



hansen

# werribee river shared trail strategy

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in association with  
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on behalf of melton city council  
wyndham city council  
parks victoria

april 2013



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# 1 introduction

The Werribee River is the major waterway in the west of Melbourne, part of which flows through the City of Melton and the City of Wyndham. These two areas are rapidly growing communities which provide an urban-rural lifestyle with close access to the city, major transport routes and an extensive range of services for the community, visitors and local businesses.

The Werribee River provides farmers and irrigators with extensive amounts of water year round. It is dammed at the Exford Weir, controlling supply downstream to the Southern Rural Diversion Weir and Channel, which supplies water to market gardeners in Werribee South. A large sewerage treatment plant, Surbiton Park, is operated by Western Water beside the river, south of Melton.

The riparian areas and escarpments along the Werribee River are a major natural feature of the region and the corridor is of great interest to geologists with the state significant Mt Cottrell nearby, and spectacular cuttings through geologically

recent volcanic flows. The waterway and surrounds is also home to an extensive variety of native fauna and flora, some of which is listed as nationally significant. Key fauna include Growling Grass Frog, Striped Legless Lizard, Golden Sun Moth, platypus, kangaroos, wallabies, koalas, waterbirds, raptors and reptiles and sections of the river surrounds contain the critically endangered Plains Grassland ecological vegetation community.

Many areas along the river have been grazed by cattle, sheep and goats over an extended period of time. Significant pest plant and animal problems exist along the river with serrated tussock and rabbits being of particular concern. Unauthorised river crossings and extractive industries have also resulted in some degradation of the waterway and surrounds. The river corridor also has an extensive history of aboriginal occupation, with middens and burial sites recorded along the waterway.

The Werribee River Shared Trail was identified in Parks Victoria’s metropolitan open space strategy; *Linking People & Spaces* (Parks Victoria, 2002) where it was recognised that access to regional open space was poor in both Melton and Wyndham Councils. Significant sections of the river within the study area have little public access, despite extensive parts in public ownership, and this project aims to explore the development of appropriate links along the corridor between the two centres. It also provides the opportunity to link key assets such as the Exford Weir, Eynesbury Township and golf course development, Cobbledick’s Ford and disconnected crown land, especially as further urban development and transport infrastructure is planned in the study area. It should be noted the trail alignment shown in the strategy is indicative only and detailed design will have to take place before any construction works can commence.

The development of this strategy is a highly significant, long-term planning and design strategy which will enable State Government Agencies, Wyndham City and Melton City to establish a new open space corridor along the Werribee River which will provide a natural, cultural, recreational and tourism focus for current and future residents of this rapidly expanding area of metropolitan Melbourne.



figure 1: context map

## 1.1 study area

The study area will be from the Western Freeway (Toolern Creek) in the north and continue downstream, incorporating the Werribee River from Exford Weir to Presidents Park and the Riverbend Historical Park in Wyndham Vale. Both sides of the waterway will be included. A number of significant infrastructure assets and recreational and tourism attractions are located along the corridor environs including:

- The Melton Reservoir;
- Toolern Creek Regional Park;
- Melton Recycled Water Plant (Surbiton Park);
- Proposed Western Grasslands Reserve;
- Future Werribee Township Regional Park;
- Presidents Park (active recreation open space);
- Proposed Outer Metropolitan Ring Road and Trail; and
- Proposed Regional Rail Link and Trail.

## 1.2 objectives of the strategy

The project aims to explore the development of appropriate links along the Werribee River between Wyndham and Melton, especially as further urban development and infrastructure is planned in the study area (including road and rail). This is a rare opportunity to establish a strategy for the River and environs between the two centres before decisions are taken about urban expansion, major public infrastructure and private land development investment.

A Strategy is required to address a number of specific and significant issues, so council(s) and other stakeholders have a clear Concept Plan to guide the development of the River trail. This recognises that Councils and other government agencies do not possess a current centrally adopted directional statement to guide investment, management or long term planning and sustainability of a Werribee River trail.

Melton and Wyndham Councils intend to utilise the Strategy as a strategic document to guide decisions surrounding future land-use planning. It will assist in the preparation of Precinct Structure Plans for Wyndham's growth areas. The Strategy is expected to provide planning guidance on the future of public open space along the river, as well as investigating the necessity of land acquisitions to ensure contiguous reserves. For the purposes of this project the River will be broken up into sections, referred to as 'reaches'.

For Melton City one of the key outcomes of the strategy is for the identification of priorities for actual works, which can be commenced immediately on funding becoming available. It is expected that the Plan will provide indicative costs associated with future on-ground works. Wyndham City will use the Strategy to undertake further design development to determine future trail alignments and park boundaries adjacent to this new open space.

Specific objectives for the Strategy include:

- Determine the best alignment and access points for the proposed shared trail;
- Identify any potential links (tourism, commercial and environmental) and associated land uses that may be reasonably developed along the river to benefit the residents of Wyndham and Melton;
- Consider future land use planning and provide guidance on the provision of public open space along the river to support and enhance the trail, identifying affected public and private land holdings, with options and recommendations for accessing such land;
- Identify the proposed management zones and determine the potential conservation and recreational activities that can be accommodated within the corridor;
- Protect environmental, cultural and historical values including fire and weed management;
- Consider the role of the trail in raising community awareness of nature conservation and the protection of native flora and fauna
- Engage the community in the maintenance and restoration of the river and surrounds.

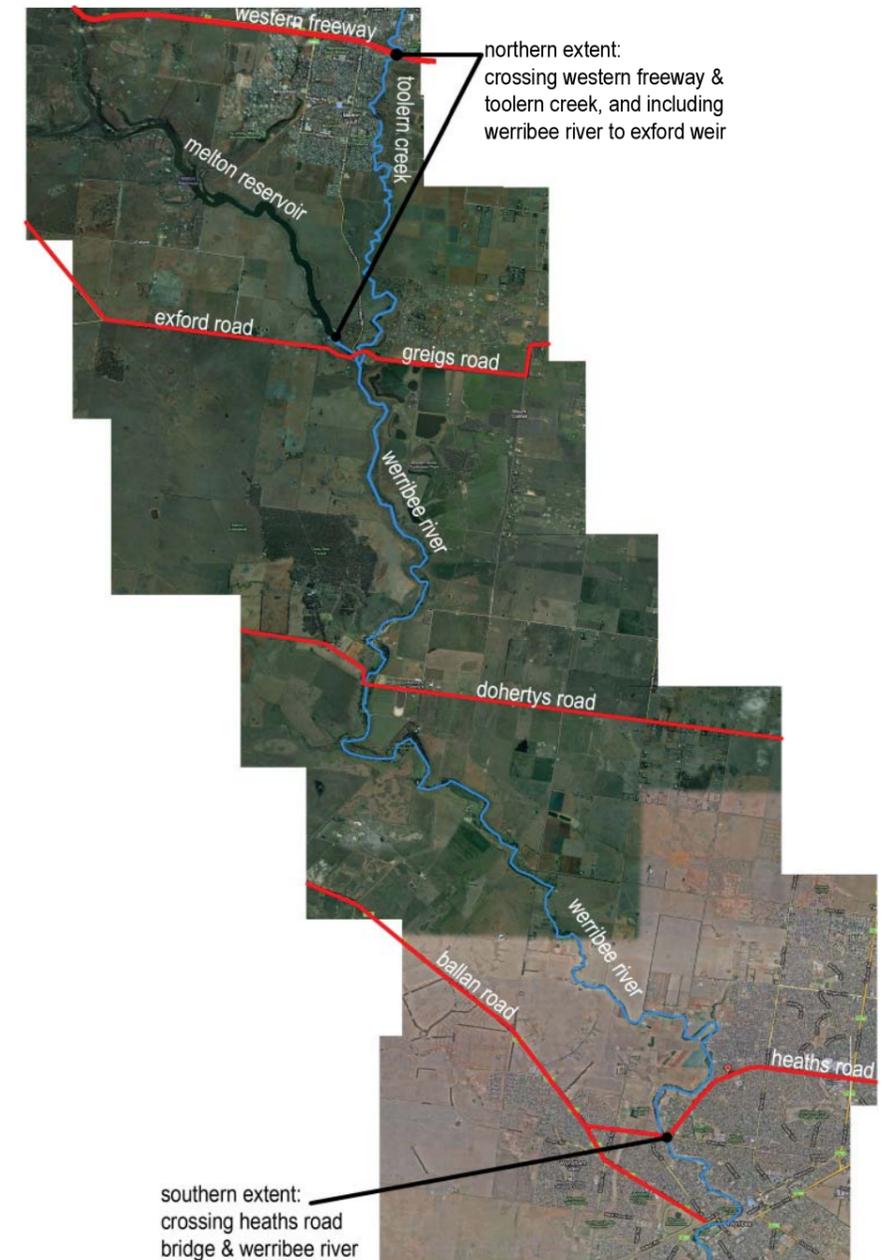


figure 2: study area

## 1.3 policy context

### linking people and spaces

*Linking People & Spaces (LPS)*, a strategy for Melbourne's open space network prepared by Parks Victoria in 2002, identifies a number of measures specifically relating to the Werribee River.

Of most significance to this project (the Werribee River Shared Trail Strategy) is the *LPS*' recommendation to "extend the Werribee River Trail north to the Melton Township" as a long term action.

The *LPS* (2002) outlines a strategy to realise the following vision statement: "a linked network of open space for all to enjoy as a part of everyday life, preserved and enhanced into the future". Underpinning the vision are the following five guiding principles supported by key objectives.

- Partnerships;
- Equity of access;
- Diversity;
- Flexibility and responsiveness; and
- Sustainability.

More than 150 actions are defined in order to realise the vision based on the principles and objectives outlined. The actions include planning and development of new parks; extensions to the metropolitan shared-use trail network; upgrades of visitor facilities and supporting infrastructure in existing parks, waterways and coastal activity nodes; and expansion of protected areas and urban land in public ownership. Actions have been prioritised into more immediate needs (one to three years), medium term actions (four to nine years) and actions that have a longer term focus (ten plus years).

Other actions relevant to the Werribee River Shared Trail Strategy include (note: some of the proposed actions have been completed or are currently underway):

- Develop a new regional recreation and conservation park along the lower reaches of the Werribee River (1 to 3 years).
- Investigate options and define park boundaries for new regional parks at Melton Township, Werribee Township and Caroline Springs (1 to 3 years).
- Investigate the potential for developing additional facilities and attractions at the Werribee Park precinct, thereby promoting the zone as a major tourist, recreation, education and conservation destination (1 to 3 years).

- Protect and enhance riparian vegetation along the waterways including Werribee River, Kororoit Creek, Maribyrnong River and Skeleton Creek (1 to 3 years).
- Close gaps in the Bay Trail from the Werribee River Trail to Point Cook Coastal Park, in order to form part of a continuous coastal open space link between Williamstown and Werribee South (1 to 3 Years).
- Extend the Werribee River Trail from Werribee Park south to the proposed Bay Trail (1 to 3 Years).
- Close key gaps and complete missing links in the Bay Trail and the Werribee River Trail (4 to 9 years).
- Establish new parkland around the Werribee growth area in order to meet demand for recreation opportunities (10 years plus).

### approved growth corridor plans: managing melbourne's growth (june 2012)

The approved Growth Corridor Plans prepared by the Growth Areas Authority, have been released for public comment. These plans set the strategic direction for future urban development of land brought into Melbourne's Urban Growth Boundary over the coming decades.

The Growth Corridor Plans are high level integrated land use and transport plans that provide a strategy for the development of Melbourne's growth corridors over the coming decades. These plans identify areas for housing, jobs, transport, town centres, open space and key infrastructure for Melbourne's newest suburbs.

The plans are a tool to guide and inform future decisions regarding urban development and infrastructure that may be required to service these new communities over the long term. They should not be interpreted as committing the government to delivering specific infrastructure or development projects or specific levels of service provision.

Figure 3 (*West Integrated Open Space Concept Plan*) below shows the intention of the Plan to establish the Werribee River Shared Trail as part of the Metropolitan Trail Network, and Figure 4 (*West Growth Corridor Plan*) identifies a key segment of the Werribee River as a Growling Grass Frog Investigation Corridor.

### melbourne 2030 (department of sustainability and environment, 2002)

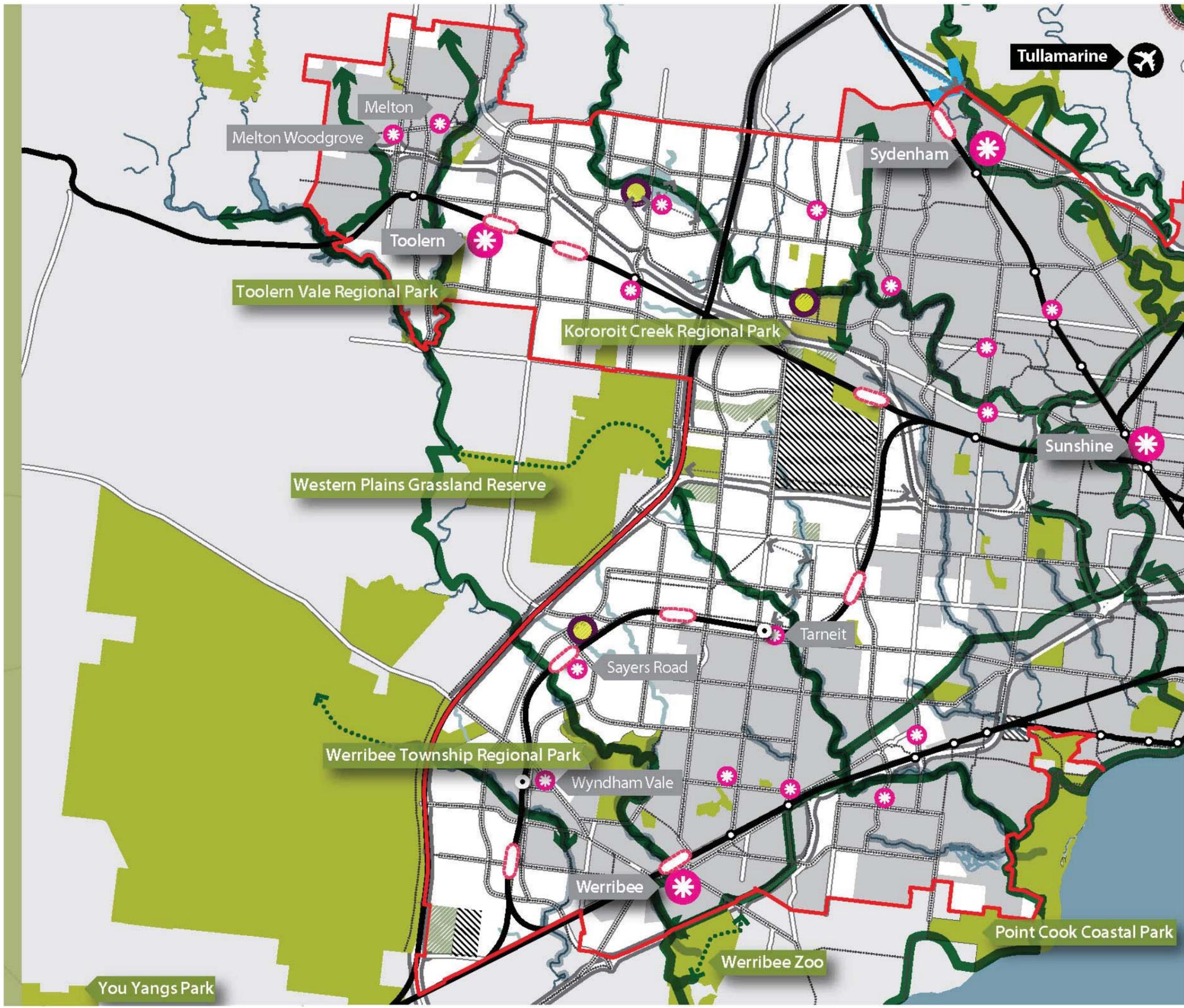
A key direction of open space planning as identified within *Melbourne 2030* is to 'rectify gaps in the network of metropolitan open space by creating new parks and ensure major open space corridors are protected and enhanced.' The document notes that the metropolitan open space network consists of the following areas relevant to the Werribee River Shared Trail Strategy:

- Major (regional) parks managed by Parks Victoria
- The Metropolitan Trail Network
- Linear open space corridors including waterways
- Areas of cultural and environmental significance

*Melbourne 2030* gives priority to developing open space networks in growth areas where existing open space is limited and demand is growing, and in non-metropolitan parts of the region, including 'The Werribee Precinct'. A key initiative for the metropolitan open space network is to reserve land for six new metropolitan parks to redress the current imbalance and provide for future growth areas:

- Werribee River Regional Park
- Werribee Township Regional Park
- Kororoit Creek Regional Park
- Merri Creek Regional Park
- Melton Township Regional Park
- Cranbourne Regional Park

# West Integrated Open Space Concept Plan



- Central Activity Area
- Principal Town Centre
- Major Town Centre
- Train Station
- Future Station
- Opportunity for Future Rail Station
- Urban Growth Boundary
- Existing Urban Area
- Area Outside UGB
- Regional Open Space (not all publicly accessible)
- Potential Regional Open Space (not all publicly accessible)
- Potential Regional Active Open Space
- Potential Bicycle Network
- Principal Bicycle Network Links
- Metropolitan Trail Network
- Metropolitan Trail Network Links
- Landscape Values

figure 3: west integrated open space concept plan

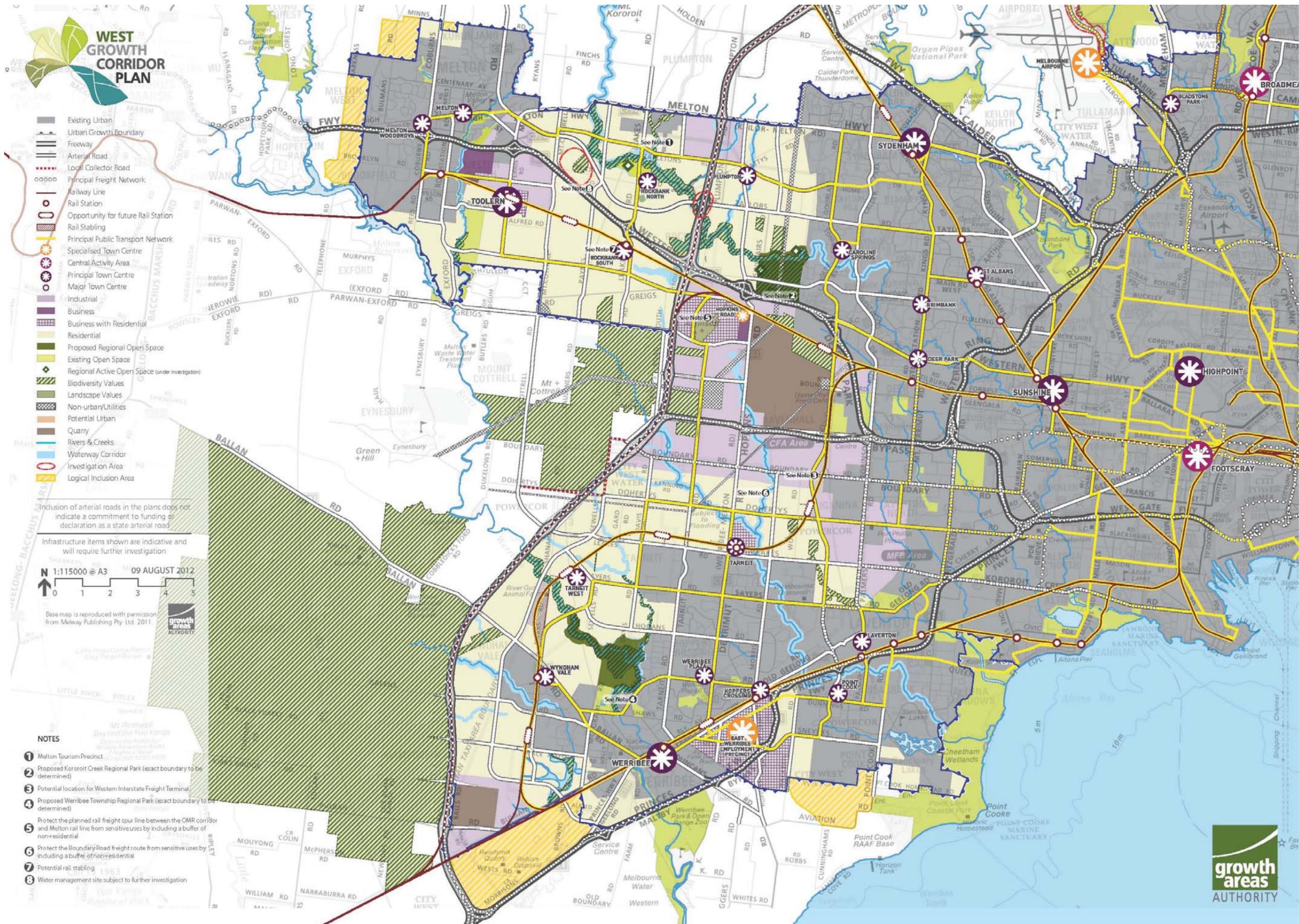


figure 4: west growth corridor plan

## 1.4 key tasks

Preparation of the Werribee River Shared Trail Strategy has comprised five key tasks:

- Information gathering – through desktop investigations, physical investigations and stakeholder consultation to identify issues and form the ‘knowledge base’ for the subsequent project phases.
- Information processing – identification and mapping of all physical constraints to trail development and potential synergies between activities and natural / cultural attractions within the corridor as well as the assessment of key community infrastructure needs and opportunities.
- Benchmarking – identification of other established trail networks within Metropolitan Melbourne and beyond as a means of defining current best practice.
- Mapping – resolution of proposed trail alignment, in consideration of physical features and key attributes, linkages, accessibility and legibility.
- Reporting - development of an explanatory report outlining the strategic justification for all identified sites, activities and linkages including recommendations for their implementation and management.

## 1.5 project management

Two project groups have assisted in providing high level and technical input into the Werribee River Shared Trail Strategy. The composition of these is outlined below.

### project control group

The Project Control Group (PCG) guides and oversees the project, providing high level direction on key issues and the approval of all elements of the project before presentation to the Councillors and the general public. This group includes representatives from Melton City Council, Wyndham City and Parks Victoria.

### project team

The project team structure outlined below makes provision for expertise across strategic planning, urban design, landscape architecture, ecology, cultural heritage (both Aboriginal and Historical), community infrastructure planning, open space planning, hydrology and geomorphology.

#### **Hansen Partnership**

Project Management, Landscape Architecture, Urban Design & Urban Planning

#### **Ecology & Heritage Partners**

Ecology & Heritage Assessment, Research & Management

#### **ASR Consultants**

Land Use & Community Infrastructure Strategic Planning & Research

#### **Cardno**

Engineering, Water Resources & Geomorphology

## 2 information gathering

The gathering of information to inform the preparation of the Strategy was fundamentally undertaken in three ways; desktop investigations, physical investigations and stakeholder engagement. These approaches are complementary and ensure a holistic, comprehensive means of gathering and processing all relevant information.

### 2.1 desktop investigations

A review of background documents and existing relevant data was undertaken in order to gain an appreciation of current and future strategic planning for urban expansion within both municipalities, and the manner by which existing and new urban areas will interface with the river corridor. A comprehensive background report is included as an appendix to this report which includes a review of a number of the following resources.

- Planning documents, including: *the State Planning Policy Framework, Amendment VC68: Delivering Melbourne's Newest Sustainable Communities, Melton Planning Scheme, Wyndham Planning Scheme and Growth Corridor Plans.*
- Urban Development documents, including the *Eynesbury Township Development Plan, Toolern Precinct Structure Plan, Wyndham Growth Area Framework Plan and Tarneit West Outline Development Plan.*
- Public Open Space documents, including: *Linking People & Spaces (2002)* and the *Discussion Paper (2010), Melton City Leisure & Open Space Strategy, Toolern Creek Park Master Plan, Melton Reservoir Development Strategy, Clarkes Road Draft Master Plan, Wyndham Waterways Strategy Plan and Defining Boundaries for Three New Metropolitan Parks* which includes Werribee Township Regional Park, Riverbend Historic Park Master Plan and Wootten Road Reserve Master Plan.

