers are deep blue to purple. Filaments are yellow and anthers are yellow. The fruit are blue to purple and usually longer than wide. (ANBG, date unknown)

Grows in a range of soil conditions, but prefers partly-shaded moist conditions.

Found in EVC 3 Damp sand Herb-rich Woodland and EVC 666 Mosaic.



Lomandra filiformis (Wattle Mat-rush)

A compact, rhizomatous perennial herb. Grows up to 50cm.

Leaves are green and flat. Each leaf is tipped with one to three tiny light brown points. Clusters of flowers are cream to light yellow appear most commonly from October to November.

Grows in a range of soil conditions generally found in open forest and woodland areas. *Lomandra filiformis* tolerates drier conditions than *Lomandra longifolia*. (ANBG, date unknown)

Found in EVC 3 Damp sand Herb-rich Woodland.



*Lomandra longifolia*** (Spiny Headed Mat-rush)

A rhizomatous, perennial herb. Grows up to 1m.

Leaves are glossy green and flat. Clusters of flowers are straw-coloured and have a spike-like structure. Flowers can attract pollinating insects.

Grows in a range of soil conditions including sandy soils, swamps and creek banks. Can tolerate occasional flooding.

Base of leaves used as indigenous food source. (ANBG, date unknown)



Ficinia nodosa (Knobby Club-sedge)

Formerly known as *Isolepis nodosa*.

Rhizomatous perennial sedge with an upright habit up to 0.8m.

Found in coastal locations. It can tolerate exposure to ocean winds. Responds well to pruning every 2 to 3 years.

Brownish/cream flowers in spring and summer.

Found in EVC 160 Coastal Dune Scrub.

6. MERRI RIVER PLANT LIST

		ECOLOGICAL VEGETATION CLASS							CHARACTER ZONE – SUITABLE LOCATION						VIEWLINES
SCIENTIFIC NAME	COMMON NAME	Damp Sands Herb-rich Woodland	Swamp Scrub	Plains Grassy Woodland	Riparian Shrubland (EVC 19) /Escarpment Shrubland (EVC 895) /Grassy Woodland (EVC 55) Mosaic	Swamp Scrub (EVC53) /Aquatic Herbland (EVC653) Mosaic	Estuarine Wetland	Coastal Dune Scrub	Rural Living	Rural	Urban	Peri-Urban	Coastal	Coastal - Urban	Species suitable for use where views are to be retained***
MEDIUM TO LARGE TREES (TYPICALLY >8M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Acacia mearnsii</i>	Black Wattle			✓	✓				✓	✓	✓	✓			✗
<i>Acacia melanoxylon</i>	Blackwood	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✗
<i>Allocasuarina verticillata</i>	Drooping Sheoak				✓				✓	✓	✓	✓	✓	✓	✗

MEDIUM TO LARGE TREES (>8M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Eucalyptus ovata</i>	Swamp Gum	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✗
<i>Eucalyptus viminalis</i> ssp. <i>viminalis</i>	Manna Gum	✓		✓	✓				✓	✓	✓	✓			✗
LARGE SHRUBS AND SMALL TREES (2-8M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Acacia paradoxa</i>	Hedge Wattle			✓	✓				✓	✓	✓	✓			✗
<i>Acacia pycnantha</i>	Golden Wattle			✓	✓				✓	✓	✓	✓			✗
<i>Acacia verticillata</i>	Prickly Moses	✓		✓	✓				✓	✓	✓	✓	✓	✓	✗
<i>Allocasuarina paludosa</i>	Swamp Sheoak	✓							✓	✓	✓	✓	✓		✗
<i>Banksia marginata</i>	Silver Banksia	✓							✓	✓	✓	✓	✓	✓	✗
<i>Bursaria spinosa</i>	Sweet Bursaria				✓				✓	✓	✓	✓			✗
<i>Leptospermum lanigerum</i>	Woolly Tea-tree		✓			✓			✓	✓	✓	✓	✓	✓	✗
<i>Melaleuca decussata</i>	Totem-poles		✓			✓			✓	✓	✓	✓	✓	✓	✗
<i>Melaleuca ericifolia</i>	Swamp Paperbark						✓						✓	✓	✗
<i>**Melaleuca lanceolata</i>	Moonah								✓	✓	✓	✓	✓	✓	✗
<i>Melaleuca squarrosa</i>	Scented Paperbark		✓			✓			✓	✓	✓	✓	✓	✓	✗
<i>Myoporum insulare</i>	Common Boobialla	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✗
<i>Ozothamnus ferrugineus</i>	Tree Everlasting			✓	✓				✓	✓	✓	✓			✗