- Environmental & Biodiversity documents, including: *the Biodiversity Assessment Report (Native Vegetation) – Melton Wyndham Investigation Area and Cobble Dick's Ford Reserve: Flora & Fauna Management Plan.*
- Existing mapping, including topographic, cadastral, vegetation, land ownership and land use.
- Relevant flora and fauna databases to determine the extent of previous investigations within or adjacent to the study area. *The Werribee River Shared Trail Strategy Flora and Fauna Desktop Study* prepared by Ecology & Heritage Partners is included as an appendix to this report.
- Relevant heritage databases to identify all previously recorded Aboriginal or historical heritage places and sites or areas of Aboriginal or historical cultural heritage sensitivity. *The Werribee River Shared Trail Strategy Aboriginal and Historical Heritage Assessment* prepared by Ecology & Heritage Partners is included as an appendix to this report.
- Hydrological analysis, hydraulic analysis and flood frequency analysis in order to establish the 10 year flow along the Werribee River.
- Geomorphological characteristics of the river, examining key parameters such as channel slope, depth-width ratio, sinuosity, stream power and areas that may be subject to erosive processes.

### 2.2 physical investigations

Detailed field surveys were undertaken along the entire length of the river corridor to verify findings of the desktop investigations and to identify landscape character units, visual character and any other land-use impacts and characteristics likely to influence the alignment of the trail and future activities which can be accommodated within the corridor.

For the purposes of describing the recorded observations of these physical observations, the river corridor has been broken down into sections (or reaches) to enable the key characteristics of each to be discussed in the following pages.

### reach 1 – toolern creek from the western freeway to bridge road

Approximate length of trail within reach: 2.8km

This section of the Toolern Creek Corridor is characterised by the presence of an established urban area on the western side of the public open space along the creek corridor contrasting with undeveloped agricultural land on the eastern side of the creek corridor. It is important to note however that the land on the eastern side of the creek corridor will include urban development as envisaged by the *Toolern Precinct Structure Plan*. Development of this area commenced in December 2011.

The following information is a summary of the existing conditions of this section of the Toolern Creek Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Plains Grassy Woodland (EVC 55), Creek line Grassy Woodland (EVC 68), Plains Grassland (EVC 132) and Plains Woodland (EVC 803) mainly within the creek corridor.
- Areas of grassland within 'Biosite 3574 – North Western Rail Reserve' may have very high conservation significance.

#### Fauna

- Identified significant fauna include Swift Parrot, Mountain Galaxias, Red-backed Kingfisher, Latham's Snipe and Platypus.
- Significant habitat potential exists for Growling Grass Frog, Striped Legless Lizard, Fat-tailed Dunnart and Golden Sun Moth.

#### Archaeological sites

- 23 previously recorded Aboriginal archaeological sites, comprising 19 artefact scatters, 3 scarred trees and 1 burial site.

#### Historical sites

- No previously recorded historical sites.

#### Landscape character

- Established urban development on the western side of the Toolern Creek Corridor, comprising a continuous ribbon of parkland open space characterised by scattered indigenous and other native trees, mown grass in open areas and the presence of a continuous recreational trail.
- The interface between existing urban development and the creek corridor typically comprises a 'boulevard treatment', with houses facing the roadway on one side and the creek corridor open space on the other.
- Undeveloped and generally flat pastoral land on the eastern side of the Toolern Creek Corridor.
- The creek itself is located within a relatively narrow incised corridor which appears in strong contrast to the flat landscapes abutting it, both by virtue of its topography and the remnant vegetation within it. The visual presence of the creek in the broader landscape is predominantly due to the canopy vegetation which protrudes above the top of the valley escarpment.
- The creek corridor presents as an enclosed landscape, strongly defined by the topographical contrast between the incised creek valley and the flat plain adjoining both sides.
- The Western Freeway, Melbourne – Ballarat Railway and Bridge Road all comprise substantial existing structures which cross the creek corridor.
- New urban development as envisaged by the *Toolern Precinct Structure Plan* will alter the landscape character of the creek corridor to one which is characterised by urban development on both sides. Open space associated with the creek corridor will likely have an 'urban parkland' character.



werribee river  
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existing conditions  
reach 1 of 7

project Ref: 10.464  
dwg no.: ECD-001  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

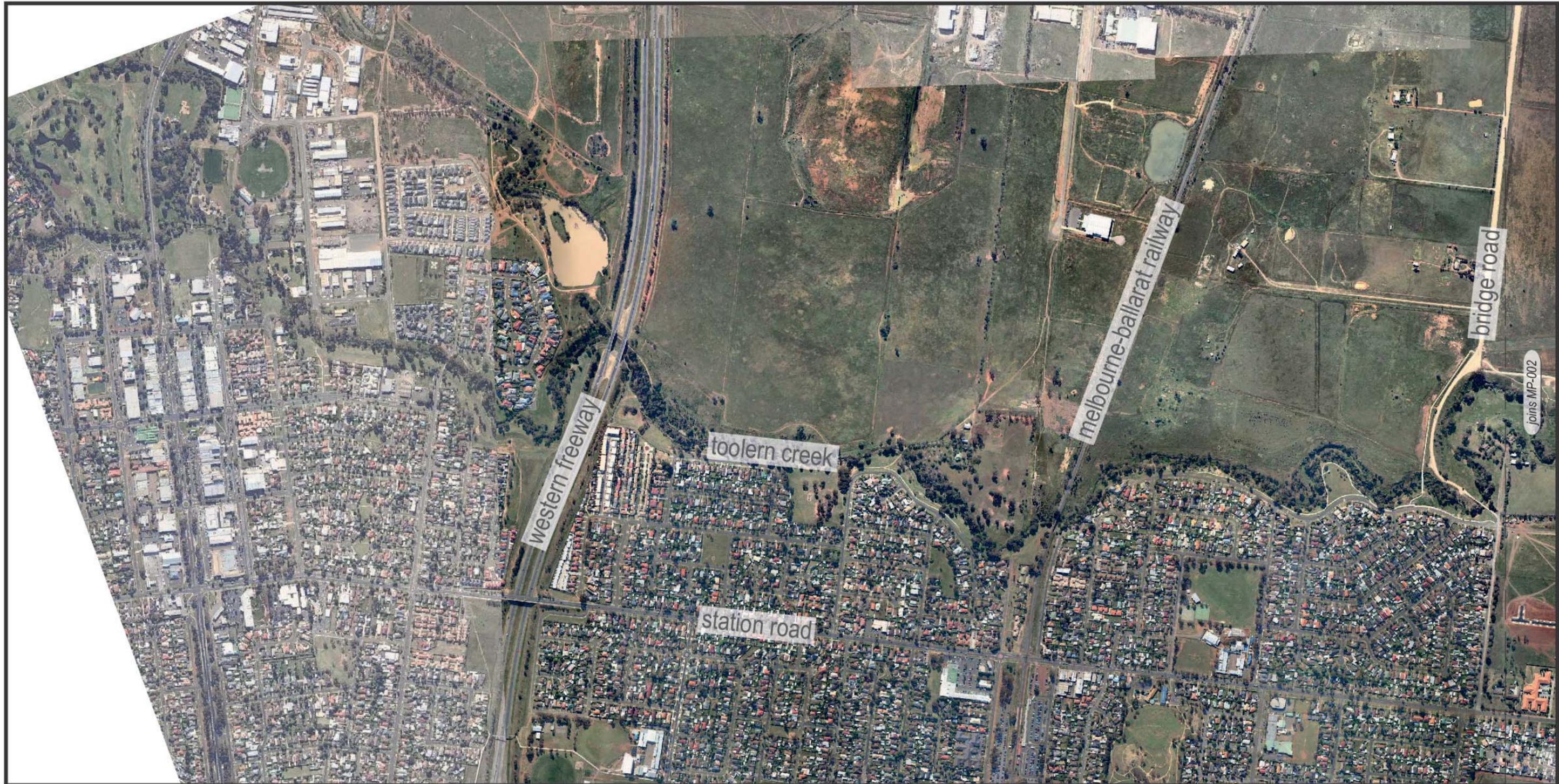
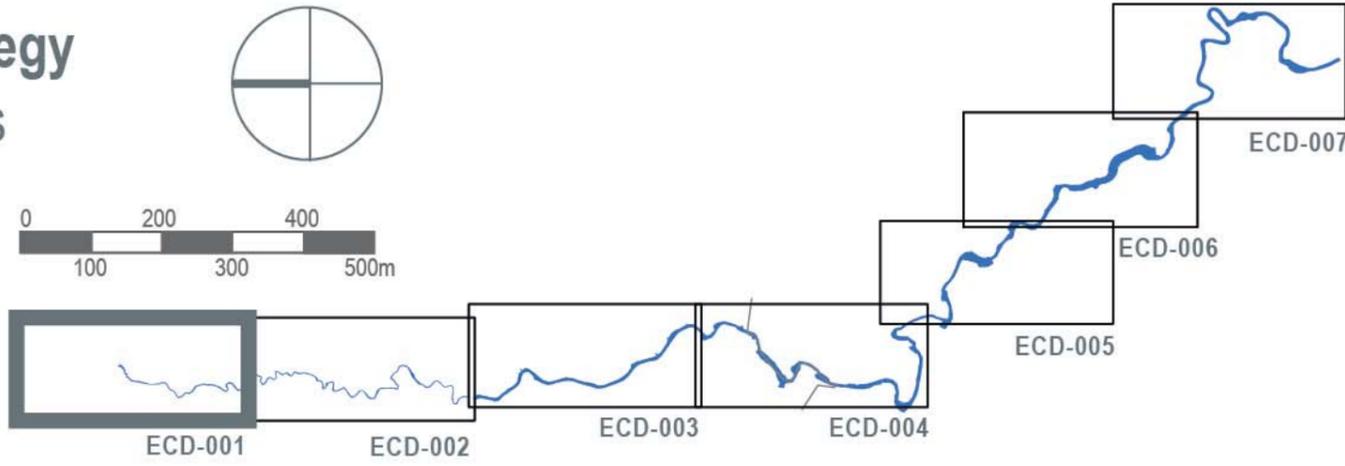


figure 5: existing conditions reach 1

## reach 2 – bridge road to greigs road

Approximate length of trail within reach: 6.2km

This section of the Toolern Creek Corridor is presently abutted on both sides by undeveloped pastoral land, with the exception of the Strathtulloh Estate which is located on the east side of the creek immediately north of Greigs Road, and comprises a low density residential subdivision characterised by individual houses on large allotments sitting amongst scattered vegetation of both remnant and planted trees. Land on both sides of the creek corridor is within the *Toolern Precinct Structure Plan* area, however only the land abutting the west side of the creek corridor will be subject to urban development, as the land abutting the east side (north of the Strathtulloh Estate) comprises the proposed Toolern Creek Parklands.

The following information is a summary of the existing conditions of this section of the Toolern Creek Corridor:

### Flora

- Areas of remnant vegetation present, comprising Plains Grassy Woodland (EVC 55), Creek line Grassy Woodland (EVC 68) and Plains Woodland (EVC 803), mainly within the creek corridor, however extending well beyond the creek corridor as part of the Exford Woodland on the northern edge of the Strathtulloh Estate (east side of Toolern Creek), which includes 'Biosite 3571 – Exford Woodland'.

### Fauna

- Identified significant fauna include Brown Toadlet, Swift Parrot, Diamond Firetail, Brown Treecreeper, Hooded Robin, Hardhead, Musk Duck, Blue-billed Duck, Crested Bellbird, Powerful Owl, Barking Owl, Intermediate Egret, Great Egret, Australasian Shoveler, Pied Cormorant, Spotted Harrier, Royal Spoonbill, Cape Barren Goose, Latham's Snipe and Platypus.
- Significant habitat potential exists for Growling Grass Frog, Striped Legless Lizard, Fat-tailed Dunnart and Golden Sun Moth.

### Archaeological sites

- 25 previously recorded Aboriginal archaeological sites, comprising 20 artefact scatters and 5 scarred trees.

### Historical sites

- 5 previously recorded historical sites, including Toolern Creek Homestead remains, Toolern Creek ruins, Exford Homestead and Strathtulloh Homestead.

### Landscape character

- Undeveloped and generally flat pastoral land on both sides of the Toolern Creek Corridor, with the exception of the Strathtulloh Estate, which comprises a low density residential subdivision, with established houses on large allotments which are typically well vegetated with scattered canopy trees.
- The northern edge of the Strathtulloh Estate is characterised by scattered remnant trees which form part of the Exford Woodland.
- The creek itself is located within a relatively narrow incised corridor which appears in strong contrast to the flat landscapes abutting it, both by virtue of its topography and the remnant vegetation within it. The visual presence of the creek in the broader landscape is predominantly due to the canopy vegetation which protrudes above the top of the valley escarpment.
- The creek corridor presents as an enclosed landscape, strongly defined by the topographical contrast between the incised creek valley and the flat plain adjoining both sides.
- The topographical and geological features of the creek corridor, including rock outcrops and vertical escarpments in the southern portion, are key contributors to the landscape character.
- New urban development as envisaged by the *Toolern Creek Structure Plan* will alter the landscape character of the creek corridor to one which is characterised by urban development with a continuous ribbon of open space along the creek corridor on the western side and a major regional parkland on the eastern side.



photo 1: existing shared trail within the future toolern creek regional park



photo 2: escarpment and creekside remnant eucalypt vegetation on toolern creek



photo 3: rock escarpment along the western side of toolern creek near exford road



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shared trail strategy  
existing conditions  
reach 2 of 7

project Ref: 10.464  
dwg no.: ECD-002  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

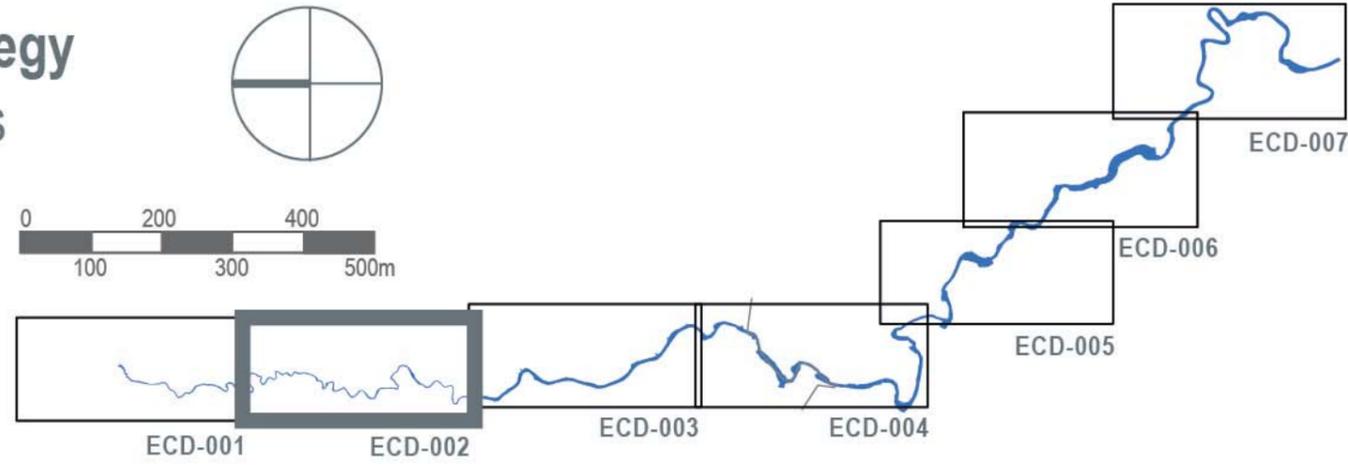


figure 6: existing conditions reach 2

### reach 3 – greigs road to moloneys reserve

Approximate length of trail within reach: 5.3km

This section of the study area includes the confluence of the Toolern Creek with the Werribee River, immediately south of Greigs Road, and continues along the Werribee River Corridor to Moloney's Reserve. The topography is quite dramatic, and essentially comprises a gorge formation for much of its length, with the Werribee River flanked on both sides by typically steep escarpments to a height of approximately 40 to 50 metres above the river bank level. The valley floor is well vegetated with numerous mature remnant canopy trees and associated understorey vegetation in parts. Exposed rock escarpments and a number of deeply incised tributaries are a key feature of the landscape. Panoramic views along and across the valley and the plains beyond are available from numerous locations along the top of the escarpment, whereas views from the valley floor itself are strongly contained, with the top of the escarpment often limiting views beyond the river corridor.

The following information is a summary of the existing conditions of this section of the Werribee River Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Plains Grassy Woodland (EVC 55) and Floodplain Riparian Woodland (EVC 56) within the defined river valley and Plains Grassland (EVC 132) beyond the top of escarpments on both sides of the river.

#### Fauna

- Identified significant fauna include Hardhead, Musk Duck, Australasian Shoveler, Freckled Duck, Blue-billed Duck, Common Sandpiper, Royal Spoonbill, Cape Barren Goose, Diamond Firetail, Spotted Harrier, Grey-crowned Babbler, Brown Treecreeper, Hooded Robin, Crested Bellbird, Masked Owl, Speckled Warbler, Black-chinned Honeyeater, Black-eared Cockatoo, Nankeen Night Heron, Growling Grass Frog, Striped Legless Lizard and Grey Goshawk.
- Significant habitat potential exists for Platypus, Growling Grass Frog, Striped Legless Lizard, Fat-tailed Dunnart and Golden Sun Moth.

#### Archaeological sites

- 18 previously recorded Aboriginal archaeological sites, comprising 16 artefact scatters and 2 scarred trees.

#### Historical sites

- 4 previously recorded historical sites, including Werribee Willows, former Mount Cottrell market garden site, former Yalock Homestead and Moloney's Farm site.

#### Landscape character

The dramatic topography is the primary contributor to landscape character in this section of the river, with the river valley deeply incised into the surrounding plains landscape. The valley in this section is approximately 200 metres wide (measured between top of escarpment on both sides) and up to 40 metres deep (from top of escarpment to river bank).

Extensive rock outcropping is a key visual feature of the escarpments defining the river corridor.

The river course is clearly demarcated by the riparian vegetation which runs along its banks on the valley floor, and contrasts strongly with the more sparsely vegetated embankments and plains beyond.

Expansive vistas along the river valley and across the plains are available from numerous vantage points along the top of the escarpment.

The depth of the valley and the steepness of the valley sides creates a relatively enclosed viewshed, such that vistas from within the valley are typically limited to the top of the escarpment. This also limits views to land uses and facilities on the plains beyond the river corridor. The land on the east is the Surbiton Park Treatment Plant owned by Western Water and the land around the treatment plant is used for irrigated agriculture. Land on the western side is used for agricultural purposes. This land falls outside the urban growth boundary and is not subject to urban development so will continue to have a rural landscape.



photo 4: werribee river corridor looking north towards confluence with toolern creek



photo 5: werribee river with surbiton park escarpment on eastern bank



photo 6: surbiton park escarpment



werribee river  
shared trail strategy  
existing conditions  
reach 3 of 7

project Ref: 10.464  
dwg no.: ECD-003  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
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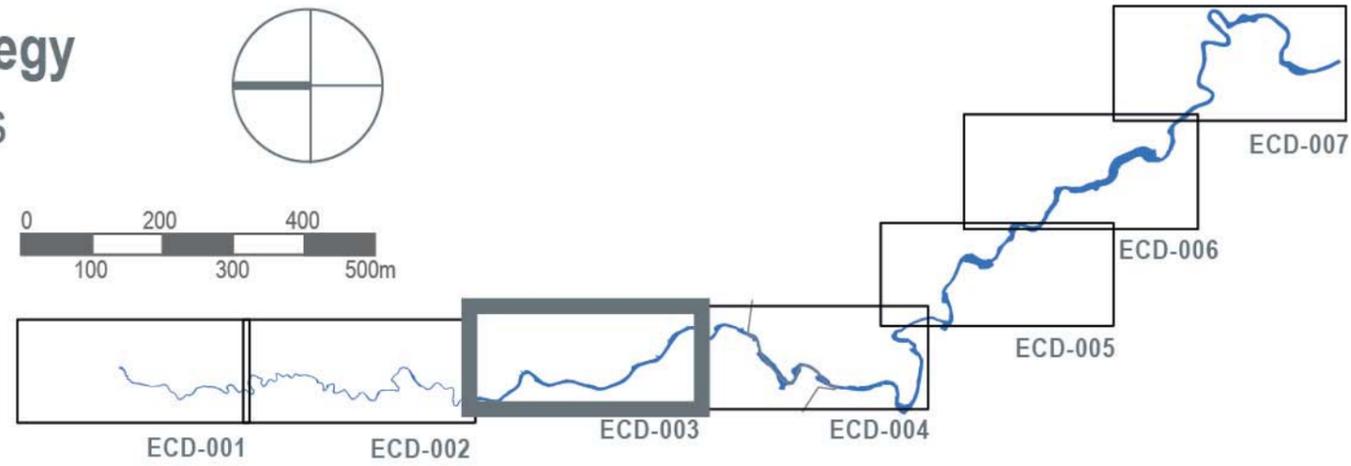


figure 7: existing conditions reach 3

#### reach 4 – moloneys reserve to cobbledick’s ford

Approximate length of trail within reach: 8km

The topography through this section of the study area is quite dramatic, and essentially comprises a gorge formation for much of its length, with the Werribee River flanked on both sides by typically steep escarpments to a height of approximately 25 metres above the river bank level. The valley floor is well vegetated with numerous mature remnant canopy trees and associated understorey vegetation in parts. Exposed rock escarpments and a number of deeply incised tributaries are a key feature of the landscape. Panoramic views along and across the valley and the plains beyond are available from numerous locations along the top of the escarpment, whereas views from the valley floor itself are strongly contained, with the top of the escarpment often limiting views beyond the river corridor.

A number of tributaries join the river through this section, themselves comprising broad, deeply incised gullies with dramatic landscape features including steep escarpments, rock outcrops and remnant vegetation. Land on the east side between Surbiton Park and incorporating Moloneys Reserve to Boundary Road is part of the proposed Western Grassland Reserve. Land on the south-west side between Wild Dog Gully and Cobbledick’s Ford Road is also part of the proposed Western Grassland Reserve

The following information is a summary of the existing conditions of this section of the Werribee River Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Plains Grassy Woodland (EVC 55) and Floodplain Riparian Woodland (EVC 56) within the defined river valley and Plains Grassland (EVC 132) beyond the top of escarpments on both sides of the river.

#### Fauna

- Identified significant fauna include Striped Legless Lizard, Growling Grass Frog, Grey Goshawk, Diamond Firetail, Speckled Warbler, Brown Treecreeper and Eastern Grey Egret.
- Significant habitat potential exists for Platypus, Growling Grass Frog, Striped Legless Lizard, Golden Sun Moth, Fat-tailed Dunnart, Plains Wanderer and Australian Painted Snipe.

#### Archaeological sites

- 29 previously recorded Aboriginal archaeological sites, comprising 24 artefact scatters, 2 scarred trees, 2 earth features and 1 burial site.

#### Historical sites

- 1 previously recorded historical site, comprising Staughton’s Bridge and road cutting.

#### Landscape character

- The dramatic topography is the primary contributor to landscape character in this section of the river, with the river valley deeply incised into the surrounding plains landscape. The valley in this section is approximately 250 metres wide (measured between top of escarpment on both sides) and up to 25 metres deep (from the level of the top of escarpment to river bank).
- Extensive rock outcropping is a key visual feature of the escarpments defining the river corridor.
- The river course is clearly demarcated by the riparian vegetation which runs along its banks on the valley floor, and contrasts strongly with the more sparsely vegetated embankments and plains beyond.
- Broad alluvial floodplains are a key landscape element of this section of the study area. A number of these are in excess of 100 metres wide (from river bank to toe of escarpment) and many hundreds of metres long. The typical configuration comprises a broad floodplain on one side of the river and steep escarpment on the other side.
- Expansive vistas along the river valley and across the plains are available from numerous vantage points along the top of the escarpment.
- The depth of the valley and the steepness of the valley sides creates a relatively enclosed viewshed, such that vistas from within the valley are typically limited to the top of the escarpment. This also limits views to land uses and facilities on the plains beyond the river corridor, such as the Eynesbury Township development.



photo 7: existing 4WD trail north of moloney’s reserve



photo 8: view across werribee river corridor from escarpment within eynesbury property



photo 9: floodplain on west bank of werribee river within eynesbury property



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project Ref: 10.464  
dwg no.: ECD-004  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

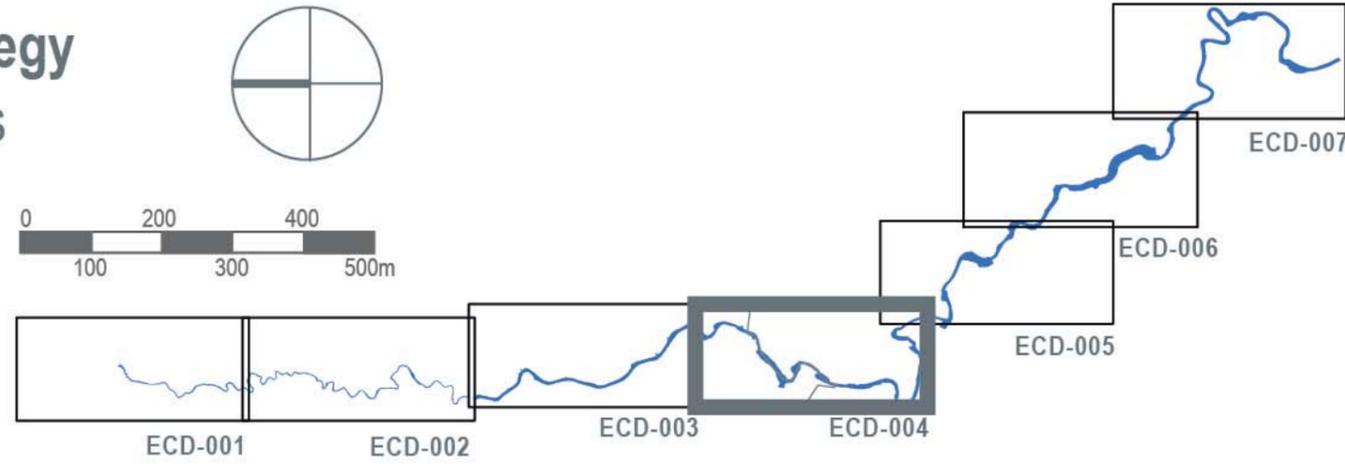


figure 8: existing conditions reach 4

### reach 5 – cobbledick’s ford to the proposed outer metropolitan ring road alignment

Approximate length of trail within reach: 5.4km

The topography through this section of the study area is less dramatic, comprising a typical landscape pattern of the Werribee River being flanked on one side by an escarpment to a height of approximately 25 metres above the river bank level, and on the other side by a broad alluvial floodplain. The floodplains are typically up to 100 metres wide, and beyond these the escarpment rises to the level of the plains landscape beyond. The valley floor is well vegetated with numerous mature remnant canopy trees and associated understorey vegetation in parts. Exposed rock escarpments are a feature of the landscape. Panoramic views along and across the valley and the plains beyond are available from numerous locations along the top of the escarpment, whereas views from the valley floor itself are strongly contained, with the top of the escarpment often limiting views beyond the river corridor.

The following information is a summary of the existing conditions of this section of the Werribee River Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Floodplain Riparian Woodland (EVC 56) within the defined river valley and Plains Grassland (EVC 132) beyond the top of escarpments on both sides of the river.

#### Fauna

- Identified significant fauna include Growling Grass Frog, Eastern Grey Egret, Royal Spoonbill and Fat-tailed Dunnart.
- Significant habitat potential exists for Platypus, Growling Grass Frog, Striped Legless Lizard, Golden Sun Moth and Fat-tailed Dunnart.

#### Archaeological sites

- 8 previously recorded Aboriginal archaeological sites, comprising 6 artefact scatters and 2 scarred trees.

#### Historical sites

- 3 previously recorded historical sites, including Cobbledick’s Ford, Cobbledick’s Farmhouse ruins and the Mount Cottrell School.

#### Landscape character

- The topography is the primary contributor to landscape character in this section of the river, with the river valley deeply incised into the surrounding plains landscape. The valley in this section is up to 300 metres wide (measured between top of escarpment on both sides) and up to 25 metres deep (from the level of the top of escarpment to river bank).
- Rock outcropping is a key visual feature of the escarpments defining the river corridor.
- The river course is clearly demarcated by the riparian vegetation which runs along its banks on the valley floor, and contrasts strongly with the more sparsely vegetated embankments and plains beyond.
- Broad alluvial floodplains are a key landscape element of this section of the study area. A number of these are in excess of 100 metres wide (from river bank to toe of escarpment) and many hundreds of metres long. The typical configuration comprises a broad floodplain on one side of the river and steep escarpment on the other side.
- Expansive vistas along the river valley and across the plains are available from numerous vantage points along the top of the escarpment.



photo 10: riparian corridor, broad floodplain and escarpment north of proposed OMR alignment



photo 11: remnant vegetation and floodplain south of cobbledick’s ford reserve



photo 12: contrasting topography of escarpment and floodplain south of cobbledick’s ford reserve



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project Ref: 10.464  
dwg no.: ECD-005  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

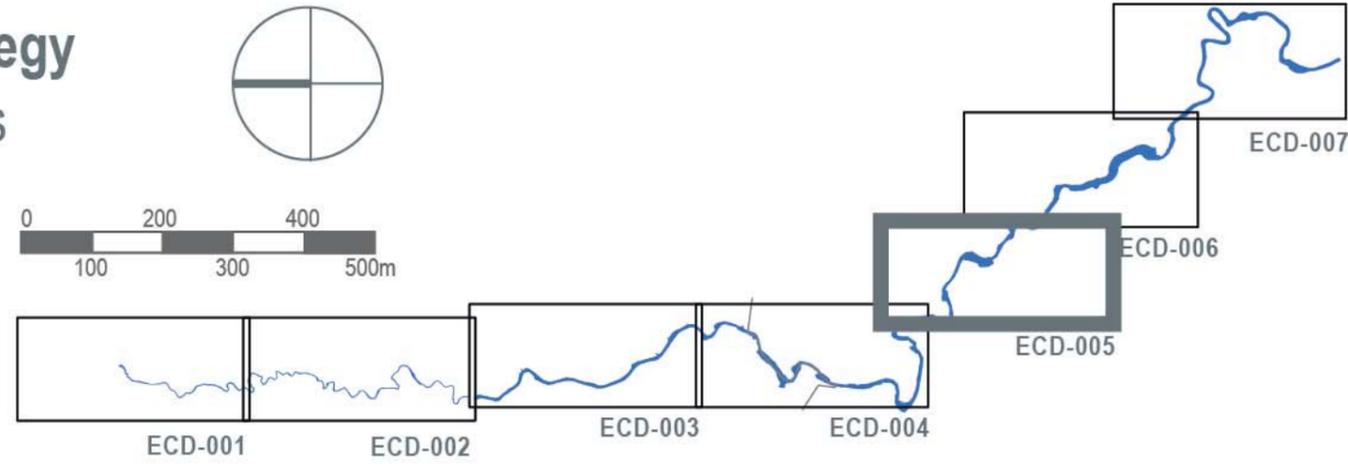


figure 9: existing conditions reach 5

### reach 6 –proposed outer metropolitan ring road alignment to sewells road alignment

Approximate length of trail within reach: 4.5km

The topography through this section of the study area is much less dramatic than sections further north, as the river becomes less deeply incised. The steep escarpments of the sections further north give way to less steeply-sloping valley sides, with the level change from river bank to top of valley typically less than 10 metres. The river banks are well vegetated with numerous mature remnant canopy trees.

The following information is a summary of the existing conditions of this section of the Werribee River Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Floodplain Riparian Woodland (EVC 56) within the defined river valley and Plains Grassy Woodland (EVC 55), Plains Grassy Wetland (EVC 125) and Plains Grassland (EVC 132) beyond the defined riparian corridor on both sides of the river.

#### Fauna

- Identified significant fauna include Golden Sun Moth and Eastern Great Egret.
- Significant habitat potential exists for Platypus, Growling Grass Frog, Striped Legless Lizard, Golden Sun Moth and Fat-tailed Dunnart.

#### Archaeological sites

- 31 previously recorded Aboriginal archaeological sites, comprising 29 artefact scatters, 1 scarred tree and 1 earth feature.

#### Historical sites

- Previously recorded historical sites, including the Wattle Park homestead and ruins.

#### Landscape character

- The landscape character of this section of the study area is different to sections to the north, as the dramatic nature of the incised valley transitions to a much less dramatic landscape. The river corridor itself is still well defined by sloping valley sides, but these slopes are gentler than the escarpments further north, and the level change from river bank to top of slope is also significantly reduced.
- The river corridor is well defined by remnant mature trees.
- Adjacent land use is predominantly agricultural, with a greater prevalence of cropping, in contrast to the areas to the north where the plains landscape is predominantly utilised for grazing.
- As the topography becomes less extreme, the extent of the floodplain begins to expand.
- New urban development proposed on both sides of the river downstream of the OMR will alter the landscape character from a farming to an urban landscape.



photo 13: remnant vegetation and pasture grasses near hobbs road



photo 14: remnant vegetation and weed infestation near wollahra rise



photo 15: remnant vegetation and weed infestation near wollahra rise



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project Ref: 10.464  
dwg no.: ECD-006  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

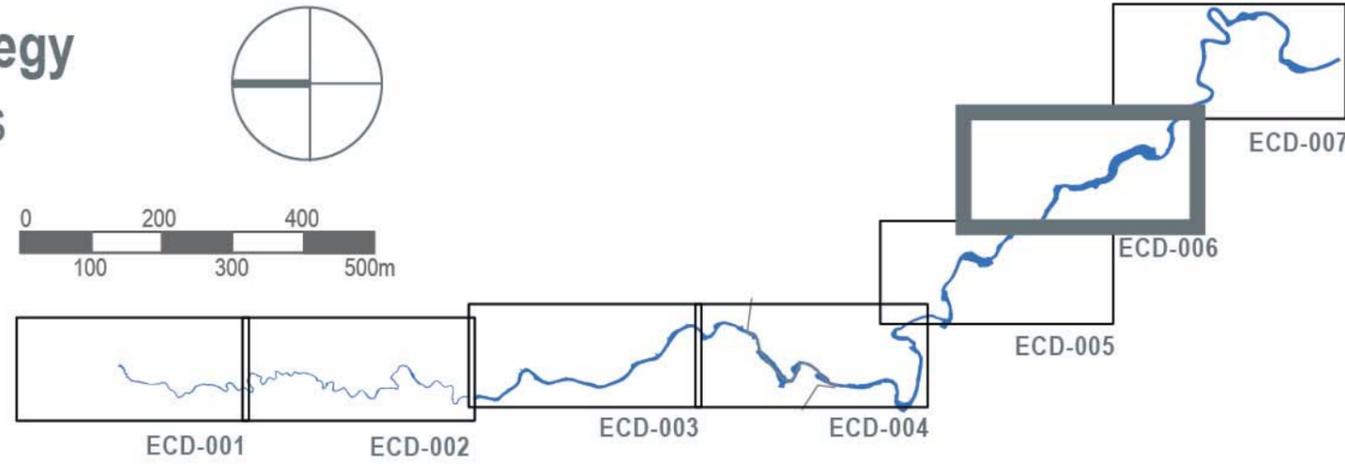


figure 10: existing conditions reach 6

### reach 7 – sewells road alignment to president’s park

Approximate length of trail within reach: 3.9km

The topography through this section of the study continues to become flatter, as the landscape transforms into a broad alluvial floodplain. The river itself still sits within a generally well-defined course, with sloping embankments on both sides, however the height of these embankments is typically below the 1:100 flood level. The river banks are well vegetated with numerous mature remnant canopy trees. Downstream from the confluence with Davis Creek, the river has an interface on its eastern bank with the established urban area of Tarneit, with an urban parkland edge treatment. This section includes a concrete pathway which in some instances sits below the 1:10 year flood line. The land on the western/southern bank comprises floodprone agricultural land which is extensively under crop. Land along this reach of the river is being investigated for inclusion into the future Werribee River Township Regional Park.

The following information is a summary of the existing conditions of this section of the Werribee River Corridor:

#### Flora

- Areas of remnant vegetation present, comprising Floodplain Riparian Woodland (EVC 56) within the defined river valley and Plains Grassy Woodland (EVC 55) beyond the defined riparian corridor on both sides of the river.

#### Fauna

- Identified significant fauna include Platypus, Nankeen Night Heron, Eastern Great Egret and Southern Brown Bandicoot.
- Significant habitat potential exists for Platypus, Growling Grass Frog, Striped Legless Lizard, Golden Sun Moth and Fat-tailed Dunnart.

#### Archaeological sites

- 19 previously recorded Aboriginal archaeological sites, comprising 15 artefact scatters, 3 scarred trees and 1 earth feature.

#### Historical sites

- 3 previously recorded historical sites, including Tarneit Road bridge, Werribee River Ford and Chaffey Irrigation Scheme infrastructure at Riverbend Historical Park.

#### Landscape character

- The landscape of this section of river is characteristic of a broad, alluvial floodplain.
- Existing land use is predominantly for agricultural crops.
- The landscape is typically flat, with the only variation to this being the relatively narrow corridor within which the river bed and banks are contained.
- A ribbon of canopy vegetation along the river banks provides a clear visual demarcation of the river corridor, particularly when viewed from distant vantage points.
- Views to existing established urban areas from the river corridor are typically set back above the 1:100 year flood plain with some existing vegetation. Houses are often visible, but are typically not visually dominant.



photo 16: werribee river banks and vegetation immediately upstream of davis creek



photo 17: riparian corridor and adjacent urban development downstream of davis creek



photo 18: werribee river banks and vegetation immediately downstream of davis creek



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project Ref: 10.464  
dwg no.: ECD-007  
scale: 1:10000@A3  
date: 03/05/2012  
aerial date: 28/10/2010  
revision: D

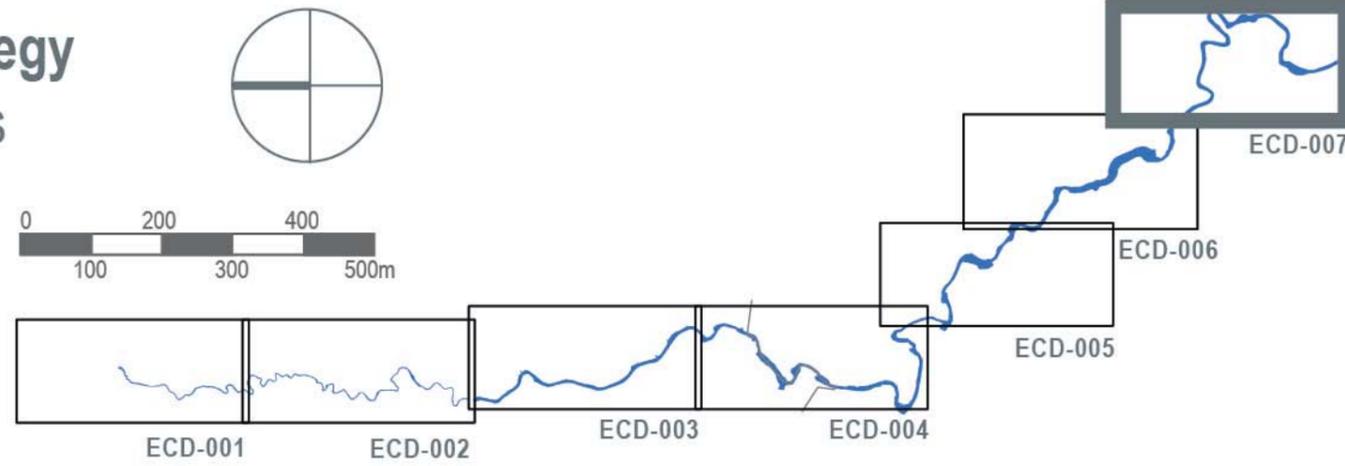


figure 11: existing conditions reach 7

## 2.3 stakeholder engagement

Regular and informed communications with a broad range of key stakeholders have occurred throughout the preparation of the Werribee River Shared Trail Strategy. The project team has consulted regularly with Melton City Council, Wyndham City, Parks Victoria and key stakeholders to ensure that the needs and expectations of all are clearly understood and acknowledged in the planning and design outcomes.

A Stakeholder Engagement Strategy was prepared at the commencement of the project, to identify when and how the Councils and stakeholders would be consulted throughout the project. The Stakeholder Engagement Strategy sought to implement the elements expressed by the Victorian Local Governance Association that 'good consultation' is as follows:

	general principle	hansen response
<b>good governance</b>	It aims to better understand the aspirations of communities and provides citizens with ways to provide input into the process of direction setting and priorities.	We aim to include the wider community, as well as key stakeholders, in the process of identifying issues to ensure community concerns are addressed as part of the process. We then intend to engage the community during the 'visioning' phase to ensure strong community ownership.
<b>good business</b>	It enhances the quality of the services provided and mutual understanding of the relevant customer/ service provider relationship.	By engaging the community in a meaningful manner prior to the formal exhibition period, many delays can be avoided.
<b>good management</b>	It works to achieve better results for everyone.	Engaging the community and ensuring that community understanding of both the aims and the outcomes of the process ensures an efficient and effective process.

table 1: elements of 'good consultation'

The Strategy also acknowledges the recent *Evaluation Framework for Community Engagement* developed by the IAP2 (International Association for Public Participation) and endorsed by the Department of Planning and Community Development. This framework identifies four levels of community engagement, as follows:

**inform:** education through media, written material, internet, spoken word, activities and/or theatre.

**consult:** consulting through community forums, surveys, community panels/juries, focus groups and workshops.

**involve:** include community in all stages of policy development (planning needs assessment, design, implementation, evaluation, monitoring) to ensure that concerns and aspirations are considered and understood.

**collaborate and empower:** action to maximise community ownership, knowledge exchange and capacity building.

The main aims of the consultation process should be to:

- Inform stakeholders about project capacity and scope (manage expectations), planning policies and pressures for change affecting the plan, to which the plan will need to respond, and discussing the implications of those considerations on the future planning and development of the area.
- Understand what stakeholders value about a place, its positive and negative features.
- Involve stakeholders in the identification of key issues that need to be addressed in the plan.
- Engage stakeholders in generating ideas and recommendations that will be contained in the plan.

### stakeholder identification

In relation to this project, key stakeholders include:

- The Project Control Group (PCG) comprising Melton City, Wyndham City and Parks Victoria.
- Melton City and Wyndham City Councillors
- Department of Planning and Community Development
- Department of Sustainability & Environment
- Department of Primary Industries

- Department of Transport
- VicTrack
- Federal Department of Environment, Water, Heritage and the Arts
- Growth Areas Authority
- VicRoads
- Aboriginal Affairs Victoria
- Tourism Victoria
- Melbourne Water
- Barwon Water
- Western Water
- Southern Rural Water
- Port Phillip & Westernport Catchment Management Authority
- Country Fire Authority
- Athletics Victoria
- Bicycle Victoria
- Bushwalking Victoria
- Land development companies
- Land owners and occupiers
- Landcare groups, including Western Melbourne Catchments Network, Truganina Landcare Group, Werribee River Association and Pinkerton Landcare Group
- Residents groups
- Other service authorities

For the purposes of efficient and orderly stakeholder engagement, stakeholders were grouped into a number of categories. These categories are intended to reflect the particular role, responsibilities and core interest areas of each, as well as provide a guide as to the extent and type of engagement occurring with each. The table on the following page provides a summary representation of these stakeholder categories and the category to which each stakeholder has been assigned.

stakeholder	category	engagement
Melton City Council Officers	Council	Active (PCG)
Wyndham City Officers	Council	Active (PCG)
Melton City Councillors	Council	Active
Wyndham Citylors	Council	Active
Parks Victoria	Government	Active
DPCD	Government	Active
DSE	Government	Active
DPI	Government	Active
Growth Areas Authority	Government	Active
Department of Transport	Government	Active
Department of E, W, H & A (Federal)	Government	Passive
VicRoads	Government	Active
Aboriginal Affairs Victoria	Agency	Passive
Wathaurung Aboriginal Corporation	Agency	Active
Wurundjeri Tribe Land and Compensation Cultural Heritage Council Incorporated	Agency	Active
Tourism Victoria	Agency	Passive
Melbourne Water	Technical	Active
Barwon Water	Technical	Passive
Western Water	Technical	Passive
Southern Rural Water	Technical	Passive
Port Phillip & Westernport CMA	Technical	Passive
Other service authorities	Technical	Passive
Athletics Victoria	Peak Organisation	Passive
Bicycle Victoria	Peak Organisation	Active
Bushwalking Victoria	Peak Organisation	Passive
Land development companies	Developer	Active
Land owners and occupiers	Community	Active
Landcare groups	Community	Active & Passive
Resident groups	Community	Passive
Werribee District Historical Society	Community	Active

table 2: stakeholder groups

With regard to the engagement formats listed in the table:

**Active Engagement:** Involvement in Workshops and direct issue of draft documents for review and provision of feedback.

**Passive Engagement:** Not involved in Workshops. Engagement involved one-on-one meetings between the stakeholder and the relevant member of the consultant team. No direct issue of draft documents for review unless requested. Opportunity to provide feedback through the formal public exhibition process.

Regular and informed communications with Melton City Council, Wyndham City and key stakeholders throughout the project have been vital to ensure that the needs and expectations of all are clearly understood and acknowledged in the planning and design outcomes of the Werribee River Shared Trail Strategy. In preparing this strategy, the project team has sought to implement innovative community engagement and consultation mechanisms that help ensure a broad cross section of the community has the opportunity to input into and be kept informed of the process. In brief, the program of consultation undertaken is outlined as follows.

#### issues identification workshop

In April 2011, the project team facilitated consultation sessions with the 'Active Stakeholders' to provide an introduction to the project and its goals and gain an appreciation of all current issues which the Werribee River Shared Trail Strategy needs to consider and respond to. The workshop was undertaken over two days with Council Staff, Councillors, residents and other stakeholders in both Melton and Wyndham.

#### individual stakeholder interviews

During April and May 2011, individual interviews were undertaken with the 'Passive Stakeholders' to identify and record information specific to their area of interest or expertise. This involved one-on-one meetings or telephone conversations between the stakeholder and the relevant member of the consultant team in order to obtain more detailed information not discussed within the public forum.

#### visioning workshop

In late June 2011, the project team facilitated consultation sessions with the 'Active Stakeholders' identified above to enable an overview of the outcomes of the Information Gathering stage of the project. This subsequently provided the basis for discussions aimed at identifying and agreeing upon the following elements to determine the vision for the Werribee River Shared Trail Strategy:

- Identification of community infrastructure needs and opportunities;
- Identification of potential synergies between natural/cultural attractions and future recreational activities;
- Development of key planning and design principles; and
- Development of a Vision Statement.

#### benchmarking discussions

The benchmarking study considered three Victorian shared trails which were selected on the basis of dialogue with and recommendations from Parks Victoria. These were the Merri Creek Trail, the Taylors Creek Trail and the Bellarine Rail Trail. As a means of defining current best practice, the project team conducted interviews with staff from each of the relevant Councils responsible for trail planning, implementation and management.

#### public exhibition

The draft Werribee River Shared Trail Strategy, comprising the mapping of the proposed trail alignment and accompanying report was released for public exhibition in 2012. The documents were made available for viewing on the Council websites and at Council Offices to ensure that stakeholders and the general public were given the opportunity to provide feedback on the draft strategy. A total of 16 submissions were received. These were reviewed by the Project Team/PCG, and incorporated into the final approved strategy.

#### project control group meetings

At regular intervals throughout the project, the project team has consulted with Project Control Group through regular phone contact with the project manager; regular scheduled PCG meetings and at the two scheduled consultation sessions.