MEDIUM SHRUBS (TYPICALLY 1-2M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Acacia myrtifolia</i>	Myrtle Wattle		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>Adriana quadripartita</i>	Coast Bitter-bush							✓					✓	✓	✓ 30% Max
<i>**Atriplex cinerea</i>	Coast Saltbush												✓	✓	✓ 30% Max
<i>Coprosma quadrifida</i>	Prickly Currant-bush				✓				✓	✓	✓	✓			✓ 30% Max
<i>**Daviesia breviflora</i>	Leafless Bitter-Pea								✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>**Daviesia latifolia</i>	Hop Bitter-Pea								✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>Epacris impressa</i>	Common Heath	✓							✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>Hedycarya angustifolia</i>	Austral Mulberry				✓				✓	✓	✓	✓			✓ 30% Max

MEDIUM SHRUBS CONT'D (TYPICALLY 1-2M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Hymenanthera dentata</i> <i>s.l</i>	Tree Violet				✓				✓	✓	✓	✓			✓ 30% Max
<i>Leptospermum</i> <i>continentale</i>	Prickly Tea-tree	✓							✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>Leptospermum</i> <i>scoparium</i>	Manuka		✓			✓			✓	✓	✓	✓	✓	✓	✓ 30% Max
<i>Leucopogon parviflorus</i>	Coast Beard-heath							✓					✓	✓	✓ 30% Max
** <i>Melaleuca gibbosa</i>	Slender Honey-myrtle								✓		✓	✓			✓ 30% Max
<i>Olearia axillaris</i>	Coast Daisy-Bush							✓					✓	✓	✓ 30% Max
<i>Rhagodia candolleana</i> <i>ssp. candolleana</i>	Seaberry Saltbush							✓					✓	✓	✓ 30% Max
<i>Rhagodia parabolica</i>	Fragrant Saltbush				✓				✓	✓	✓	✓	✓	✓	✓ 30% Max

SMALL SHRUBS AND PROSTRATE SHRUBS (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Astroloma humifusum</i>	Cranberry Heath	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
<i>Acrotriche serrulata</i>	Honey-pots	✓							✓	✓	✓	✓	✓	✓	✓
<i>Bossiaea prostrata</i>	Creeping Bossiaea			✓	✓				✓	✓	✓	✓			✓
<i>Correa alba</i> var <i>pannosa</i> 'Western Pink Star'	Western Pink Star Correa							✓					✓	✓	✓
<i>Correa reflexa</i> 'Granny's Grave'	Granny's Grave Correa							✓					✓	✓	✓
<i>Enchylaena tomentosa</i> var. <i>tomentosa</i>	Ruby Saltbush				✓				✓	✓	✓	✓	✓	✓	✓
<i>Hibbertia stricta</i> s.l.	Upright Guinea-flower	✓							✓	✓	✓	✓	✓	✓	✓
<i>**Kunzea pomifera</i>	Muntries								✓	✓	✓	✓			✓
<i>Leucopogon virgatus</i>	Common Beard-heath		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>*Leucophyta brownii</i>	Cushion Bush										✓	✓	✓	✓	✓
<i>Pimelea humilis</i>	Common Rice-flower		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
<i>Zygophyllum billardierei</i>	Coast Twin-leaf							✓					✓	✓	✓