## 3 issues

### 3.1 conservation

- Protection of conservation values and biodiversity is a priority along the river.
- The environmental impact of the shared trail and its associated uses is a primary concern and it is important to consider what acceptable levels of disturbance to ecological values are.
- Protection of wildlife is important, particular the Growling Grass Frog and migratory birds at the Werribee Treatment Plant and the Western Water Treatment Plant.
- It is important to facilitate more activity in open space, but the diversity of recreation activities within the Grey Box Forest area and native grasslands should be appropriate to the conservation nature of the area.
- Weed management and revegetation projects which are underway at points along the Werribee River, for example at Surbiton Park, need to be considered.
- Littering and dumping of rubbish is a concern to the local ecosystem and better management is required.
- Establishment and recognition of the Werribee River corridor as a Biolink is an important opportunity.
- Dog access along Werribee River corridor could have an adverse impact on native wildlife, establishment of a on leash area as a standard for the entire corridor should be considered.



photo 19: remnant eucalypt vegetation along the werribee river near greig's road

### 3.2 heritage

- The conservation of heritage elements is a critical consideration in the future management of the river corridor.
- The whole river has been used as a resource zone by Aboriginal groups, with areas such as campsites being of increased sensitivity.
- A number of Aboriginal sites have previously been identified, with scar trees, artefact scatters and burial sites recorded.
- There is cultural sensitivity along either side of the length of the Werribee River and the Toolern Creek and a Cultural Heritage Management Plan will need to be prepared for trail development proposals.
- It is important not to disturb known sites but there may be the opportunity to have interpretative signage along the trail to reflect on its history.
- A number of historical landforms have significance within the area, including river bends, junctions, buried paleochannels (old creeks which used to flow into the river), raised terrace areas and archaeological sites.
- Cobbledick's Ford, the Exford Homestead and river infrastructure such as pump stations are important to the Post Contact heritage of the area.



photo 20: heritage-listed "wirrawong" shearing shed west of the confluence of the werribee river and toolern Creek

### 3.3 activity

- Destination and rest points along the trail should be identified and amenities such as seating provided, particularly in wider areas of open space.
- Destination points should also be determined in consideration of Precinct Structure Plans, which identify nodes such as schools and activity or community centres.
- Kayaking and canoeing are popular activities along the river which could be enhanced by the trail.
- Bike riding and walking is anticipated to be the main activity along the trail, for both recreational purposes and commuting.
- Horse riding is common around the area, however from a risk management perspective it is undesirable that this will occur along the shared trail in the urban areas downstream of the OMR and upstream of Greigs Road.
- Trail bikes are a problem along the river due to environmental disturbance and safety issues.
- Illegal 4wd access along the river is an ongoing safety, maintenance and environmental issue.



photo 21: recent parkland furnishings within future toolern creek regional park

### 3.4 access

- Walking along the river is popular, however the current provision is unsatisfactory and interrupted.
- The suggestion of a 3m sealed pathway or other suitable surface is an adequate provision providing that barriers are provided at road approaches so that motor vehicles cannot access the shared trail.
- In urban areas there is a preference for the trail alignment on both side of the river with pedestrian bridge crossings incorporated every two to four kilometres which will create a series of one to two hour loop walks. This length of walk is the most popular for daily exercise walks. However this may be difficult in some areas where escarpments are high and wide.
- The flooding capacity of the river will need to be carefully looked at, as it is increasing in intensity and frequency and the trail alignment will need to be above the 1:10 year flood level to meet Melbourne Water’s preferred requirements. The only exception to this is the existing concrete pathway at Davis Creek, which in some instances sits below this flood level. Any existing pathways with improvements planned which are currently under the 1:10 year flood level, should be re-designed to be above the 1:10 year flood level.
- There are a number of steep areas, for example at the confluence of Toolern Creek and the Werribee River which will require design attention.
- Public access points are currently provided to the river at the public reserves at Cobbledick’s Ford and the confluence of Toolern Creek and the Werribee River which should be enhanced.
- The trail must be safe and accessible, and should not have long sections of pathway without allowing for emergency and visitor access in and out.
- The trail’s primary purpose is recreation, leisure and tourism, however it will also provide for low level commuting particularly through the urban areas.
- Connections to other transport networks are important as well as links to roads that support cycling and connect to destinations such as schools, town centres and major employment areas. A shared path that runs along the length of the railway at Melton and the proposed Regional Rail Link has been proposed in the Precinct Structure Plans and Growth Corridors Plan.

### 3.5 security / safety

- Passive surveillance is important in the provision of nodes and should be connected back into the road network.
- Security is a concern for landowners as there are already issues keeping people out of private land and the shared trail may promote easier access and increased risk and liability for landholders, particularly in more isolated areas.

- Security of infrastructure, crops and stock is a concern around the Western Water Plant and agricultural areas.
- The image of some of the reserves, industrial and agricultural areas along the river has been negative in the past which could be overcome by increased surveillance.
- Concerns for farmers regarding the implementation of the trail along their side of the river include increased management burdens, reduced stock access to river and increased fire risk from visitors behaviour.
- A five metre wide corridor for the shared trail (including the pavement and roll-off zones) is required wherever possible for emergency access.
- *Austrroads Guide to Road Design: Pedestrian and Cyclist Paths* and *VicRoads Cycle Notes* should provide the basis for ensuring the provision of a safe shared trail.
- Fencing and land boundary security.

### 3.6 implementation

- The acquisition of land for the shared trail use is complicated, particularly as rural landowners use the river and the adjacent land for stock and farming purposes. The options for acquiring land are land purchase and easement / right of access and these circumstances will need to be carefully investigated.
- The trail may be best constructed on land with significant prior disturbance as this will lessen impact on key intact sites of scientific significance.
- Both Melton City Council and Wyndham City support the use of concrete for the path as it is easier to construct and manage.
- Management of the shared trail is important, and the majority of the trail will be under Parks Victoria or Council management.



photo 22: surbiton park escarpment along the east bank of the werribee river

### 3.7 interfaces

- Adjacent landowners place a great value on the river corridor, with some of them using it for stock and irrigation purposes.
- There are a number of possible future developments and strategic planning directions around the area, particularly the Precinct Structure Plans, which will determine the public open space corridor alignment which will contain the shared trail.
- The development plans for subdivision which follow will determine specific road reserves on the boundary of the public open space corridor and the implementation of the trail.
- Many landowners along the river have licences to pump water from the river for irrigation purposes which involves pump infrastructure along the river. Trail construction would need to ensure there is no damage to existing assets, and ideally allow for the pipe to be buried (if not already) and the trail constructed over.
- The Western Water Treatment Plant / Surbiton Park interface will require careful management for the trail as the treatment plant intends to expand its operations and the threat of vandalism is occasionally an issue.



photo 23: werribee River floodplain and escarpment with farm buildings beyond, near proposed OMR alignment

## 4 information processing

The gathering of information and the issues identification process led to the formulation of a series of opportunities and constraints relating to the development of the shared trail. These physical influences and potential synergies between activities and attractions within the river corridor have been mapped in a series of Opportunities and Constraints diagrams (Appendix 2). These principles are briefly outlined as follows.

### 4.1 opportunities

- Potential to align the trail to enhance views from the top of the escarpment.
- Large, open and flat floodplain areas could be developed for passive and active recreational nodes.
- The river is narrower in the southern extents of the study area which will allow for more river crossings.
- There is the opportunity for educational functions at revegetation areas and significant environmental areas to raise public awareness.
- Opportunities to connect to a range of existing open spaces including the Toolern Creek Regional Park, Melton Reservoir, Melton Botanic Gardens, Pinkerton Forest, Eynesbury, Grey Box Forest, Moloney's Reserve, Cobbledick's Ford Reserve, Presidents Park and Riverbend Historical Park as well as proposed open spaces including the Western Grasslands Reserve, Growling Grass Frog Reserve, Outer Metropolitan Ring Shared Trail, Regional Rail Link Shared Trail and Werribee Township Regional Park.
- Opportunities to connect to a number of destinations including the Melton Township, the Werribee Township, Melton Station, Werribee Station, Eynesbury Estate, Strathtulloh Estate, Waterford Estate and existing schools.
- Opportunity to present regional interpretative signage for heritage including the Toolern Homestead, Eynesbury Homestead, the road cutting at the Boundary Road extension, the old homestead on the Surbiton Park River Flats, Melton Weir and Riverbend Weir.
- Large land parcels with a single landholder such as Surbiton Park, Eynesbury and the Western Grasslands Reserve may provide for less complex negotiations for trail access.
- Land held by public authorities may provide for less complex negotiations for trail access.
- Opportunity to respond appropriately to movement networks, nodes, areas/boundaries, community infrastructure and open space networks with the surrounding Precinct Structure Plans.

### 4.2 constraints

- Melbourne Water guidelines dictate that the trail should not be aligned below the 1:10 year flood level.
- Urban Development in PSP's may extend to the upper edge of the 1:100 year flood level.
- Steep and wide escarpments in the northern extents of Werribee River create grade separation issues, such that it is difficult and expensive to run the trail between the river bank and the top of escarpment.
- Wide escarpments in the northern extents of the Werribee River make river crossings less feasible and/or costly if they have to remain above the 1:100 year flood level.
- Trail infrastructure must be designed to allow for regular inundation of floodplains in central and southern extents.
- Significant environmental areas such as the Western Grasslands Reserves, Growling Grass Frog buffer areas and areas undergoing revegetation should be carefully managed and protected.
- Trail development needs to manage and minimise impact on wildlife such as migratory waterbirds.
- Land above the river bank in future urban areas may be required for Melbourne Water treatment wetlands, restricting available areas for trail alignment.
- Disturbance created from trail construction must be avoided near known sites of cultural heritage significance.
- The trail may have an adverse impact on existing agricultural functions of rural properties. This needs to be managed for minimal impact.
- Potential problems with trail encroachment into Surbiton Park EPA odour buffer zone.
- Security concerns need to be managed if the trail is to be located adjacent to Surbiton Park.
- The trail alignment needs to consider existing and proposed extractive industries along the Werribee River corridor.
- Development of floodplains for recreational purposes must be submitted and preapproved by Melbourne Water.

## 5 vision statement

The Werribee River Shared Trail Strategy aims to explore the development of appropriate links along the Werribee River, a major waterway in the west of Melbourne. This will provide guidance on the long term planning, management and sustainability of the shared trail, taking into account future land use planning and access to regional open space.

The Werribee River environs include a range of significant natural assets and geological features. The corridor is home to a variety of native flora and fauna and has an extensive history of Aboriginal occupation. The establishment of this new open space corridor along the Werribee River will incorporate linkages to surrounding open space and key assets, this is particularly important as further urban development and transport infrastructure is planned in the study area. The strategy will establish a new open space corridor along the Werribee River which will provide a natural, cultural, recreational and tourism focus for current and future residents of this rapidly expanding area of metropolitan Melbourne.

## 6 key planning and design principles

The Werribee River Shared Trail Strategy has been developed on the basis of a set of fundamental planning and design principles, as follows:

- Protect and enhance natural, historical and recreational values of the Werribee River and environs.
  - Carefully manage and protect environmental areas such as the Western Grasslands Reserves, Growling Grass Frog buffer areas and areas undergoing revegetation.
  - Ensure that the shared trail and associated open space corridor is integrated with other existing and proposed future regional open space assets.
  - Create links to other destinations, including surrounding townships, estates, schools and stations, to ensure that existing and future communities can access and utilise the shared trail as an integrated component of the future urban landscape.
  - Ensure that the development of the trail is undertaken in a manner which is coordinated with existing and proposed structures, including the development of a number of road bridges.
  - Create passive and active recreational nodes on large, open and flat floodplain areas to provide rest stops and functions as either 'destinations' or 'setting out points' for trail users.
  - Enhance educational functions at significant environmental areas to raise public awareness of nature conservation and the protection of native flora and fauna (e.g. signage and educational elements).
- Provide public access and surveillance along the entire open space corridor, ensuring safe and equitable linkages.
  - Provide river crossings within urban areas at regular intervals of approximately 2-4 kilometres to enable residents to utilise sections of the trail in proximity to their homes for recreational circuits and to access and experience both sides of the river.
  - Ensure that the shared trail is located between the 1 in 10 year and the 1 in 100 year flood level where possible to maintain the river corridor experience for trail users whilst ensuring that flood flows and public risk can be managed.
  - Ensure that longitudinal gradients along the trail do not exceed 1 in 20 (5%) unless no suitable route is available to achieve this.
  - Provide a consistent 3 metre wide concrete trail surface that is suitable for shared usage by pedestrians, cyclists and maintenance vehicles.
  - There are other considerations to be made that will determine the width of the open space corridor such as Melbourne Water waterway setback guidelines, GGF conservation areas etc. The adjoining PSPs will consider all of the various factors and the final width of the open space corridor.
  - Ensure that the width of the open space corridor in rural areas comprises all land between the river and the proposed trail alignment, plus all land located within a distance of 5 metres beyond the proposed trail alignment.

## 7 community infrastructure needs assessment

A *Community Needs and Opportunities Assessment Report* has been prepared and forms part of the preparation of the Werribee River Shared Trail Strategy. The purpose of the assessment is to:

- Provide a contextual overview of the land use planning context the Trail study area forms part of;
- Describes the existing and proposed trail network that the Werribee River Shared Trail will form part of;
- Identifies the current and projected population forecasts for both the City of Wyndham and City of Melton;
- Provides estimates of future demand for recreational cycling, walking and running in the City of Wyndham and City of Melton;
- Summarises the key findings arising from the consultation process conducted with key stakeholders; and
- Provides a list of key conclusions and recommendations that the draft Strategy should consider.

The *Community Needs and Opportunities Assessment Report* is included as an appendix to this report. Key aspects of this assessment, outlined below, include population forecasts and key activity demand estimates, land use planning context and an overview of major bicycle and pedestrian trail networks in Melbourne's outer west.

### 7.1 current & projected population forecasts

Both Melton and Wyndham are formally recognised as two of Melbourne's major urban growth municipalities (along with Hume, Whittlesea, Casey and Cardinia). Table 1 below provides population forecasts for these two municipalities from 2011 to 2031. It shows that the Melton / Wyndham Growth Corridor currently has a population of approximately 280,000 people (2011) and is forecast to grow by 100% over the next 20 years to approximately 560,000 people.

city of melton	year					numeric change 2011 - 2031	% change from 2011 to 2031
	2011	2016	2021	2026	2031		
population aged 5-14 years	16,904	21,198	26,790	31,793	36,289	19,385	115%
population aged 15+ years	81,374	98,191	122,338	147,128	171,151	89,777	110%
total melton population	108,840	131,552	163,749	196,013	226,704	117,864	108%
<b>city of wyndham</b>							
population aged 5-14 years	25,755	35,365	42,497	46,192	48,961	23,206	90%
population aged 15+ years	129,722	166,770	201,226	232,052	259,358	129,636	100%
total wyndham population	172,106	223,323	266,901	302,911	334,678	162,572	94%
<b>total melton / wyndham</b>							
population aged 5-14 years	42,659	56,563	69,287	77,985	85,250	42,591	100%
population aged 15+ years	211,096	264,961	323,564	379,180	430,509	219,413	104%
total melton / wyndham	280,946	354,875	430,650	498,924	561,382	280,436	100%

table 3: city of melton & city of wyndham corridor population forecasts: 2011 to 2031  
Source: City of Wyndham, Forecast.ID: Population and Household Forecasts (2006)

### 7.2 key recreational activity demand estimates

It is anticipated that the Werribee River Shared Trail will be used primarily for recreational walking, running and cycling, particularly by residents who live, or will live, adjacent to the Werribee River .

*Linking People & Spaces* (2002) identifies the main activities undertaken by visitors to Melbourne's metropolitan regional parks. Although the activities are based on results from visitor surveys undertaken in metropolitan parks managed by Parks Victoria more than a decade ago (between 1995 and 1997) they are likely to still reflect more current utilisation patterns.

category	% of park visitors who participated
walking	69.4
picnicking	54.9
socialising	47.8
sightseeing	39.3
sitting around doing nothing	36.7
relaxing, reading or sunbathing	34.9
supervising children's play	30.1
studying birds, plants or animals	22.2
<b>cycling</b>	<b>13.0</b>
<b>walking the dog</b>	<b>10.4</b>
<b>jogging</b>	<b>3.1</b>

table 4: activities undertaken by visitors in melbourne's metropolitan parklands

While it is very difficult to determine with any certainty how many people may end up using the Trail at any point in time, or how frequently they will use it, it is possible to infer how many people currently participate in some of the key activities identified above (throughout the Melton / Wyndham corridor) in either an organised or informal capacity, and how many are likely to do so over the next 20 years.

activity type	year				
	2011	2016	2021	2026	2031
People Aged 15+ participating in organised and / or non-organised walking <sup>1</sup>	77,261	96,976	118,424	138,780	157,566
People Aged 15+ participating in organised and / or non-organised cycling <sup>2</sup>	26,809	33,650	41,093	48,156	54,675
People Aged 15+ participating in organised and / or non-organised running <sup>3</sup>	26,809	33,650	41,093	48,156	54,675
5 to 14 olds bike riding <sup>4</sup>	27,985	37,105	45,452	51,158	55,924
Total Estimated No. of participants	158,864	201,381	246,062	286,250	322,840

table 5: projected number of people participating in organised & non organised cycling and walking in the city of melton & city of wyndham corridor: 2011 to 2031

Whilst the trail will primarily be used for recreational walking, running and cycling the list of other activities it potentially could be used for is extensive. These include picnic activities, nature observation, horse riding, canoeing / kayaking, orienteering, fishing, swimming (subject to pollution levels) and roller sports.

### 7.3 land use planning context

The study area defined for the Shared Trail Strategy is located within two of Melbourne’s major growth corridors: 1) the City of Melton and 2) the City of Wyndham. The relationship between the proposed Shared Trail and future land development along it will be one of the most critical issues to address in the Strategy.

The Werribee River Shared Trail study area can be categorised into three major segments: 1) a northern future urban catchment (inclusive of the Toolern Creek) that includes a large future residential population within the *Toolern Precinct Structure Plan*; 2) a large central rural component flanked on the western side of the river by the Eynesbury Development which has recently been given planning approval to expand from 2,900 dwellings to 4,500 dwellings, and 3) a southern future urban catchment consisting of a number of proposed communities near

Wyndham Vale (west of the Werribee River) and Wyndham North (east of the Werribee River). These future urban communities have either been given formal planning approval, or are the subject of current Precinct Structure Planning processes.

Precinct Structure Plans (PSPs) are master plans for whole communities which usually cater for between 10,000 to 30,000 people. PSP’s lay out roads, shopping centres, schools, parks, housing, employment the connections to transport and generally resolve the complex issues of biodiversity, cultural heritage, infrastructure provision and council charges.

The Growth Areas Authority (GAA) is the statutory authority responsible for overseeing the preparation of all precinct structure plans in Melbourne’s growth areas and advising the Minister for Planning on their approval.

PSPs can be prepared and funded by council, landowners and developers, the GAA (with funding provided by the Victorian Government and through the Commonwealth Government’s Housing Affordability Fund) or other agencies directed to do so by the Minister for Planning. In all cases the process will require the active involvement of land owners, developers, service and infrastructure providers and councils.

With the incorporation of new areas in the UGB the GAA has set out preliminary boundaries and interim names for the PSP program. It should be noted that these may be subject to change from time to time depending on changing circumstances.

Table 6 and Figure 12 below show the eight PSP’s which abut the Werribee River Shared Trail, 2 of which have been completed and approved and 6 of which have yet to be completed.

psp number	psp name	status
31	<i>Toolern</i>	Completed & Approved
1097	<i>Toolern Park</i>	To be completed
1088	<i>Oakbank</i>	To be completed
1092	<i>Westbrook</i>	To be completed
1091	<i>Riverdale</i>	To be completed
40	<i>Ballan Road</i>	To be completed
35	<i>Riverwalk</i>	Completed & Approved

table 6: completed & to be completed psp’s abutting the werribee river shared trail corridor

<sup>1,2,3</sup> Source: Australian Sports Commission, *Participation in Exercise, Recreation and Sport: Annual Report for States & Territories: Victoria (2010)*

<sup>4</sup> Source: Australian Bureau Statistics (Cat. 4901.0 ) *Children’s Participation in Cultural and Leisure Activities, Australia, Apr 2009*



figure 12: approved & proposed precinct structure plan locations abutting werribee river

Preliminary discussions with the GAA have identified a number of key issues and opportunities associated with the preparation of the PSPs and the Werribee River Shared Trail. These include:

- A desire to explore co-location of active open space along or partially within the open space corridor at key nodes;
- Housing density – the GAA are keen to explore opportunities for both high and low density housing along the interface with the Werribee River Shared Trail;
- Exploring the principle that all future PSPs abutting the River Corridor contribute funding towards the construction of trails and amenities within the corridor on the understanding that funding be shared between the State Government and future development because of the Trails’ ‘metropolitan status’ in PSPs.
- The concept of establishing agreed standards of provision are important in this respect, and requires further discussion.
- The PSP guidelines require developers to provide a minimum 2.5m local access trail along the edge of all open space. As the Werribee River Shared Trail is a regional recreational trail, it will be 3m wide, and hence in locations where the shared trail functions as a local access trail, a 3m trail should be provided by developers in lieu of a 2.5m trail.

## 7.4 overview of major bicycle and pedestrian trail networks in melbourne's outer west

Bicycle and pedestrian networks consist of a range of existing and proposed routes across the State. Some networks have a transport focus (e.g. cycling to get somewhere for work, school, shops etc), while others are mainly for recreation (e.g. cycling to get fit, see the countryside, enjoy the outdoors). Bike riders can use any network for any purpose, and will often use different parts of each network to get to their destination. In broad terms the bicycle network (and, in part, the pedestrian network) consists of:

- The Principal Bicycle Network;
- The Metropolitan Trail Network;
- Municipal Bicycle Networks; and
- Rail Trails (primarily Regional Victoria).

Although the Werribee River Trail may provide some opportunity for commuting from home to place of employment, this role is anticipated to be insignificant. When established, the Trail will primarily perform a recreational role in the broader metropolitan trail network, and will therefore form part of the Metropolitan Trail Network, as indicated in the Draft Growth Corridor Plans released in November 2011 (refer to Figure 2).

### the principal bicycle network (PBN)

The Principal Bicycle Network (PBN) is a network of cycle routes that provide access to key destinations within the Melbourne metropolitan area. The PBN is one of a number of cycling networks that make up the cycling infrastructure of metropolitan Melbourne. The PBN is primarily on road bike lanes and off road trails abutting major roads.

The purpose of the PBN is to guide investment in cycle infrastructure by VicRoads. This investment aims to increase the number of people cycling for transport. Cycling for transport includes riding bicycles to work, to school, for shopping, visiting friends etc.

The PBN was first established in 1994 and was largely based on arterial roads, forming a coarse rectangular grid of cycling routes. Since then Melbourne has grown significantly and travel patterns have changed across the city. At the same time cycling has become more popular, particular for transport purposes, and the role that cycling plays in our transport system is now clearly recognised.

The PBN is currently under review and the network will change substantially. Completion of the review is anticipated in mid-2011.

The new PBN will differ from the original PBN in a number of key ways:

- More 'destination-focused', connecting activity centres, Central Activity Districts and the CBD to their cycling catchments
- increased use of local roads

- Increased use of off-road paths, with a primary design principle of maximising separation between cyclists and motorists, as well as other priority treatments
- Designation of two levels of route development – 'PBN Priority Routes' and 'PBN Support Routes'
  - Priority routes will be pro-actively developed by VicRoads
  - Support routes will be developed opportunistically through other major road projects such as road or intersection upgrades.

### the metropolitan trail network (MTN)

- The Metropolitan Trail Network (MTN) is a network of existing and proposed recreational shared trails in metropolitan Melbourne that link people to spaces.
- The MTN provides trails which are useful for people who are inexperienced in cycling, who may find roads too busy to learn on. Most of the MTN is off-road through parks and along waterways, built as shared paths (bike riders and pedestrians), but there are some short sections of trail abutting roads and some minor on road links on quiet local streets.
- Parks Victoria has been responsible for coordinating the development of the MTN across Melbourne. However, VicRoads, local councils and other public land managers may implement the parts of the network on land that they manage.

Significant parts of the MTN in Melbourne's outer west are described below.

#### Werribee River Trail

The Werribee River Trail currently runs from the junction of Davis Creek and the Werribee River near Tarneit south to the Federation Trail at the Princes Freeway. It then runs from the Princes Freeway through the northern section of the Werribee River Regional Park to the Werribee Park Tourism Precinct. The trail is then proposed to follow the river further south to meet the Bay at Werribee South.

Much of this length is currently in place, with the trail running along both sides of the river from Werribee Train Station north to Heaths Road, and continuing along the eastern bank to Tarneit.

South of Werribee Station, the trail runs along the eastern side of the river to the Princes Freeway. The trail will then continue under the Maltby Bypass on the western side of the river to connect with the Werribee River Park, although this underpass has not yet been built.

#### The Bay Trail

The Bay Trail when completed will run from the Point Nepean National Park in Portsea on the east side of Port Phillip Bay to the mouth of the Werribee River in Werribee South on the west. The western section starts at the Yarra and follows the Bay through Williamstown and Altona to Cheetham Wetlands and Sanctuary Lakes. It is proposed to continue south and west through Point Cook Coastal Park and then along the coast to the Werribee River.

#### The Federation Trail

The Federation Trail primarily follows the old sewer reservation from Williamstown Road and Stony Creek to the Werribee River. Trails including those on the Werribee River, Skeleton Creek, Laverton Creek and Kororoit Creek do or will intersect with this trail. The first and main section of the Federation Trail from Millers Road in Altona to the Werribee River was officially opened on Sunday 22 October 2006 after ten years of campaigning and two legal challenges. It now provides the most important arterial route in the west. VicRoads plan is to extend the trail from Millers Road to connect with the Bay Trail in Yarraville and construction has been completed along part of this extension.

#### Kororoit Creek Path

The Kororoit Creek Trail is a shared use path for cyclists and pedestrians, which follows the Kororoit Creek. It currently exists in part between Caroline Springs and Sunshine and planning is complete and construction commenced to complete the gaps in Albanvale, Deer Park and Cairnlea. The final gap will be completed as part of the proposed subdivision in Burnside. Construction of the trail between Sunshine and the Federation Trail will occur in 2012. Planning is underway for the trail between the Federation Trail and the Bay Trail in Altona.

### municipal bicycle networks (MBNs)

Municipal Bicycle Networks (MBNs) are networks of local cycling routes and shared pathways within metropolitan Melbourne and in regional Victoria. These local networks link to the PBN and MTN. The local council is the custodian of each MBN and has the primary responsibility for managing its development. Both the City of Wyndham and City of Melton have bicycle and pedestrian strategies. It is expected that local network trails will connect with the Werribee River Trail at various points along the corridor.

### rail trails

Rail Trails are multi-purpose recreational trails that are built along closed railway corridors in regional Victoria. The primary function of rail trails is to provide for recreational cyclists and other users such as horse riders and walkers.

The Department of Sustainability and Environment (DSE) has the primary responsibility for managing the crown land that the Rail Trails are on. Local committees and Councils are responsible for implementing facilities on Rail Trails. The Werribee River Shared Trail will not be classified as a rail trail, nor does it present any opportunity to link with former railway corridors.

### other significant trail opportunities

#### Proposed Regional Rail Link – Outer

The State Government has announced the Regional Rail Link between Werribee and Sunshine is proceeding. Plans include a path along both sides of the corridor.

#### Werribee to Hoppers Crossing Path

VicRoads have identified this route as part of the PBN Review.

## 8 benchmarking

The benchmarking study, which is included in the accompany appendices, considers three Victorian shared trails which run through urban, peri-urban and rural areas - the Merri Creek Trail, the Taylors Creek Trail and the Bellarine Rail Trail. Issues identified through this benchmarking study have informed the Werribee River Shared Trail Strategy.

Trails were selected for the study on the basis of dialogue with and recommendations from Parks Victoria. The study team conducted interviews with staff from each of the relevant Councils responsible for trail planning, implementation and management as follows:

- Merri Creek Trail – City of Yarra, Moreland City Council and City of Darebin
- Taylor’s Creek Trail – Brimbank City Council
- Bellarine Rail Trail – City of Greater Geelong

For the purposes of the report, common issues that were identified through the study were summarized into the sections below, which are discussed in the Benchmarking Report.

- Trail planning;
- Trail implementation;
- Trail width, type & function;
- Topography;
- Flood levels;
- Cultural heritage;
- Vegetation (including management & maintenance);
- User experience, safety & amenity; and
- Other issues.



photo 24: merri creek trail



photo 25: taylor’s creek trail



photo 26: bellarine rail trail

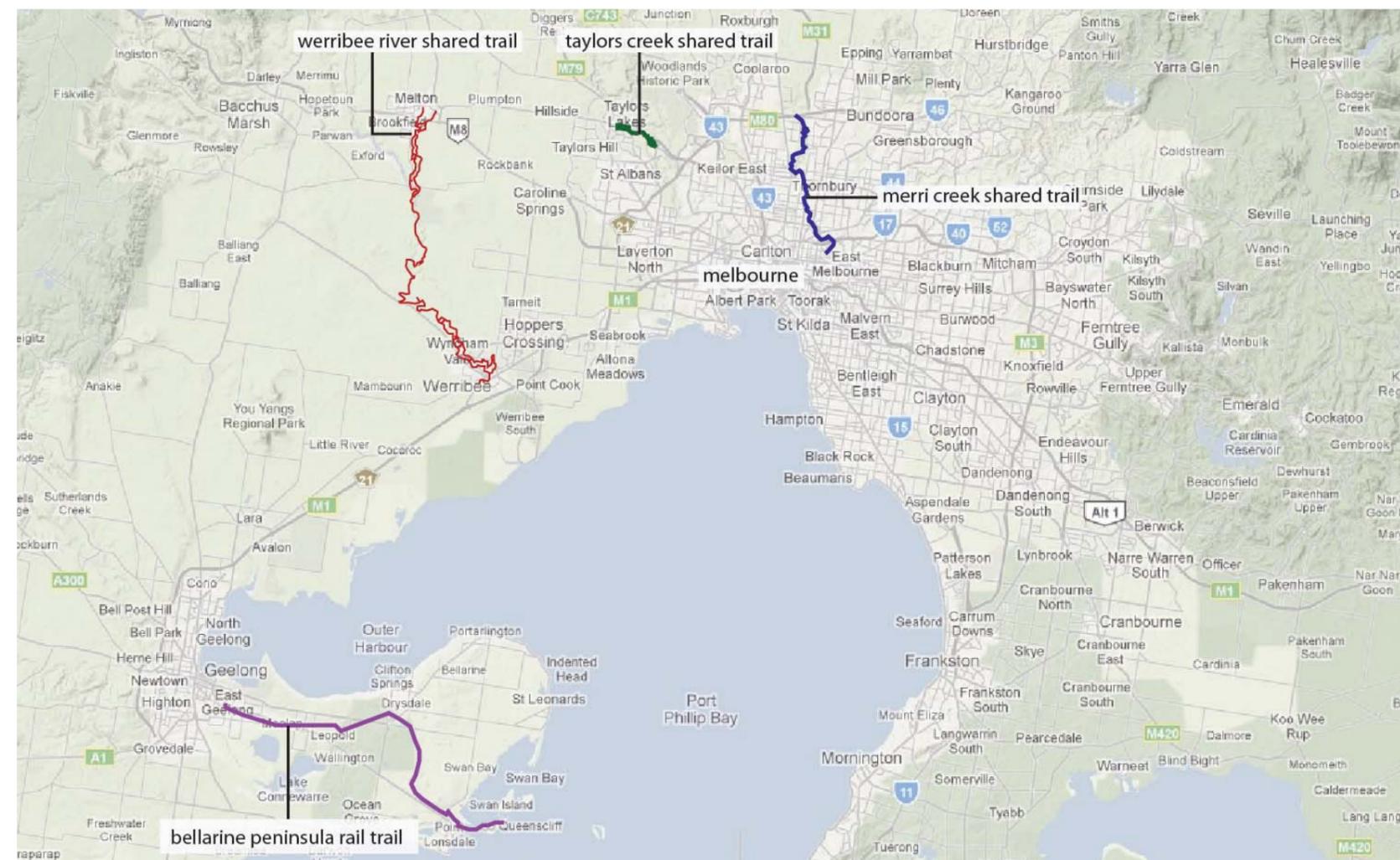


figure 13: benchmarking study context map

## 9 the strategy

The Werribee River Shared Trail Strategy is intended to provide a highly significant, long-term planning and design strategy aimed at the establishment of a regionally significant open space and recreational corridor along the Werribee River between Melton and Werribee. The Strategy is intended to deliver a comprehensive, well-informed and visionary plan which will enable State Government Agencies, Melton City and Wyndham City to progressively establish a new open space corridor which will provide a natural, cultural and recreational focus for current and future residents of this rapidly expanding area of metropolitan Melbourne.

The overarching approach to the preparation of the Strategy is one which is based on the assumption that the vision, concepts and outcomes will be informed by – and will respond to – ‘internal’ and ‘external’ influences in two key spheres, namely:

Internal influences – the physical characteristics of the river corridor itself, and the manner by which these will provide a diverse range of opportunities and constraints relating to the ability of the corridor to function as the future primary open space serving current and future residents, and satisfying their needs with respect to the provision of environmental, cultural and recreational resources for the future benefit of these communities.

External influences – current and future strategic planning for urban development within both municipalities, and the manner by which existing and new urban communities will interface and interact with the river corridor, including expectations for access and use.

The Strategy comprises a series of elements, each of which are outlined in following sections, and all of which have been informed and guided by the information gathering, information processing and benchmarking processes which have been undertaken by the project team. The elements of the strategy include:

- Trail alignment
- Trail configuration
- Open space corridor definition
- Open space corridor facilities
- Open space corridor management
- Open space corridor interface treatments
- Opportunities to transfer land to public ownership
- Safety and security
- Linkages beyond the open space corridor
- Integration with regional open space assets

### 9.1 trail alignment

The proposed alignment of the shared trail has been determined on the basis of both the internal and external influences described above, however the fundamental determinants of the proposed trail alignment are all related to internal influences, namely flood levels, topography, significant natural and cultural features, existing and future structures and suitable crossing locations.

#### flood levels

The major constraint on trail alignment is the 1 in 10 year flood level. *Melbourne Water has prepared Shared Pathways Guidelines* (2009) which specify that shared pathways and trails should be located above the 1 in 10 year ARI flood level. This requirement is intended to achieve two primary outcomes;

- Firstly, to ensure that pathways do not adversely affect the ability of waterways, drains and floodways to convey flood flows, and
- Secondly, to reduce exposure of the public to risk from flood events.

A key input into the preparation of the Strategy has been the modelling and subsequent mapping of both 1 in 10 year and 1 in 100 year ARI flood levels for the entire length of the study area. This information is identified on the Trail Alignment Master Plans contained within this report.

The intention of the Strategy in responding to the constraint imposed by flood levels has been to locate the trail between the 1 in 10 year and the 1 in 100 year flood levels wherever possible. By doing this, the trail alignment is able to maintain a close proximity to the river itself, hence emphasising the river corridor experience for users of the trail.



photo 27: informal rock crossing downstream of the diversion weir at riverbend historic park

#### topography

The Toolern Creek and Werribee River corridors comprise significant variation in topographical characteristics along the length of the study area. The riverbank profiles of the Werribee River at the southern end of the study area are well defined but relatively gentle in slope and typically of heights of approximately 5 metres from top of bank to the edge of the watercourse. Moving upstream the topography changes markedly, such that the central section of the river is characterised by a deeply-incised valley with the river flanked on one or both sides by relatively steep embankments and escarpments of heights up to 50 metres from the top of the escarpment to the edge of the watercourse. Further upstream, as the study area follows the Toolern Creek above its confluence with the Werribee River, the height of the embankments and escarpments reduces to between 10 and 15 metres, however still maintains some relatively steep sections, and in some instances vertical escarpments.

Longitudinal gradients along the trail should not exceed 1 in 20 (5%) unless no suitable route is available to achieve this. To meet guidelines outlined in *Austrroads Guide to Road Design: Pedestrian and Cyclist Paths*, the longitudinal gradient of the trail should not exceed 1 in 14 (7%) in any circumstances.

Given the nature of the river corridor topography, and the desire to have a shared trail running generally parallel with the river course, the trail alignment typically runs along rather than across the contours. In this regard, the constraint imposed by the topographical characteristics of the river corridor apply more to the degree to which the trail is required to cut into the prevailing slope as opposed to the incline of the trail, which is relatively constant. Exceptions to this are those locations where the trail alignment is required to transition from the bottom of an embankment to the top.



photo 28: typical geomorphology and vegetation of the surbiton park escarpment

In this regard, the Strategy assumes that slopes and embankments with a gradient in excess of 1 in 5 (20%) pose a constraint to the development of a shared trail with a 'typical' configuration. A description of the 'typical' configuration of the shared trail is provided in Section 9.2 of this report. The constraint imposed by these gradients relates to the extent of earthworks (cut and fill) likely to be required in order to construct the trail at the required width and with the required crossfall.

Along the length of the study area, there are specific locations where avoidance of slopes in excess of 1 in 5 is not possible. In these areas, an alternative trail configuration will be required, as described in Section 9.2.

### natural and cultural heritage features

The study area comprises extensive areas of remnant indigenous vegetation of varying levels of quality and intactness, along with numerous previously-recorded Aboriginal and historic sites. These are identified and explained in detail within the *Flora and Fauna Desktop Study for the Werribee River Shared Trail Strategy* (November 2011) and the *Werribee River Shared Trail Strategy Aboriginal and Historical Heritage Assessment* (November 2011), both of which are provided as appendices to this report.

The future trail alignment will have to take into account Growling Grass Frog (GGF) requirements which are outlined in the *Sub-Regional Strategy for the GGF*, the *Biodiversity Strategy for GGF Requirements* and *Wyndham Precinct Plans 40, 92, 1088 and 1091: Growling Grass Frog Conservation Management Plan, Wyndham Vale and Tarneit, Victoria*. The final location of the GGF wetlands may require local adjustments to the shared trail.

With regard to natural vegetation, the determination of trail alignment has been considered with respect to the anticipated impacts to significant species or their associated habitats resulting from the construction and use of the path. The associated constraint levels are as follows:

Negligible – no impacts to significant flora because existing paths are available and/or there are options clearly visible in aerial photography to avoid possible areas of native vegetation.

Low – the original habitat appears disturbed or is cultivated and/or is fragmented from suitable adjacent habitat, therefore the condition is considered to be poor with little understorey.

Medium – the original habitat appears to have been modified but not destroyed, and/or may contain areas of indigenous vegetation that the trail would need to avoid.

High – the complexity of remnant vegetation may considerably constrain the path positioning, possibly involving careful alignment around trees and around patches of remnant vegetation. Careful mapping of vegetation would be required in these areas to avoid and minimise disturbance to native vegetation.

Existing vegetation which meets the criteria described above for a high level of constraint to trail alignment is identified in the Trail Alignment Master Plan diagrams.

With regard to areas of Aboriginal cultural heritage sensitivity, known Aboriginal places and historical sites, determination of the final trail alignment will need to give consideration to the following key recommendations:

Field surveys and further consultation with the relevant Aboriginal communities take place. If an activity is determined to be a high impact activity and is within 200m of a waterway such as the Werribee River, it should be guided by any completed desktop and/or standard Aboriginal cultural heritage assessment, given consultation with aboriginal communities and/or the Registered Aboriginal Party has occurred and management recommendation have been set out to guide any future complex assessment by individual land owners. Any activities as outlined above must be in accordance with any approved complex assessment or aboriginal Cultural Heritage Management Plan (CHMP).



photo 29: typical deeply-incised profile of the werribee river corridor upstream from cobbledick's ford



photo 30: heritage-listed "staughton's cutting", which was part of the original access route to the eynesbury property



photo 31: relatively intact riparian vegetation along the werribee river within the eynesbury property

### existing and future structures

Along the length of the Toolern Creek and Werribee River corridors within the study area, there are a number of existing structures which the trail alignment is required to consider. These include the following:

- Western Freeway bridges
- Melbourne – Ballarat Railway bridge
- Bridge Road bridge, Melton
- Greig’s Road bridge, Exford
- Cobbledick’s Ford
- Werribee River Southern Rural Water irrigation diversion weir (still in use)

There are also a number of future structures proposed within the study area, for which consideration is also required to ensure that development of the shared trail can be undertaken in a manner which is coordinated with the development of these structures. They include:

- Primary and secondary arterial road bridges as prescribed in various Precinct Structure Plans
- Bridge associated with the proposed realignment of Bridge Road, Melton
- Bridges associated with the future Outer Metropolitan Ring Road
- Bridge associated with the proposed Regional Rail Link

The location of each of these structures, and the manner in which the proposed shared trail alignment considers them, is identified in the Trail Alignment Master Plan diagrams.



photo 32: greig’s road bridge over the werribee river downstream from melton reservoir

### suitable crossing locations

As a principle, the Strategy aims to provide crossings over Toolern Creek and the Werribee River at regular intervals within those sections of the corridor which are within the Urban Growth Boundary and zoned to develop from rural to urban areas in the near future. The preferred distance between these crossings is approximately 2-4 kilometres, to enable residents to utilise sections of the trail in proximity to their homes for recreational circuits of 4-8 kilometres in length, and allowing them to access and experience both sides of the creek or river.

Proposed crossing locations, as identified in the Trail Alignment Master Plan diagrams, have been determined such that they can be provided in accordance with *Melbourne Water’s Shared Pathways Guidelines* (2009). Adherence to these Guidelines requires that the underside bridges are set above the 1 in 10 year ARI flood level for minor waterways and above the 1 in 100 year ARI flood level for major waterways. In the context of the Strategy, Toolern Creek and any of the tributaries which intersect the Werribee River within the study area are considered to be minor waterways, whilst the Werribee River itself is considered to be a major waterway.



photo 33: approximate location of former bridge crossing as part of original access route to the eynesbury property

The Guidelines also require that bridges are aligned perpendicular with the waterway. It should be noted that the 1:100 year flood level is a starting point and each bridge location is individually assessed. The recently completed shared trail crossing of the Werribee River between the Werribee River Regional Park and the Werribee Mansion Tourism Precinct has been constructed with Melbourne Water approval at just below the 1:10 year flood level.

Wherever possible, the Strategy assumes that a shared trail crossing can be provided as part of a road or rail crossing over Toolern Creek or the Werribee River. Where these crossings are existing, the recommendation is that provision be made for the shared trail, either on the existing structure (where there is sufficient room) or alternatively as a new purpose-designed structure fixed to the side of the existing structure, subject to engineering investigations and detailed design. Where these road or rail crossings are proposed, the Strategy recommends that the future design of these structures makes provision for the inclusion of sufficient width to enable the inclusion of the shared trail across the waterway and provide sufficient clearance under the structure for the trail to follow the river.



photo 34: existing concrete ford across toolern creek

## 9.2 trail configuration

The proposed typical configuration of the shared trail will comprise a 3 metre wide reinforced concrete paved surface in both the urban and rural sections, with a minimum 0.5 metre wide level grassed verge on either side functioning as a 'roll-off' zone as per the *Austrroads Guide to Road Design: Pedestrian and Cyclist Paths*. Hence the total width of land required for the provision of the shared trail in a typical configuration is 4 metres.

The typical configuration is proposed for all areas where the trail traverses slopes which have a gradient of no steeper than 1 in 5 (20%). In such locations, a 4 metre wide level corridor (to allow for the 3 metre wide trail and 0.5 metre wide verge either side) can be provided with excavation of no more than 0.5 metres, which is considered to be acceptable in areas other than those containing significant natural or cultural attributes.

Where the trail alignment traverses slopes with a gradient steeper than 1 in 5 (20%) the typical configuration is not suitable, as it would result in excessive excavation of the existing terrain. In these instances, the trail will likely be defined by a retaining wall of a maximum 1 metre height to one side, with the level trail corridor cut into the slope. A safety rail or balustrade may be required on the 'downhill' side of the trail, to protect against users accidentally leaving the path. It is important that the cutting of slopes necessary to accommodate the trail in steep areas must not contribute or exacerbate any erosion issues.

The Strategy assumes that where slopes have a gradient exceeding 1 in 3 (33%) then the trail alignment should avoid these slopes, as construction of the pathway would be complex and difficult to achieve without significant excavation and retaining wall construction.

Examples of both the typical and non-typical configurations are provided in Figures 96-98.

## 9.3 open space corridor definition

The intent of the Strategy is to define the trail alignment within the context of a public open space corridor. In this regard, the Strategy provides for definition of the preferred width of the open space corridor along the length of the study area.

It is important to note that the extent and nature of the open space corridor is anticipated to be different in existing/future urban areas as compared to rural areas. Within the context of strategic land use planning for the region, existing/future urban areas and rural areas are prescribed in the Planning Schemes of both Melton City and Wyndham City, and in the Precinct Structure Planning being undertaken by those municipalities in association with the Growth Areas Authority. In general terms, the northern section of the study area (Western Freeway to Greig's Road) and the southern section of the study area (Outer Metropolitan Ring Road alignment to President's Park) are within the Urban Growth Boundary and are within and/or adjacent to land identified for urban development. The central section of the study area (Greig's Road to the Outer Metropolitan Ring Road alignment) is beyond the Urban Growth Boundary and as such urban development of this land is not anticipated. The northern and southern sections of the trail and associated open space corridor are identified in the PSPs as urban open space and conservation reserves, with abutting urban development, whereas the central section of the trail will retain its existing rural landscape setting and associated adjoining land uses.

### urban parkland open space corridor definition

The northern and southern sections of the study area are within the Urban Growth Boundary, and are adjoined by existing urban development in Melton South and Strathulloh (in the north) and Werribee and Tarneit (in the south). In addition to existing urban development, the northern and southern sections of the study area are affected by the following Precinct Structure Plans:

- PSP 31 - Toolern (completed and approved)
- PSP 40 – Ballan Road (to be completed)
- PSP 1088 - Oakbank (to be completed)
- PSP 1091 – Riverdale (to be completed)
- PSP 1092 – Westbrook (to be completed)
- PSP 1097 – Toolern Park (exhibited)

In these areas, the Strategy defines the open space corridor as comprising all land between the Toolern Creek / Werribee River and the proposed trail alignment, plus all land between the proposed trail alignment and the 1 in 100 year ARI flood level or a distance of 25 metres beyond the proposed trail alignment (whichever is the greater). Other factors may influence the open space corridor, such as Melbourne Water waterway setback guidelines, GGF conservation areas etc. Adjoining PSPs will consider all these factors for the final width of the open space corridor.



photo 35: toolern creek vegetation and escarpment, with recent urban development beyond



photo 36: rehabilitation works along davis creek, with recent urban development beyond

### rural parkland open space corridor definition

The central section is outside the Urban Growth Boundary. Urban development is not anticipated to be a future consideration with respect to the rural shared trail open space corridor interfaces. In these areas, the Strategy defines the open space corridor as comprising all land between the Werribee River and the proposed trail alignment, plus all land located within a distance of 5 metres beyond the proposed trail alignment (away from the watercourse).

The justification for defining this extent of land to comprise the rural open space corridor within which the trail is to be located is as follows:

- Including all land between the trail and the Werribee River ensures that the shared trail maintains a direct relationship (either physical or visual) with the watercourse along its length.
- Including land for a minimum distance of 5 metres beyond the trail alignment (ie away from the watercourse) ensures the provision of an appropriate-width open space buffer between the trail and adjacent rural land, for the purposes of ensuring appropriate land management practices within the corridor and along its interface with existing rural land. This also ensures that the majority of productive agricultural land within the 1 in 100 year ARI flood level remains available for that use.
- The rural activities abutting the trail will provide a borrowed landscape of open space due to the nature of rural activity. If at some time in the future the rural land is redeveloped then a reassessment of the open space corridor should be undertaken as part of that redevelopment process.



photo 37: pastoral floodplain landscape with escarpment and agricultural landscape beyond

### 9.4 open space corridor facilities

The provision of appropriate recreational facilities within the defined open space corridor is something which the Strategy assumes will predominantly be facilitated through future detailed planning for the establishment of these public open spaces by both Melton City and Wyndham City. The type and extent of facilities provided will be guided by these future detailed planning processes.

However, the Strategy advocates the provision of a minimum level of recreational facilities which are considered to be directly related to the shared trail itself, and intended to service the future users of the shared trail. These facilities include the trail itself, crossings over existing watercourses at the locations identified in the Trail Alignment Master Plan diagrams, directional and safety signage, trail seating every 500m - 1km and/or at good viewing points, down-outs and sufficient lighting to ensure the provision of a safe environment for trail users. It should be noted that the Strategy assumes that trail lighting is generally not to be provided except in underpasses or areas that have very high commuter use.