HERBS (TYPICALLY <1M)****		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Acaena echinata</i>	Sheep's Burr			✓	✓				✓	✓	✓	✓			✓
<i>Acaena novae-zelandiae</i>	Bidgee Widgee			✓	✓				✓	✓	✓	✓			
<i>Apium prostratum</i> ssp. <i>prostratum</i>	Sea Celery							✓					✓	✓	✓
<i>Carpobrotus rossii</i>	Karkalla or Pigface							✓					✓	✓	✓
<i>Dichondra repens</i>	Kidney-weed		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
<i>Einadia nutans</i> ssp. <i>nutans</i>	Nodding Saltbush				✓				✓	✓	✓	✓			✓
<i>Euchiton collinus</i> s.l.	Creeping Cudweed				✓				✓	✓	✓	✓			✓
<i>Gonocarpus tetragynus</i>	Common Raspwort	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
<i>Hydrocotyle laxiflora</i>	Stinking Pennywort	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
<i>Hydrocotyle pterocarpa</i>	Wing Pennywort		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Hypericum gramineum</i>	Small St John's Wort	✓							✓	✓	✓	✓	✓	✓	✓
<i>Kennedia prostrata</i>	Running Postman	✓							✓	✓	✓	✓	✓	✓	✓
<i>Lagenophora stipitata</i>	Common Bottle-daisy	✓							✓	✓	✓	✓	✓	✓	✓
<i>Leptinella longipes</i>	Coast Cotula						✓						✓	✓	✓

HERBS (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Myriophyllum simulans</i>	Amphibious Water-milfoil					✓							✓	✓	✓
<i>Oxalis exilis</i>	Shady Wood-sorrel	✓							✓	✓	✓	✓	✓	✓	✓
<i>Oxalis perennans</i>	Grassland Wood-sorrel			✓	✓				✓	✓	✓	✓			✓
<i>Persicaria decipiens</i>	Slender Knotweed		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Potamogeton tricarinatus</i> s.l.	Floating Pondweed					✓							✓	✓	✓
<i>Samolus repens</i>	Creeping Brookweed						✓						✓	✓	✓
<i>Sarcocornia quinqueflora</i> ssp. <i>quinqueflora</i>	Beaded Glasswort						✓						✓	✓	✓
<i>Senecio glomeratus</i>	Annual Fireweed	✓							✓	✓	✓	✓	✓	✓	✓
<i>Senecio odoratus</i> var. <i>odoratus</i>	Scented Groundsel		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Senecio pinnatifolius</i>	Variable Groundsel							✓					✓	✓	✓
<i>Solenogyne dominii</i>	Smooth Solenogyne	✓							✓	✓	✓	✓	✓	✓	✓
<i>Stackhousia spathulata</i>	Coast Stackhousia							✓					✓	✓	✓

HERBS CONT'D (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Threlkeldia diffusa</i>	Coast Bonefruit							✓					✓	✓	✓
<i>Urtica incisa</i>	Scrub Nettle		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Utricularia australis</i>	Yellow Bladderwort					✓							✓	✓	✓
<i>Wahlenbergia communis</i> s.l.	Tufted Bluebell				✓				✓	✓	✓	✓			✓
<i>Wahlenbergia gymnoclada</i>	Naked Bluebell	✓							✓	✓	✓	✓	✓	✓	✓

GRAMINOIDS (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Apodasmia brownii</i>	Coarse Twine-rush						✓						✓	✓	✓
<i>Amphibromus sinuatus</i>	Wavy Swamp Wallaby-grass					✓							✓	✓	✓
<i>Austrostipa bigeniculata</i>	Knead Spear-grass				✓				✓	✓	✓	✓			✓
<i>*Austrodanthonia penkillata</i>	Slender Wallaby-grass								✓	✓	✓	✓	✓	✓	✓
<i>*Austrodanthonia Procera</i>	Tall Wallaby Grass								✓	✓	✓	✓	✓	✓	✓
<i>Austrodanthonia racemosa</i> var. <i>racemosa</i>	Stiped Wallaby-grass			✓	✓				✓	✓	✓	✓	✓	✓	✓