In addition to these facilities, which would be provided along the length of the trail, the Strategy identifies possible locations for the establishment of 'minor' and 'major' recreation nodes at specific identified locations along the length of the trail. These recreation nodes are intended to provide rest stops and to function as either 'destinations' or 'setting out points' for trail users, in a manner which ensures that users have access to such facilities whether they choose to access the entire length of the trail or just sections thereof. The facilities anticipated to be provided at these recreation nodes are as follows:

#### Minor recreation node

- Seating
- Shelter structure
- Bike racks

#### Major recreation node

- Seating
- Shelter structures
- Bike racks
- Electric BBQ and picnic facilities
- Toilets
- Potable water supply to drinking fountain
- Car parking and access road connection to adjacent public roads

In addition to these facilities, the prevalence of natural and cultural heritage assets along the length of the study area provides an excellent opportunity for the provision of a comprehensive interpretive signage network. The Strategy recommends that the development of an interpretive signage plan should occur as a stand-alone study for the entire trail length, such that a coordinated suite of interpretive facilities can be developed and implemented in a staged manner as sections of the trail itself are developed. Such an approach would provide the opportunity for a 'Werribee River Trail Experience', which would allow trail users to enjoy a coordinated, holistic approach to interpretation of the many geological, ecological, Aboriginal and historical features along the length of the trail.



photo 38: existing park furniture and facilities at riverbend historic park

## 9.5 open space corridor management

The Strategy anticipates that management of the open space corridor within which the trail is located, in both urban and rural open space corridor settings, is primarily the responsibility of Melton City and Wyndham City. Parks Victoria would be the responsible authority for the management of those sections of the open space corridor which fall under their jurisdiction, comprising the Toolern Creek Parklands in the north, the future Werribee Township Regional Park in the south and the Western Grasslands Reserves.

It is anticipated that management of the open space corridor would comprise all typical maintenance and management functions which both Councils already undertake for public open space within their respective municipalities, along with maintenance of the trail and those facilities directly associated with it. In addition to this, and specifically with regard to the rural open space corridor, management responsibilities would include the maintenance of fencing along the interface between the open space corridor and adjoining private rural land.

Management of the open space corridor should also ensure an appropriate level of liaison, coordination and allocation of maintenance budgets with those authorities who have a vested interest in the river corridor, its assets and its functionality. These authorities, listed below, each have existing or anticipated future management obligations with respect to the river corridor and the Strategy recognises the importance of ensuring that the establishment and management of an open space corridor does not conflict with the current and ongoing management practices of each of these authorities. The relevant authorities include:

- Melbourne Water
- Western Water
- Southern Rural Water
- Parks Victoria
- Department of Sustainability and Environment
- Department of Primary Industries
- Department of Transport
- VicRoads
- Melton City
- Wyndham City

## 9.6 open space corridor interface treatments

As previously described, the Strategy identifies two different configurations of the shared trail open space corridor, namely an urban open space corridor (northern and southern sections within Urban Growth Boundary) and a rural open space corridor (central section outside Urban Growth Boundary). The manner by which the interface between open space corridor and adjoining land use differs for each of these corridor types, is outlined below.

### urban open space corridor interface

The Strategy anticipates that the urban open space corridors will be adjacent to urban development, typically comprising residential land uses, however potentially also comprising active open space, activity centres, schools or employment areas. In each case, the fundamental expectation of the Strategy is that the interface between the open space corridor and these adjoining land uses will comprise a public roadway, and not comprise either side or rear boundary fencing in any circumstances. The interface between the open space corridor and adjoining land uses should not be fenced, except where this is necessary for safety reasons (such as at narrow points where the trail alignment is constrained between a roadway and steep topography). This will ensure that the interface between the urban open space corridor and adjoining land uses exhibits the following characteristics:

- Permeable public access along the entire open space corridor.
- Passive surveillance along all edges of the corridor from adjoining urban development and the roadway.



photo 39: urban encroachment on the werribee river corridor downstream from davis creek

- An attractive outlook for all future adjoining urban development.
- Opportunities for the open space corridor to make a strong positive contribution to future neighbourhood character and identity.
- Visual, physical and spatial integration of public open space with adjoining residential or other land uses.
- The provision of local access trails to connect adjacent communities into the open space corridor and along public roadways on the open space boundary in the event that the shared trail is inaccessible, generally due to flood events.

### rural open space corridor

In contrast to the urban open space corridor, the Strategy anticipates that the rural open space corridor will be adjoined by rural land uses. The interface with these land uses will typically require the provision of fencing, to minimise risks associated with public access into private rural land, which may be grazing land with stock. Fencing along this interface should comprise standard post-and-wire farm fencing, to create a clear delineation of public and private land but ensuring that the appearance and character of the fencing is consistent with the prevailing rural landscape character. This fencing will typically be located within 5 metres of the trail alignment. Other appropriate fencing options could be considered depending on the abutting land use at the time of the trails construction. The provision of stock access gates may be required in particular locations, and would be confirmed through a future detailed design process in close consultation with adjoining landowners. Access to the trail in this area will be via nodes with specific access points from the road infrastructure.



photo 40: pastoral landscape beyond werribee river escarpment at surbiton park

## 9.7 safety and security

In order to ensure the provision of a safe and secure trail environment for both users of the trail and managers of the shared trail open space corridor, the Strategy adopts the guiding principles of *Melbourne Water's Shared Pathways Guidelines* (2009). These guiding principles ensure that the location of the shared trail will not compromise:

- The safety of trail users – especially their exposure to risks associated with inundation.
  - Standards for flood protection.
  - The waterway and riparian corridor and its intrinsic and natural values.
  - The relationship between the waterway, its floodplain and any associated floodplain features.
  - The opportunity to undertake future improvement works.
  - Melbourne Water (and other Authority) constructed assets, above or below ground.
  - The maintenance of those assets.
  - The hydraulic function of the waterway.
- Maintenance access.
  - Measures to be undertaken in the detailed design and implementation of the shared trail and associated open space corridor to ensure the application of these guiding principles include:
    - The development of an appropriate 'Pathways Agreement', as identified in *Melbourne Water's Shared Pathways Guidelines*
    - Detailed alignment investigations to ensure that the shared trail can be located above the 1 in 10 year ARI flood level, and in areas where this cannot be achieved, the provision of adequate safety measures to ensure that access to sections of the trail located below the 1 in 10 year ARI flood level will be prevented in high flow events.
    - Detailed alignment design and construction techniques which protect significant biodiversity values.
    - Detailed design of watercourse crossings to ensure that these structures do not increase flood levels or incur unacceptable flow obstruction in a significant flood event.
- The provision of well drafted and clearly designed signage which has the capacity to advise and inform trail users of potentially hazardous situations ahead, and indicates alternative routes where their use may be required.
  - The provision of 'drown-outs' (as identified in *Melbourne Water's Shared Pathways Guidelines*) where required to give trail users advanced warning of a potentially dangerous situation on the trail ahead and to prevent access to those areas in the event of flooding.
  - The use of concrete as a preferred trail surface material, to ensure durability and avoid the risk of trail surface erosion associated with granitic sand paths.

Other measures to be considered in the detailed design and implementation of the shared trail to ensure safety and security include; consideration of Crime Prevention Through Environmental Design Principles (CPTED) in general, the *Victorian Government's Safer Design Guidelines*, consultation with the CFA to ensure the trail does not impede their ability to manage wildfires in the area, and the *Austroads Guide to Road Design: Pedestrian and Cyclist Paths*.

## 9.8 linkages beyond the open space corridor

The Strategy recognises that the shared trail and its associated open space corridor will become a regionally significant public open space within the context of both Melton and Wyndham municipalities. In this regard, the means by which the shared trail is linked to other 'activity generators' beyond the corridor is critical in ensuring that existing and future communities can access and utilise the shared trail as an integrated component of the future urban landscape. The principle of ensuring good connections between the shared trail and destinations outside the open space corridor applies to both the urban and the rural open space corridors, however it is anticipated that more connections would be required in the urban open space corridor than the rural open space corridor, in reflection of the expected type and density of development and distribution of activity generators in these developing urban areas.

A key input to determine where opportunities for linkages to local communities occur is the Precinct Structure Plans which have either been prepared or are under preparation for future urban development at both the northern and southern ends of the study area. The categories of existing or proposed future land use for these communities within an acceptable walking distance of the shared trail open space corridor, include the following:

- Trails, bridges and underpasses
- Passive open space
- Active open space
- Activity centre
- School
- Community centre

The Trail Alignment Master Plan diagrams indicate the proposed locations for these land uses. It is recommended that (in all situations) where these land uses are proposed within 800 metres of the shared trail open space corridor that provision be made in PSP planning for the establishment of an off-road shared trail connection between these land uses and the shared trail open space corridor. Such provision is anticipated to ensure that the shared trail and its open space corridor is intrinsically and safely linked with surrounding urban areas and maximises opportunities for existing and future communities to access and use the trail.

## 9.9 integration with regional open space assets

The Strategy recognises the importance of ensuring that the shared trail and associated open space corridor is integrated with other existing and proposed future regional open space assets. With respect to the study area, the following regional open space assets have been identified as being appropriate for integration with the shared trail, primarily due to their relative proximity:

- Toolern Creek Parklands
- Melton Reservoir
- Western Grasslands Reserve (proposed)
- Werribee Township Regional Park (proposed)

And to these areas outside the study area:

- Federation Trail
- Bay Trail
- Werribee Mansion Tourism Precinct

The Strategy makes provision for linkages between the shared trail and these regional open space and recreational assets, as identified on the Trail Alignment Master Plan diagrams.

## 9.10 implementation of the trail and associated open space corridor

Significant sections of the study area are presently in private ownership. Those currently in public ownership are as follows:

- Public open space along the west side of Toolern Creek north of Bridge Road
- Toolern Creek Parklands
- Greig's Road reserve (at the confluence of Toolern Creek and Werribee River)
- Surbiton Park (Western Water Treatment Plant)
- Moloney's Reserve
- Cobbledick's Ford Reserve
- Public open space along the east side of Werribee River (downstream from its confluence with Davis Creek)
- Riverbend Historic Park
- President's Park

In addition, there are three private properties with direct interface to the Werribee River which are currently affected by Public Acquisition Overlays in either the Melton or Wyndham Planning Schemes, for the purposes of establishing the proposed Western Grasslands Reserve. These properties are as follows:

- 1884 Mount Cottrell Road, Mount Cottrell
- 2182 Boundary Road, Mount Cottrell
- Part of the Eynesbury Property (adjoining Cobbledick's Ford Road, Eynesbury)

All other land adjoining either Toolern Creek or Werribee River within the study area is presently in private ownership.

The method by which land identified by the Strategy as being within the defined shared trail open space corridor is transferred from private to public ownership differs for the urban open space corridor and the rural open space corridor.

A Cultural Heritage Management Plan (CHMP) will be required as part of detailed design for all parts of the proposed trail prior to any on ground implementation.

### urban open space corridor

The Strategy anticipates that land identified as being within the shared trail urban open space corridor will be zoned in the PSPs as encumbered land for waterway, environment, cultural heritage or open spaces purposes. Land in these encumbered zones will transfer from private to public ownership through the Planning Approval Process for urban development. The Planning Approval processes of both Melton City and Wyndham City make provision to provide public open space, bridges and trails through a number of mechanisms within their respective Planning Schemes. The Precinct Structure Plans have extensive and detailed provisions for development requirements to ensure the provision of public open space as a fundamental component of urban development.

It is anticipated that the Strategy will become a Reference Document within both Melton and Wyndham Planning Schemes, and will also become a Reference Document to the relevant Precinct Structure Plans currently under preparation. In order to include the Strategy as a Reference Document a planning scheme amendment is required, the process of which is set out in the *Planning and Environment Act 1987*. Following adoption of the Werribee River Shared Trail Strategy, further implementation of the project outcomes may result in additional changes to the Melton and Wyndham Planning Schemes. Such changes could take the form of additional objectives and strategies in the MSS, a Local Planning Policy or other additional requirements in the planning scheme.

The *Toolern Precinct Structure Plan and Development Contributions Plan* have identified and funded a strategic alignment for 3.25km of trail and bridge crossings on the Toolern Creek component of this strategy.



photo 41: floodplain landscape and riparian vegetation within the future toolern creek regional park

rural open space corridor

The Strategy acknowledges that the shared trail rural open space corridor is located outside the Urban Growth Boundary. Urban development is not anticipated to occur in these areas. As a result, the utilisation of a development contributions scheme to facilitate the transfer of land from private to public ownership is not an option for the rural open space corridor. Instead, land identified in the Strategy as forming the rural open space corridor will need to be acquired by State or Local Government, possibly utilising funds from the Growth Areas Infrastructure Contribution Scheme (GAIC) or accessed through other mechanisms such as 173 agreements.

Melton City and Wyndham City have undertaken an independent valuation of all private land which the Strategy identifies as being part of the shared trail rural open space corridor.

Following adoption of the Strategy by both Melton City and Wyndham City, the method by which the land is transferred from private to public ownership will follow a process which is outlined in very broad terms below:

<b>step 1</b>	Adoption of the Werribee River Shared Trail Strategy by Melton City and Wyndham City.
<b>step 2</b>	Planning Scheme Amendment process to apply Public Acquisition Overlays to affected land or establish a 173 agreement.
<b>step 3</b>	Purchase of land affected by the Public Acquisition Overlay by State or Local Government in accordance with established procedures.
<b>step 4</b>	Establishment of public open space and construction of the shared trail and associated facilities.

The exception to this process is the land identified as part of the rural open space corridor which forms part of the Western Water Treatment Plant, known as Surbiton Park. This land is not private, however it is presently part of Western Water’s operational plant and as such is not presently accessible by the public. The method of facilitating public access to the extent of this land identified in the Trail Alignment Master Plan diagrams, for the establishment of the shared trail and associated rural open space corridor, would be subject to an agreement between Melton City Council and Western Water. The Strategy recommends that such an agreement be drafted, potentially utilising Melbourne Water’s typical ‘pathways agreement’ as a precedent or template agreement.

Subject to further investigation there maybe sections of the trail where Melton and Werribee Councils could secure rights in the form of a licence over Crown Land to construct, maintain and use the Shared Trail along the Werribee River. Prior to commencement of detailed planning there is a need to determine land access via licence or acquisition and a full title search will need to be undertaken to understand if a permanent reserve of the river bed and banks exists through all or part of the rural area. These may have been created under the *Land Act 1958*, the *Water Act of 1989* or the *Government Gazettal of May 1881*. In addition, if a reservation exists a licenced surveyor would need to undertake a survey to establish the exact location of the permanent reservation of any given point.

### responsibility for implementation of the trail

Responsibility for implementation of the trail will be shared between Wyndham City, Melton City, Parks Victoria and the GAA. It will be imperative for these organisations to work together to facilitate these outcomes.

#### Trail Design and Costings

##### Within the Urban Growth Boundary

- 3m wide reinforced concrete trail of 250mm depth on crushed rock with 0.5m wide grassed runoff either side, in lieu of separate 2.5m wide local access trails and Melbourne Water access track.
- Construction costs to include retaining walls and other preparatory works.
- Local access trails to link to the trail at appropriate locations approximately every 400m.

##### Outside the Urban Growth Boundary

- Land acquisition and trail construction to be defined and funded from Federal, State and Council sources.
- Within the proposed Grassland Reserves, DSE and Parks Victoria will be responsible for the land acquisition and trail development respectively subject to funding.

#### Scope of Works and Responsibilities

##### Within the Urban Growth Boundary (south of the river)

PSP92, comprising the area from the centre of the PAO for the Outer Metropolitan Ring Road (OMR) to the western edge of the Hobbs Road reserve and under the RRL.

- Trail to be delivered by developer works (in lieu of standard 'back of kerb' shared path) along the general alignment identified in the Werribee River Shared Trail Strategy and consistent with the approved Conservation Management Plan (CMP).

PSP40, comprising the area from the western edge of the Hobbs Road reserve, under the Regional Rail Link (RRL) to the eastern boundary of 575 McGrath Road.

- Trail to be funded by Developer Contributions (DCs) as a local charge - apportioned across all landowners in PSP 40 (the 'Local Trail DC').
- The Local Trail DC charge is to include the cost of three local bridges to cross the two northern tributaries (Lot 1 PS708620 Hobbs Road/70-160 Hobbs Road) of the Werribee River and the flood runner / breakaway channel in the south.
- The Local Trail DC charge does not include the costs for construction of the shared trail bridge over the Werribee River (Bridge 31) east of Woolahra Rise. Council's position is that this bridge is to be funded by the Wyndham West DCP (50%) and the Wyndham North DCP (50%). This is subject to further discussion.
- From the shared trail bridge (Bridge 31) the remainder of the trail, within the proposed Werribee Township Regional Park, is to be delivered by DSE / Parks Victoria subject to funding and the final definition of the park boundary and land acquisition.

##### Within the Urban Growth Boundary (north of the river)

PSP1088 and PSP 1091, comprising the area from the eastern edge of the PAO for the OMR, under the RRL, to the shared trail bridge over the Werribee River (Bridge 31), south east of Sewells Road. A short link is to provide access through the stockland site to Davis Road.

- Trail to be delivered by developer works (in lieu of standard 'back of kerb' shared path) along the general alignment identified in the Werribee River Shared Trail Strategy and consistent with the approved CMP.
- The small section under the RRL is excluded from developer works and is to be funded by other means.
- The remainder of trail in the proposed Werribee Township Regional Park is to be delivered by DSE / Parks Victoria subject to funding and the final definition of the park boundary and land acquisition.

## 10 trail alignment master plans

The following master plans show the proposed shared trail alignment from the Western Freeway (Toolern Creek) in the north to Presidents Park and the Riverbend Historical Park in Wyndham Vale.

The proposed 3m wide shared trail is located between the 1:10 and 1:100 year flood level where possible and the trail alignment is a key determinant of the open space corridor within which it is located. Several significant recreational and tourism assets are located along the corridor environs, along with a number of proposed development sites and infrastructure.

The following features are identified in the trail alignment master plans:

- Proposed trail alignment;
- Open space corridor;
- Roads;
- Contours;
- 1 in 10 and 1 in 100 year flood extents;
- Existing shared trail;
- Proposed shared trail bridges;
- Significant flora (Ecological Vegetation Classes (EVCs) from *The Werribee River Shared Trail Strategy Flora and Fauna Desktop Study* prepared by Ecology & Heritage Partners (November 2011), attached as an appendix);
- Heritage sites and sites of interest;
- Existing and proposed car parks;
- Existing and proposed visitor amenities; and
- Future land use associated with Precinct Structure Plan areas, including proposed urban development, passive/active open space, activity centres, schools, communities centres and roads. Future land uses shown in the trail alignment master plans are subject to change and will be confirmed in the final PSPs.
- Cross sections have been prepared for the locations shown and these are provided in Section 11 of this report.

Chainages are also provided for reference along the shared trail. These measurements are in metres and are labelled according to the seven reaches of

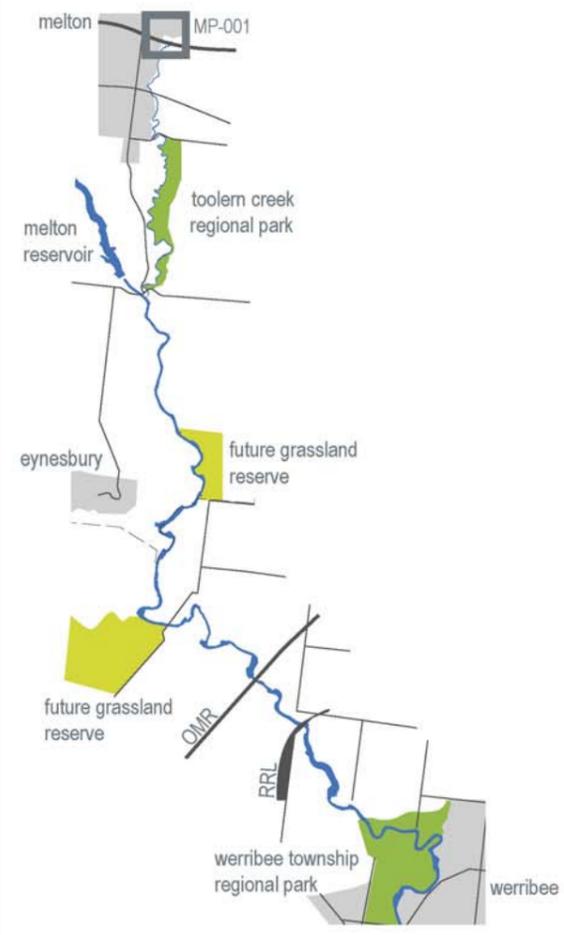


figure 14: trail alignment map 1

legend

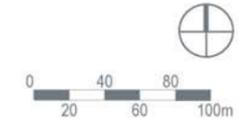
- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
- extent of shared trail on existing 4wd maintenance track
- existing shared trail
- proposed shared trail bridge
- significant flora
- heritage site / site of interest
- existing car park
- proposed car park
- existing visitor amenities
- proposed visitor amenities
- psp area - future urban development
- psp area - future passive open space
- psp area - future active open space
- psp area - future activity centre
- psp area - future school
- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



werrabee river shared trail strategy  
trail alignment masterplan

MP-001



Project Ref: 2010.464  
Dwg No.: MP-001  
Scale: 1:4000@A3  
Date: 12.03.13  
Revision: H

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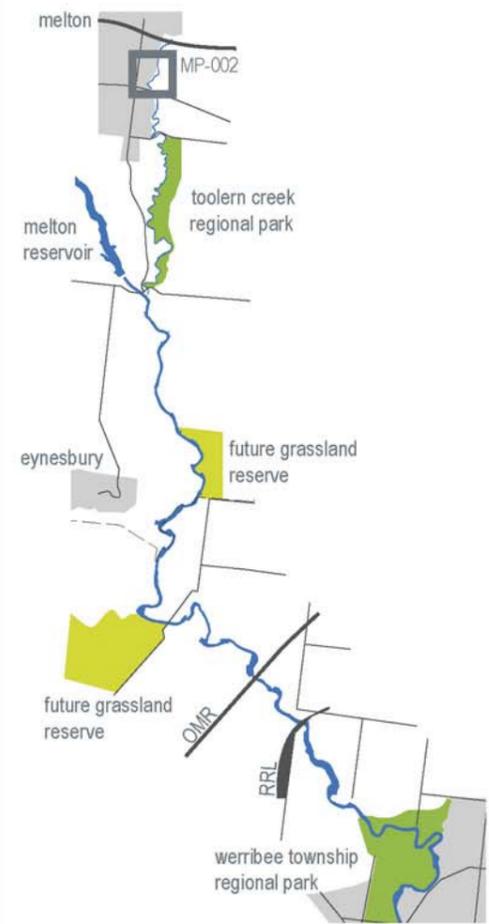




legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
- extent of shared trail on existing 4wd maintenance track
- existing shared trail
- proposed shared trail bridge
- significant flora
- heritage site / site of interest
- existing car park
- proposed car park
- existing visitor amenities
- proposed visitor amenities
- psp area - future urban development
- psp area - future passive open space
- psp area - future active open space
- psp area - future activity centre
- psp area - future school
- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan

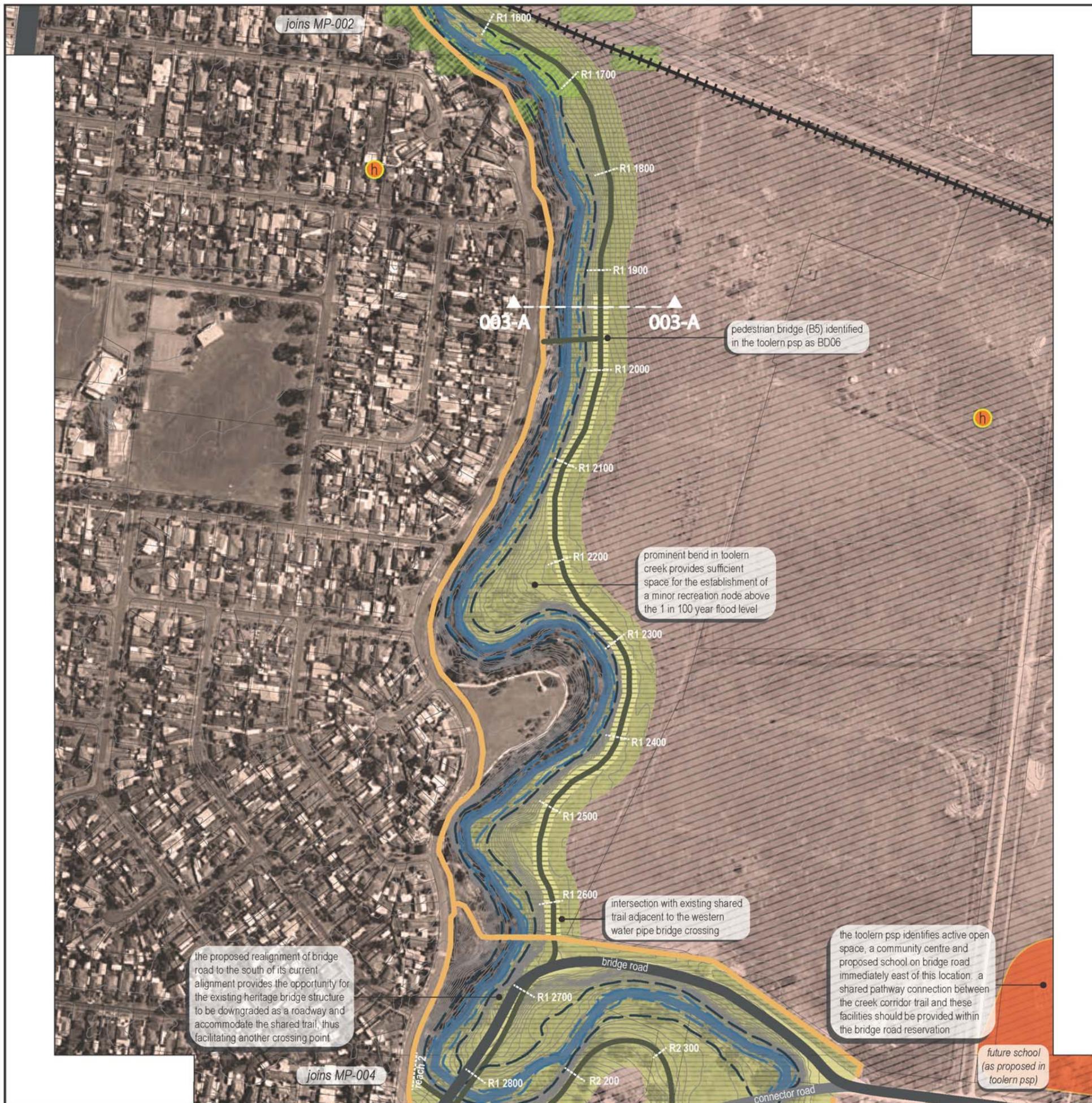


werribee river shared trail strategy  
trail alignment masterplan  
MP-002

Project Ref: 2010.464  
 Dwg No.: MP-002  
 Scale: 1:4000@A3  
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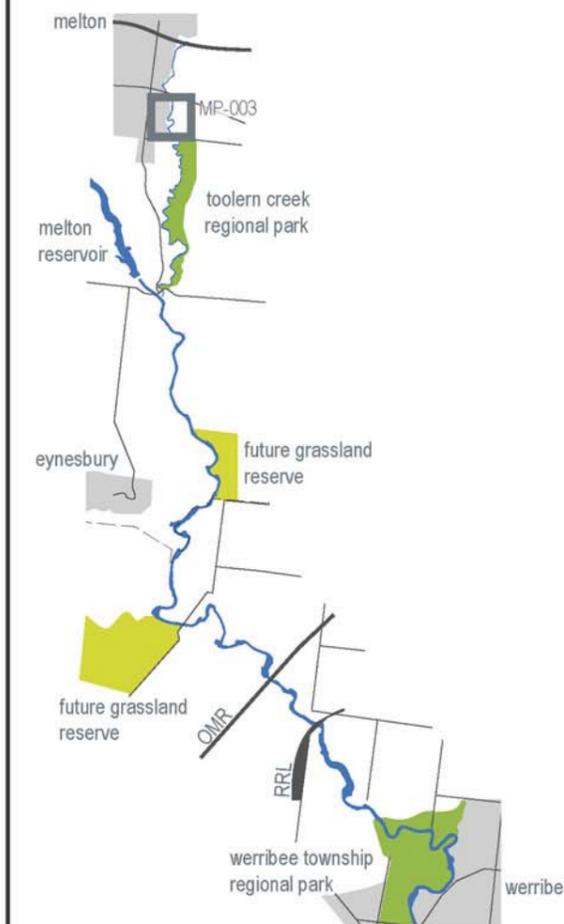
figure 15: trail alignment map 2



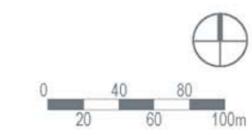
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- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
- extent of shared trail on existing 4wd maintenance track
- existing shared trail
- proposed shared trail bridge
- significant flora
- heritage site / site of interest
- existing car park
- proposed car park
- existing visitor amenities
- proposed visitor amenities
- psp area - future urban development
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- psp area - future active open space
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- psp area - future school
- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



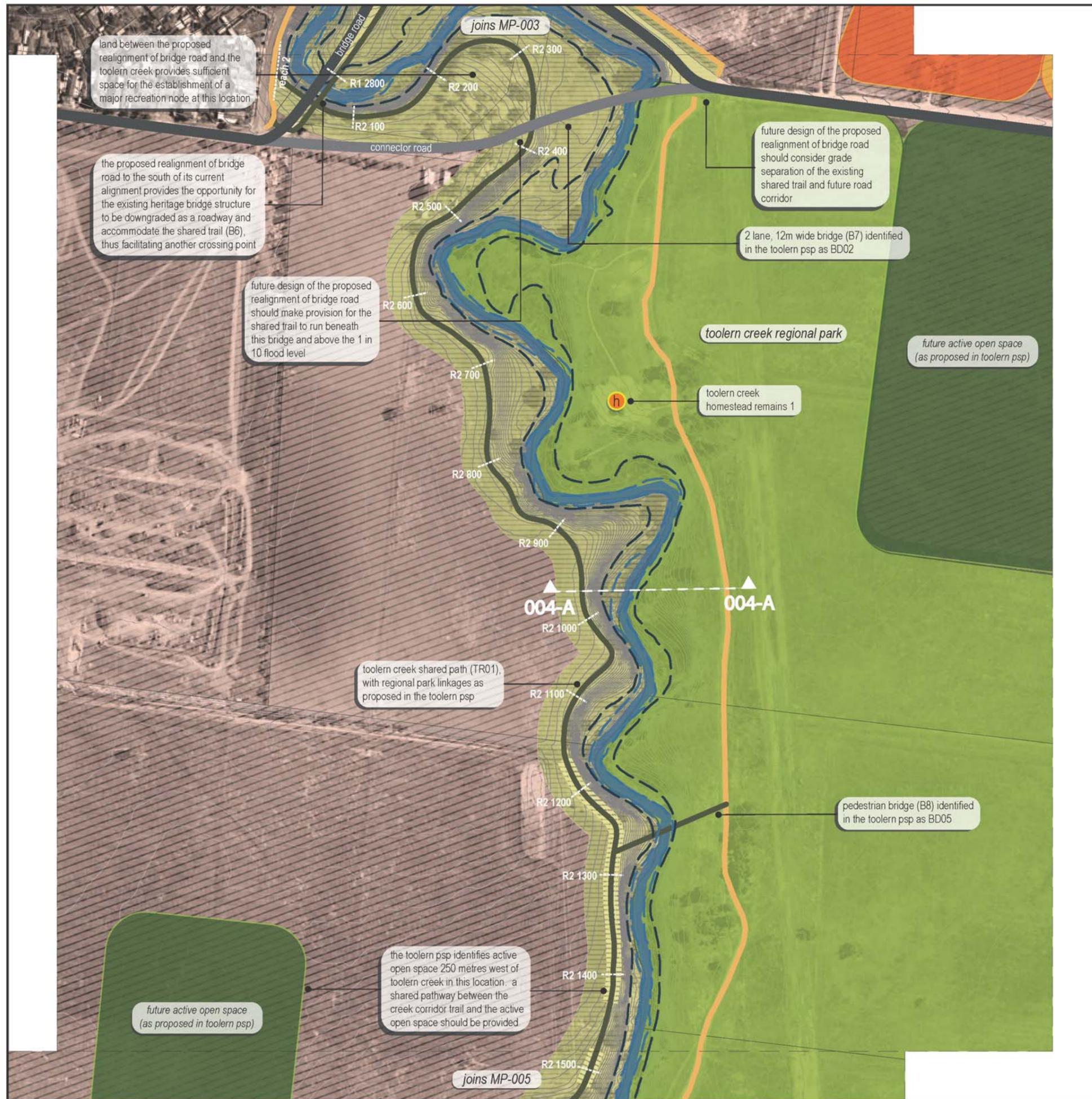
werribee river shared trail strategy  
trail alignment masterplan  
MP-003



Project Ref: 2010.464  
Dwg No.: MP-003  
Scale: 1:4000@A3  
Date: 08.05.12  
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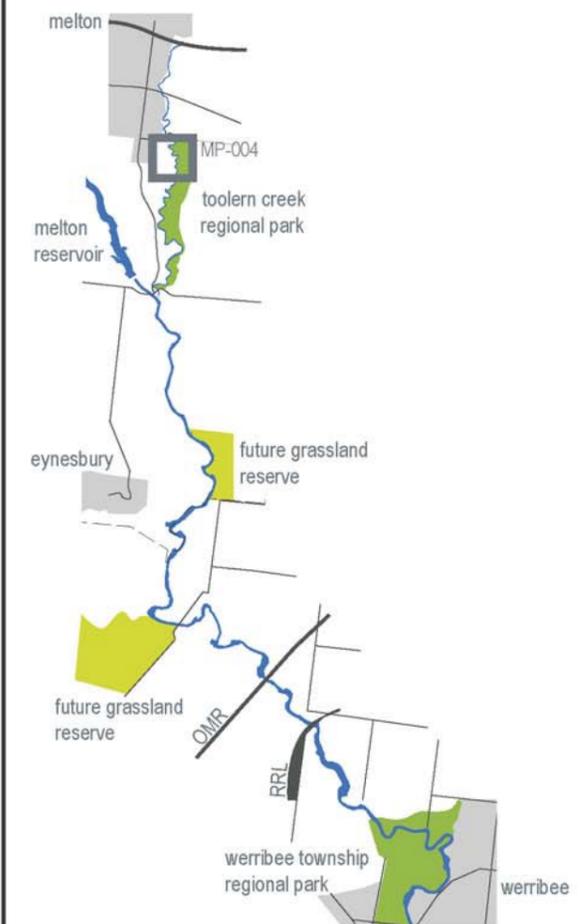
figure 16: trail alignment map 3



legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
- extent of shared trail on existing 4wd maintenance track
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- psp area - future school
- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



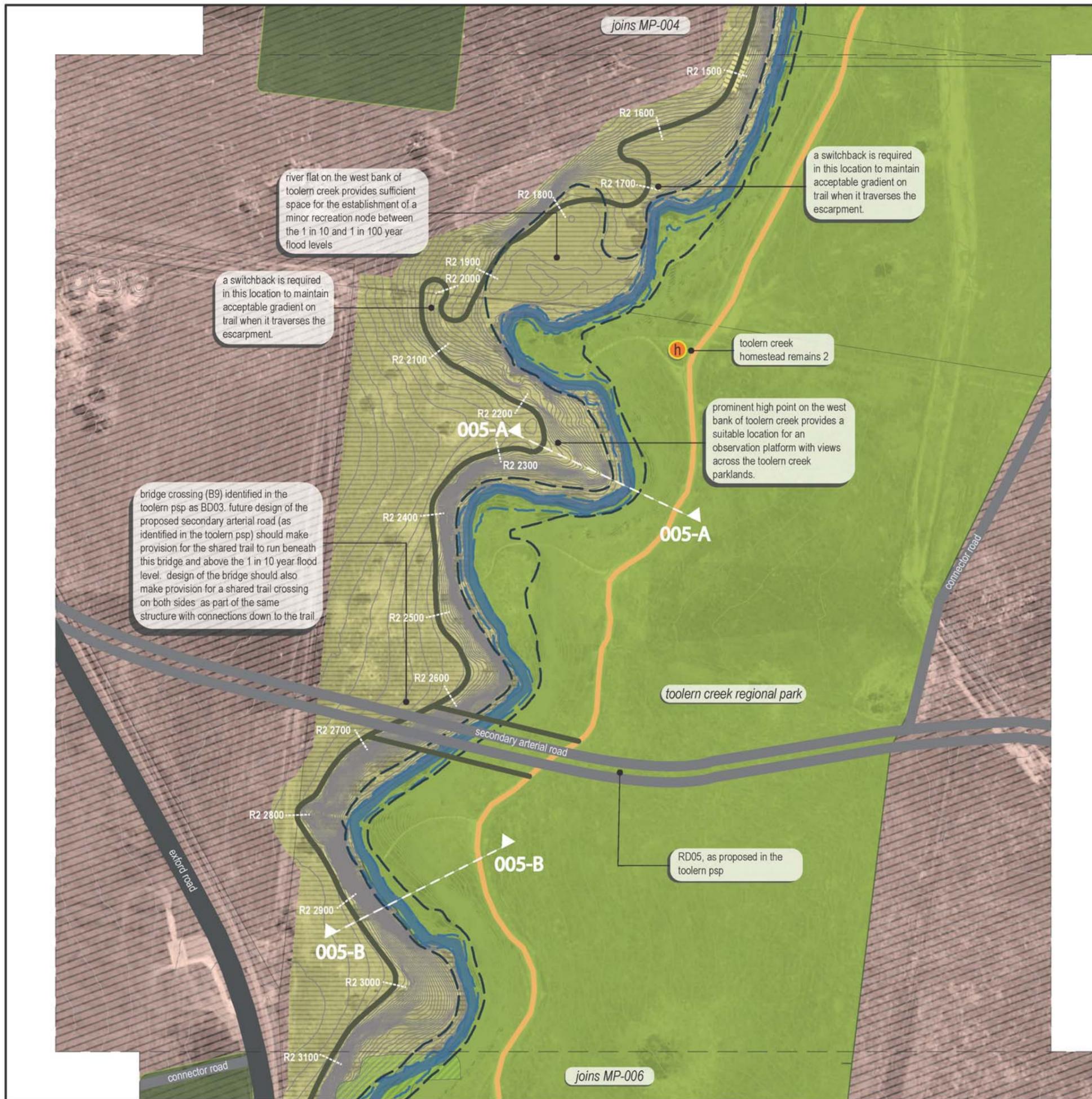
werribee river shared trail strategy  
trail alignment masterplan  
MP-004

Project Ref: 2010.464  
 Dwg No.: MP-004  
 Scale: 1:4000@A3  
 Date: 08.05.12  
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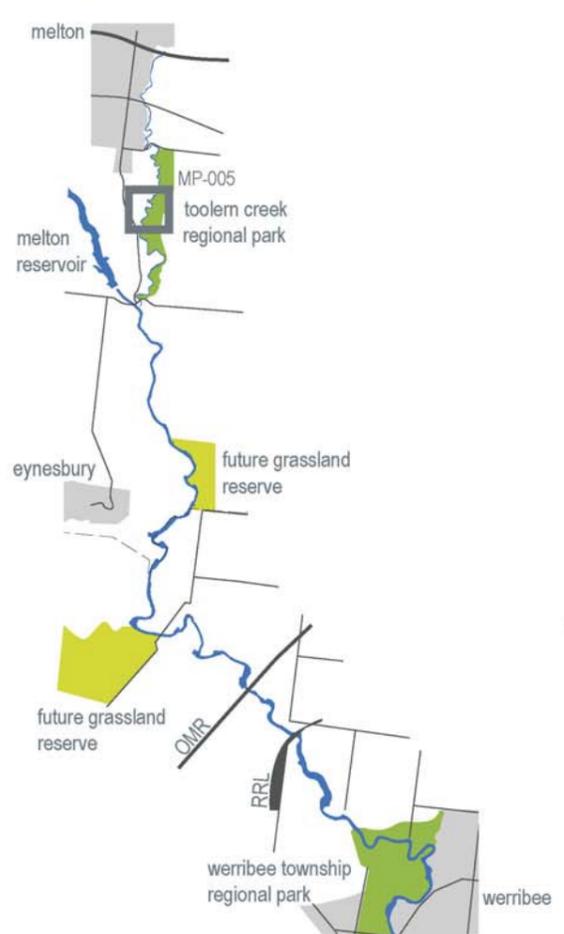
figure 17: trail alignment map 4



legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
- extent of shared trail on existing 4wd maintenance track
- existing shared trail
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- significant flora
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- psp area - future road
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- proposed regional rail link
- proposed grassland reserve

key plan



werribee river shared trail strategy  
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MP-005

Project Ref: 2010.464  
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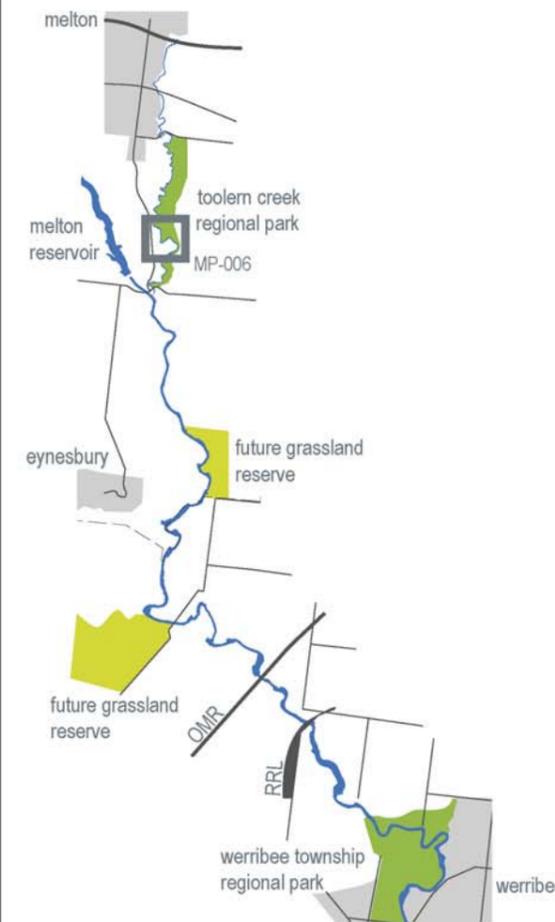
figure 18: trail alignment map 5



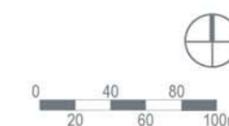
legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



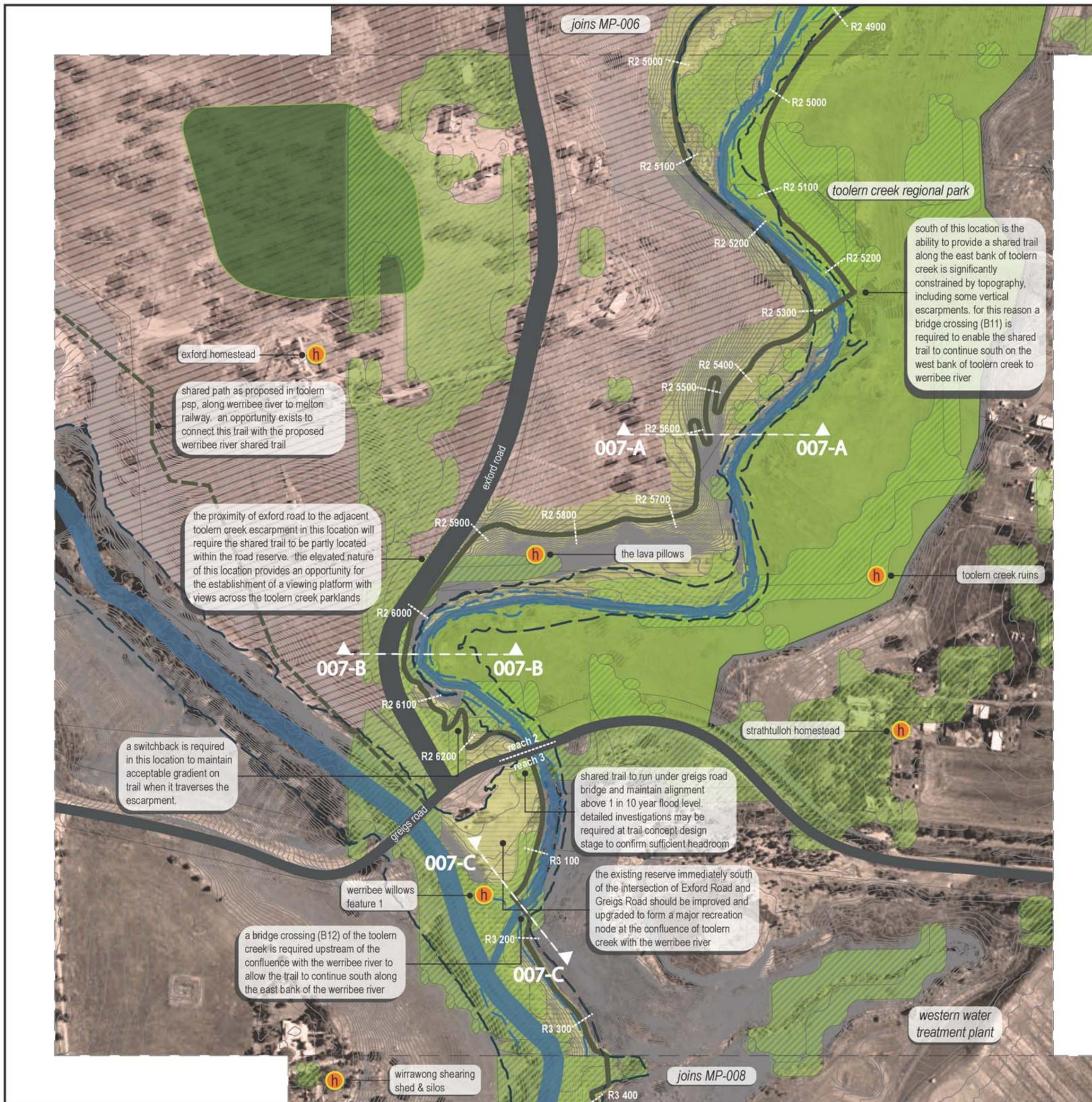
werribee river shared trail strategy  
trail alignment masterplan  
MP-006



Project Ref: 2010.464  
Dwg No.: MP-006  
Scale: 1:4000@A3  
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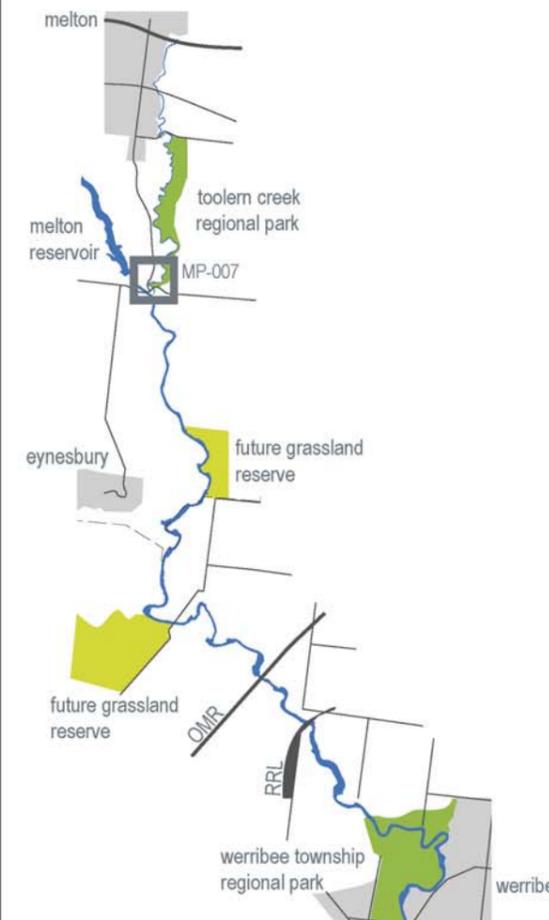
figure 19: trail alignment map 6



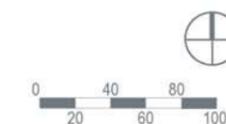
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- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