GRAMINOIDS CONT'D (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Austrodanthonia setacea</i>	Bristly Wallaby-grass			✓	✓				✓	✓	✓	✓			✓
<i>Austrostipa bigeniculata</i>	Kneed Spear-grass			✓	✓				✓	✓	✓	✓			✓
<i>Austrostipa mollis</i>	Supple Spear-grass			✓	✓				✓	✓	✓	✓			✓
<i>Baumea articulata</i>	Jointed Twig-sedge					✓							✓	✓	✓
<i>Baumea rubiginosa s.l.</i>	Soft Twig-rush	✓							✓	✓	✓	✓	✓	✓	✓
<i>Baumea juncea</i>	Bare Twig-sedge						✓						✓	✓	✓
<i>Calystegia sepium</i>	Large Bindweed						✓						✓	✓	✓
<i>Carex appressa</i>	Tall Sedge		✓		✓	✓			✓	✓	✓	✓	✓	✓	✓
<i>Deyeuxia quadriseta</i>	Reed Bent-grass	✓							✓	✓	✓	✓	✓	✓	✓
<i>*Dianella revoluta</i>	Spreading Flax-lily or Black Anther Flax-lily								✓	✓	✓	✓	✓	✓	✓
<i>Dianella tasmanica</i>	Tasman Flax-lily	✓			✓				✓	✓	✓	✓	✓	✓	✓
<i>Distichlis distichophylla</i>	Australian Salt-grass						✓						✓	✓	✓
<i>Elymus scaber</i> var. <i>scaber</i>	Common Wheat-grass			✓	✓				✓	✓	✓	✓			✓
<i>Ficinia nodosa</i>	Knobby Club-rush							✓					✓	✓	✓

GRAMINOIDS CONT'D (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Gahnia clarkei</i>	Tall Saw-sedge		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Gahnia filum</i>	Chaffy Saw-sedge						✓						✓	✓	✓
<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Gahnia trifida</i>	Coast Saw-sedge		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Isolepis fluitans</i>	Floating Club-sedge					✓							✓	✓	✓
<i>Juncus kraussii</i> <i>ssp. australiensis</i>	Sea Rush						✓						✓	✓	✓
<i>Juncus procerus</i>	Tall Rush	✓							✓	✓	✓	✓	✓	✓	✓
<i>Lachnagrostis billardierei</i> <i>ssp. billardierei</i>	Coast Blown-grass							✓					✓	✓	✓
<i>Lachnagrostis filiformis</i> (perennial variety)	Wetland Blown-grass					✓							✓	✓	✓
<i>Lachnagrostis filiformis</i>	Common Blown-grass					✓							✓	✓	✓
<i>Lepidosperma laterale</i>	Variable Sword-sedge					✓							✓	✓	✓
<i>Lepidosperma longitudinale</i>	Pithy Sword-sedge	✓							✓	✓	✓	✓	✓	✓	✓
<i>Lomandra filiformis</i>	Wattle Mat-rush	✓							✓	✓	✓	✓	✓	✓	✓

GRAMINOIDS CONT'D (TYPICALLY <1M)		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>*Lomandra longifolia</i>	Spiny Headed Mat Rush								✓	✓	✓	✓			✓
<i>Microlaena stipoides</i> <i>var. stipoides</i>	Weeping Grass	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
<i>Panicum effusum</i>	Hairy Panic				✓				✓	✓	✓	✓			✓
<i>**Patersonia occidentalis</i>	Long Purple Flag								✓	✓	✓	✓	✓	✓	✓
<i>Phragmites australis</i>	Common Reed		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Poa ensiformis</i>	Sword Tussock-grass				✓				✓	✓	✓	✓			✓
<i>*Poa labillardierei</i>	Common Tussock-grass			✓					✓	✓	✓	✓	✓	✓	✓
<i>Poa poiformis</i>	Coast Tussock-grass						✓						✓	✓	✓
<i>Poa rodwayi</i>	Velvet Tussock-grass	✓		✓					✓	✓	✓	✓	✓	✓	✓
<i>Schoenoplectus pungens</i>	Sharp Club-sedge						✓						✓	✓	✓
<i>Schoenus lepidosperma</i>	Slender Bog-sedge		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Schoenus nitens</i>	Shiny Bog-sedge							✓					✓	✓	✓
<i>Themeda triandra</i>	Kangaroo Grass	✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
<i>Triglochin procerum s.l.</i>	Water Ribbons					✓							✓	✓	✓

CLIMBERS		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Clematis microphylla</i> var. <i>microphylla</i>	Small-leaved Clematis				✓			✓	✓	✓	✓	✓	✓	✓	✓
<i>Comesperma volubile</i>	Love Creeper	✓							✓	✓	✓	✓	✓	✓	✓
<i>Convolvulus</i> <i>erubescens</i> spp. agg.	Pink Bindweed				✓				✓	✓	✓	✓			✓
<i>Muehlenbeckia adpressa</i>	Climbing Lignum		✓			✓			✓	✓	✓	✓	✓	✓	✓
<i>Pandorea pandorana</i>	Wonga Vine				✓				✓	✓	✓	✓			✓
<i>Tetragonia implexicoma</i>	Bower Spinach							✓					✓	✓	✓
FERNS		EVC3	EVC53	EVC55	EVC666	EVC720	EVC10	EVC160	RL	R	U	P-U	C	C-U	VIEWLINES
<i>Blechnum minus</i>	Soft Water-fern		✓		✓	✓			✓	✓	✓	✓	✓	✓	✓
<i>Calochlaena dubia</i>	Common Ground-fern				✓				✓	✓	✓	✓			✓
<i>Cheilanthes distans</i>	Bristly Cloak-fern				✓				✓	✓	✓	✓			✓
<i>Dicksonia antarctica</i>	Soft Tree-fern				✓				✓	✓	✓	✓			✓
<i>Polystichum proliferum</i>	Mother Shield-fern				✓				✓	✓	✓	✓			✓
<i>Pteridium esculentum</i>	Austral Bracken				✓				✓	✓	✓	✓			✓
<i>Todea barbara</i>	Austral King-fern				✓				✓	✓	✓	✓			✓

Notes: *Native species found in the Warrnambool Bioregion which are not typically found in the EVC immediately adjacent the Merri River, but are approved for use by Warrnambool City Council and the GHCMA.

**Native species not found in the Warrnambool Bioregion, but are approved for use by Warrnambool City Council and the GHCMA. (WCC, date unknown, p. 26)

References: Warrnambool Plain Bioregion EVC list (DELWP¹), Merri River Restoration Strategy (WCC, date unknown), Australian Plants Society – Warrnambool and District Group Inc Pty Ltd (APS, 2020) and Plants of the Great South West (Sparrow, K. 2013). ***Planting in viewlines. In situations where the river embankment is very steep, medium shrub coverage of more than 30% may be acceptable provided that it can be demonstrated to Council that viewlines from public paths/roads will not be restricted. ****Herbs will be difficult to establish, except in mulched garden beds.

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APPENDIX 1: MERRI RIVER LANDSCAPING AND REVEGETATION CHECKLIST

Steps for planning landscape and revegetation projects along the Merri River:

☐ **STEP 1 – SELECT THE CHARACTER ZONE**

Determine which character zone the area falls within. This helps to determine what species will be appropriate for the location.

☐ **STEP 2 – LOOK AT THE LANDSCAPE CONTEXT**

Determine what the landscape context is of the site. Determining the landscape context involves identifying the current/future use of the land adjacent to the river and ensuring the design and plants selected will be compatible with the land use and also achieve good ecological and/or social outcomes, depending on the location.

☐ **STEP 3 – COMPLETE A SITE ANALYSIS**

Carry out a thorough site analysis, including identification of any key viewlines to and from public land adjacent to the river that need to be protected. Map 5 shows key viewlines from the public open space reserves in the Urban Zone on the south side of the Merri River.

☐ **STEP 4 – PREPARE THE PLANTING PLAN**

Prepare a plan of the length to be landscaped. Show a plan drawn to scale showing, site orientation, surface levels (where known), edge of River, existing vegetation to be retained/removed, proposed plant species including densities, locations of existing/proposed paths, mulching details, and any other relevant information.

☐ **STEP 5 - FILL IN THE WARRNAMBOOL CITY REVEGETATION PLAN TEMPLATE - CHECKLIST**

Attached to the Warrnambool City Council Revegetation Policy.

☐ **STEP 6 – SUBMIT THE PROPOSAL TO COUNCIL FOR APPROVAL***

***Note:** the Landscape Guidelines and checklist can also be applied to development applications requiring the submission of a Landscaping Plan for public open space adjoining the river. However, the assessment process for such applications would need to follow the normal planning assessment process, with landscaping plans endorsed by the planning department.