**key plan**



**werribee river shared trail strategy  
trail alignment masterplan  
MP-007**

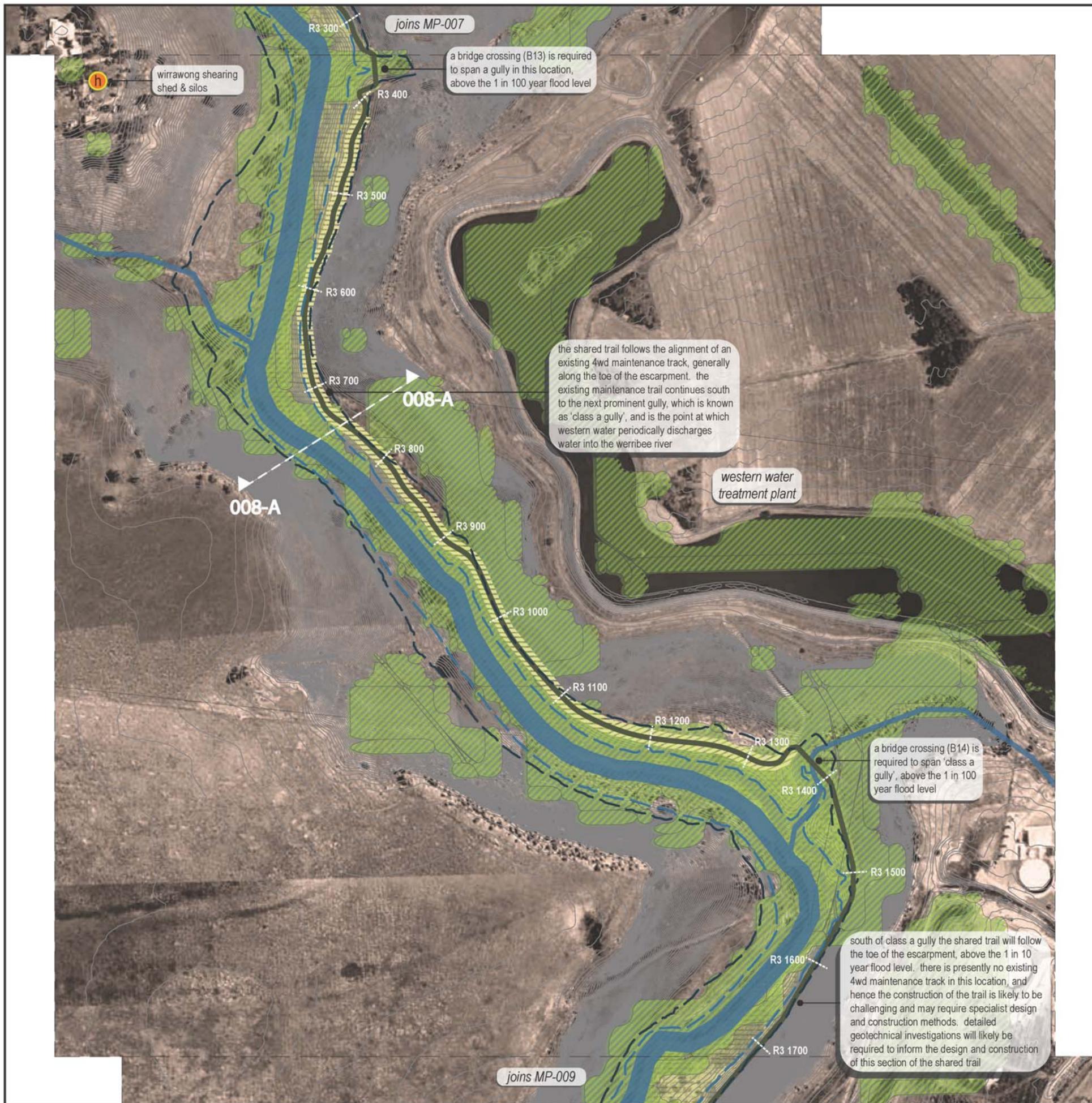


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 Date: 08.05.12  
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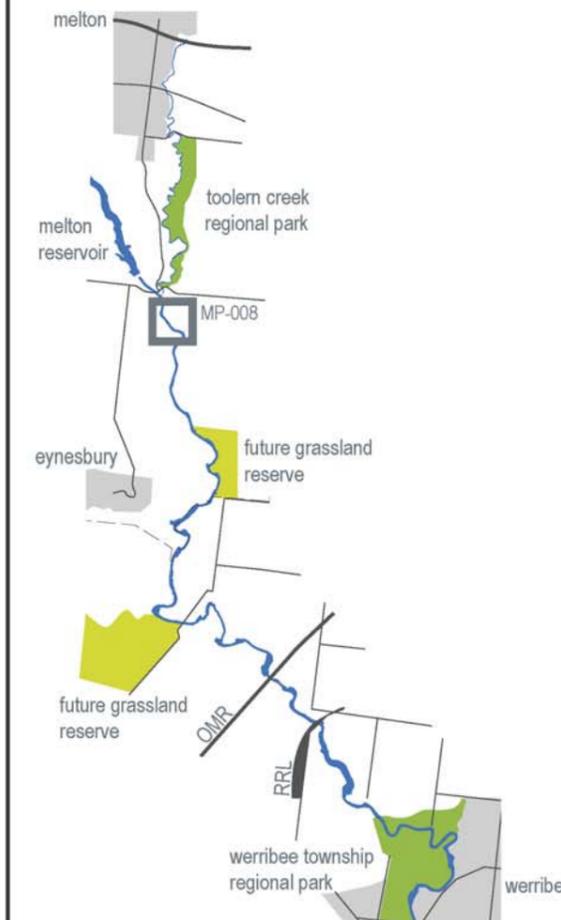
figure 20: trail alignment map 7



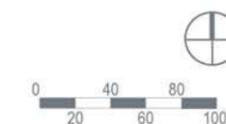
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- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



werribee river shared trail strategy  
trail alignment masterplan  
MP-008



Project Ref: 2010.464  
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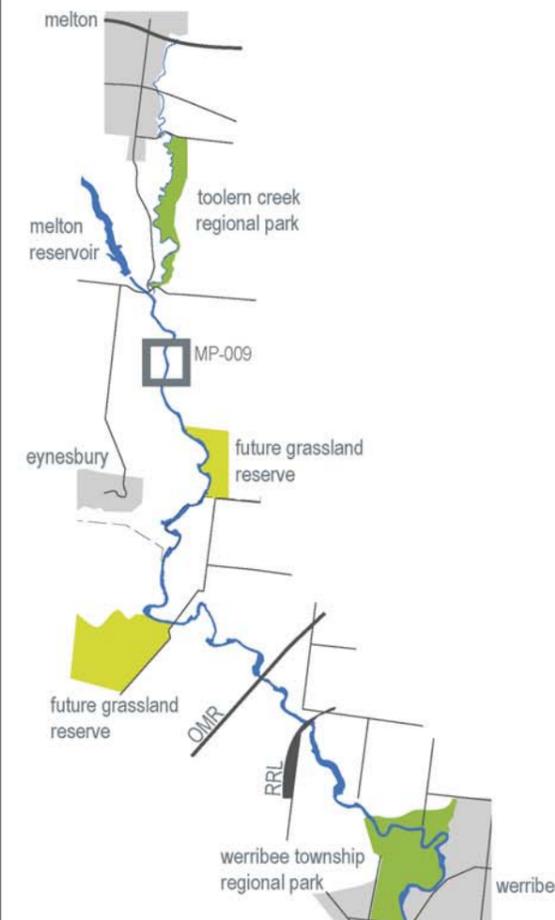
figure 21: trail alignment map 8



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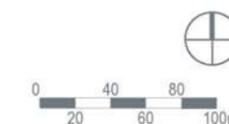
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- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
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- 100m chainages
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- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-009

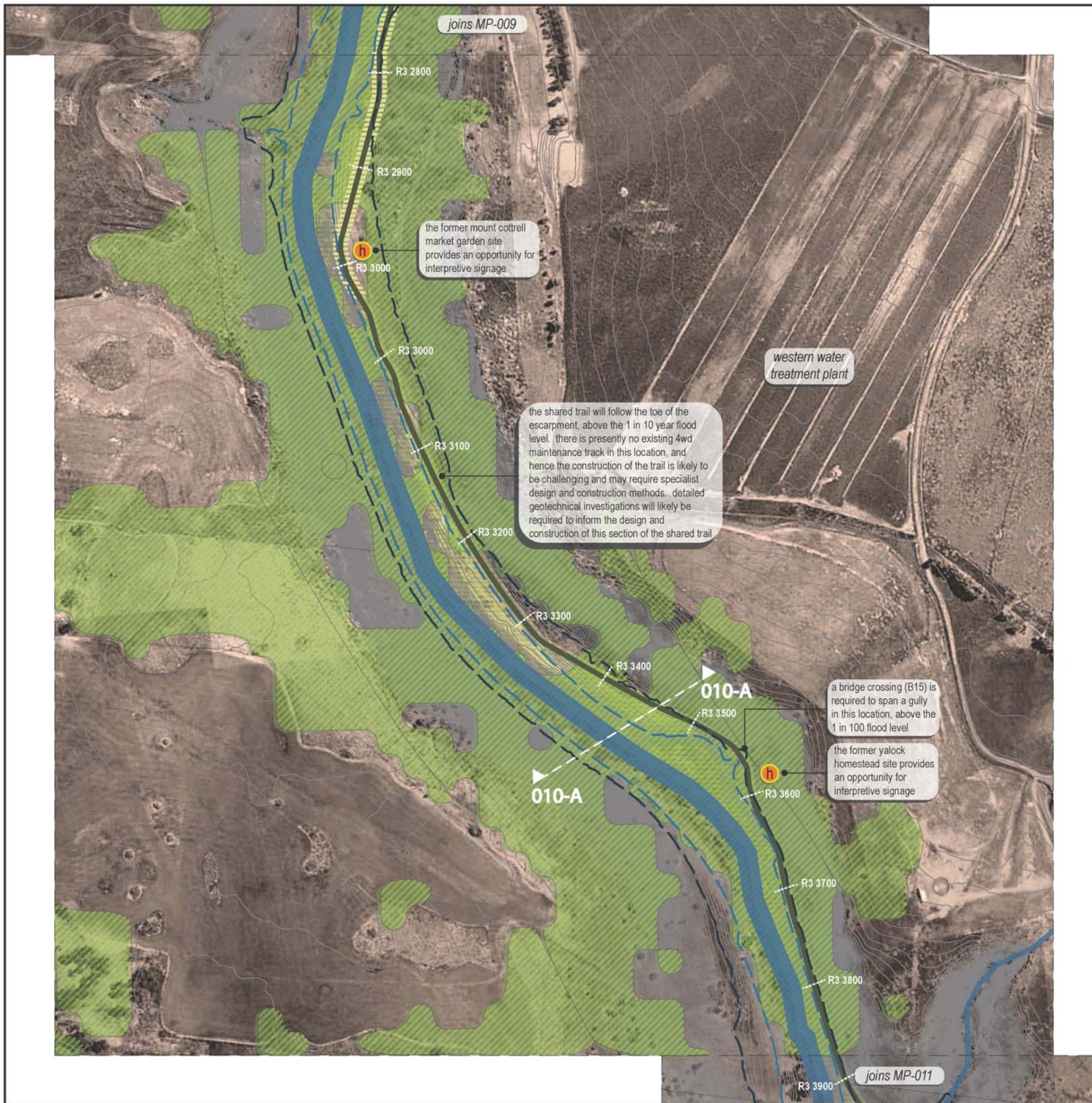


Project Ref: 2010.464  
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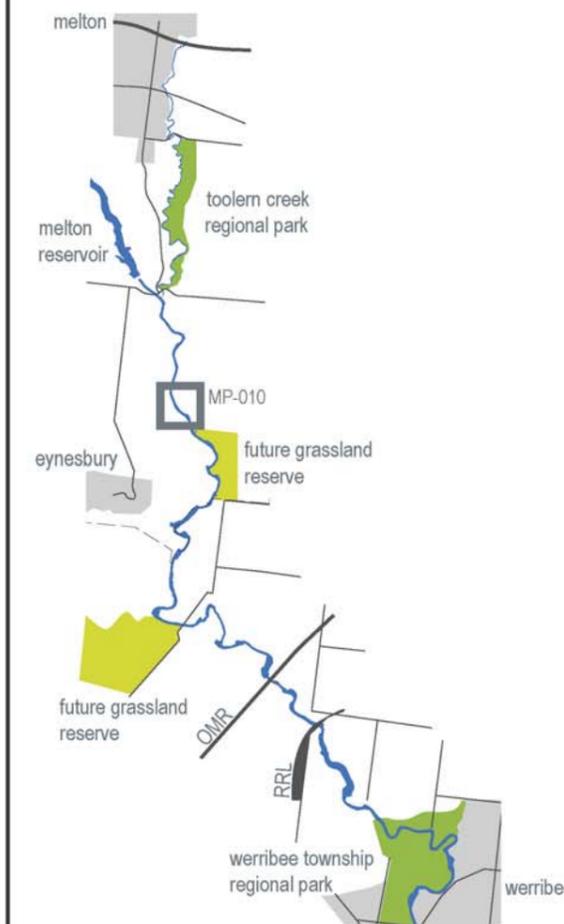
figure 22: trail alignment map 9



legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
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key plan

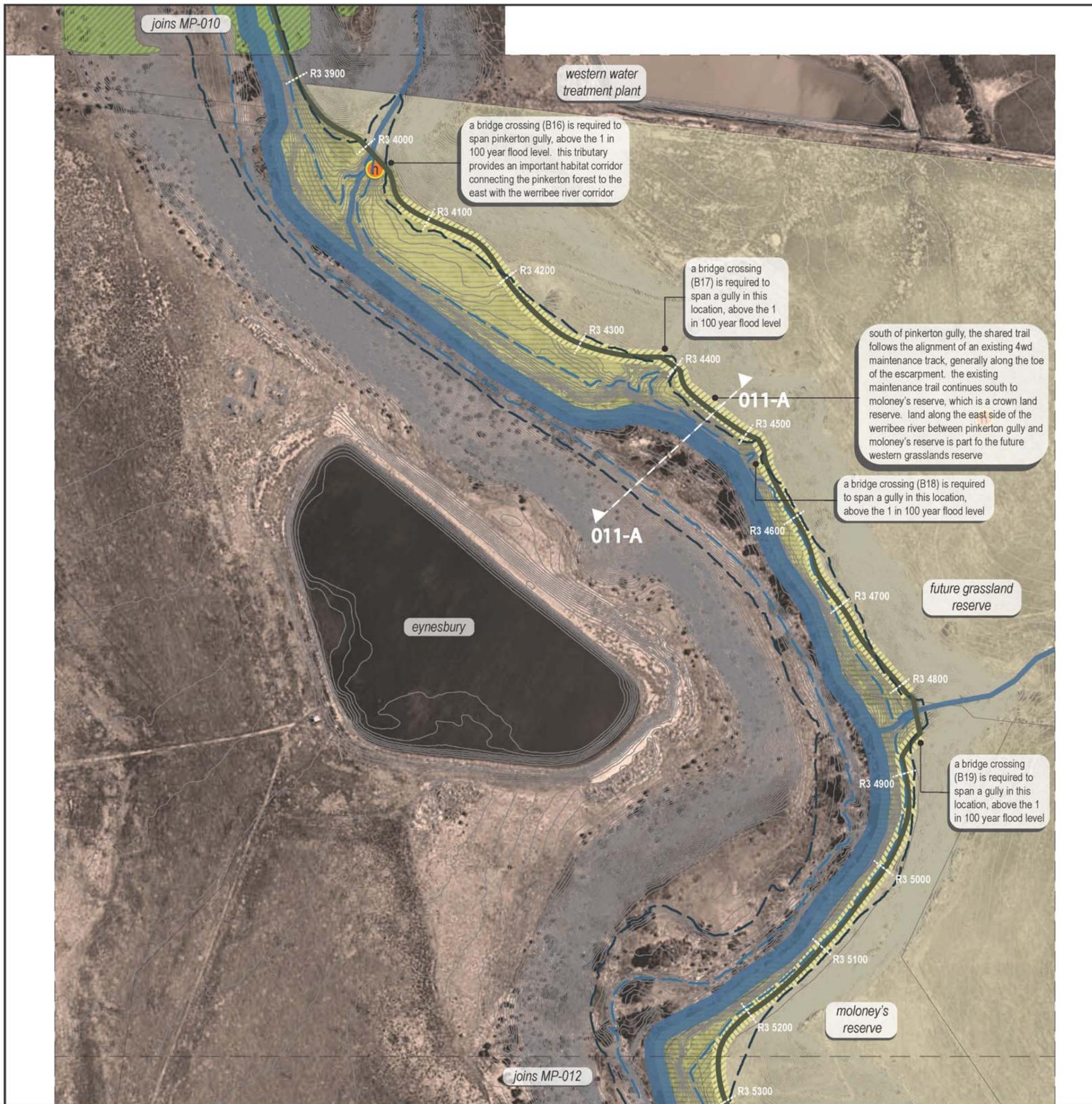


werribee river shared trail strategy  
trail alignment masterplan  
MP-010

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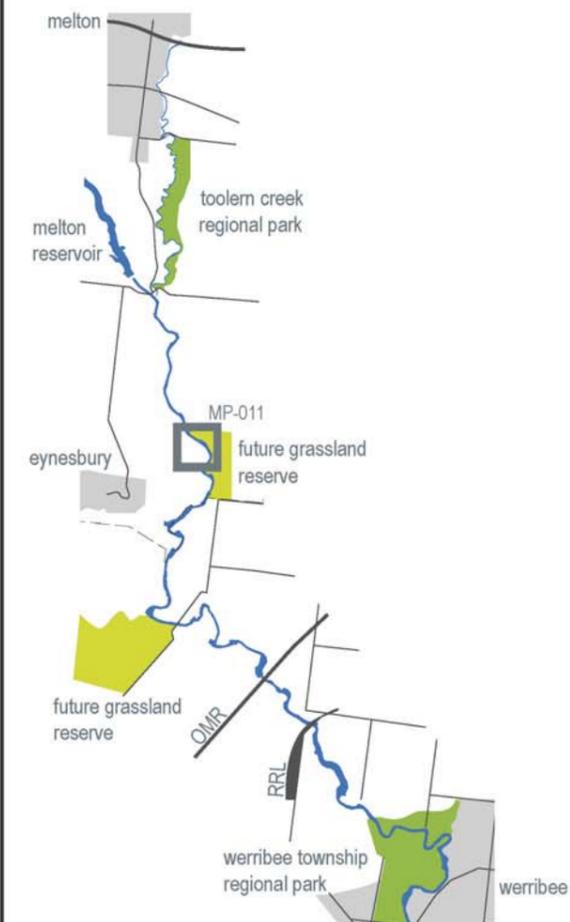
figure 23: trail alignment map 10



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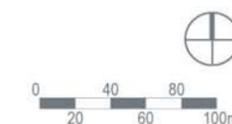
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- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
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- psp area - future road
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- proposed regional rail link
- proposed grassland reserve

### key plan



## werribee river shared trail strategy trail alignment masterplan

MP-011

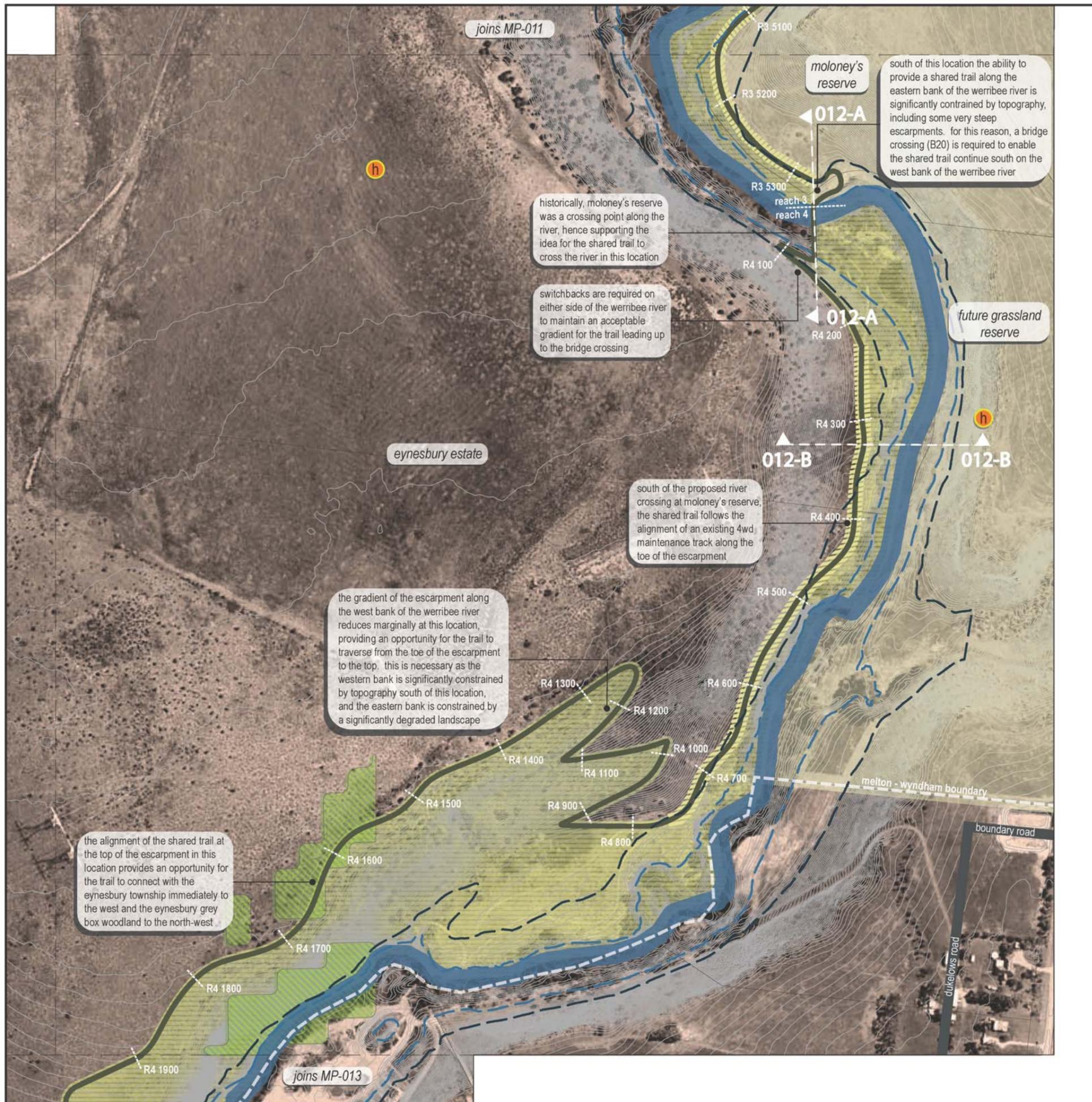


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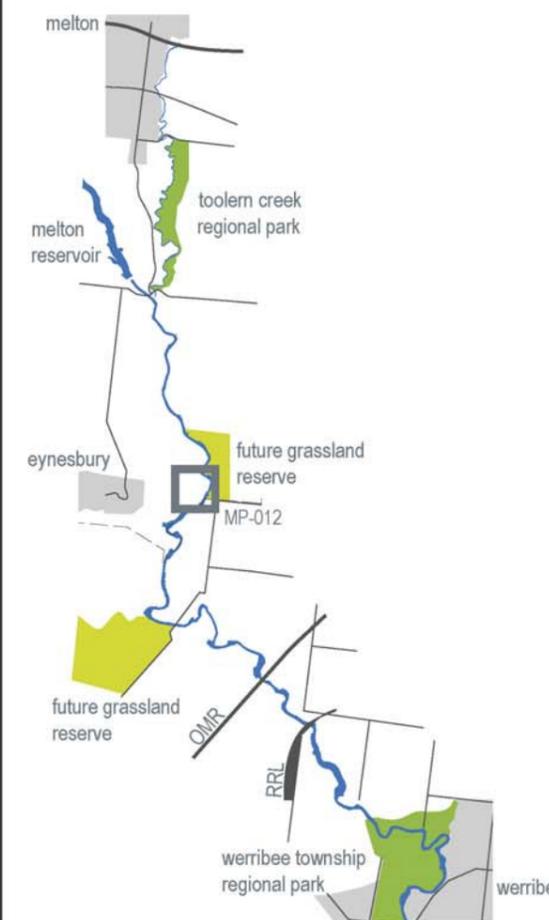
figure 24: trail alignment map 11



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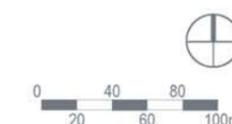
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- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
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- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
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key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-012

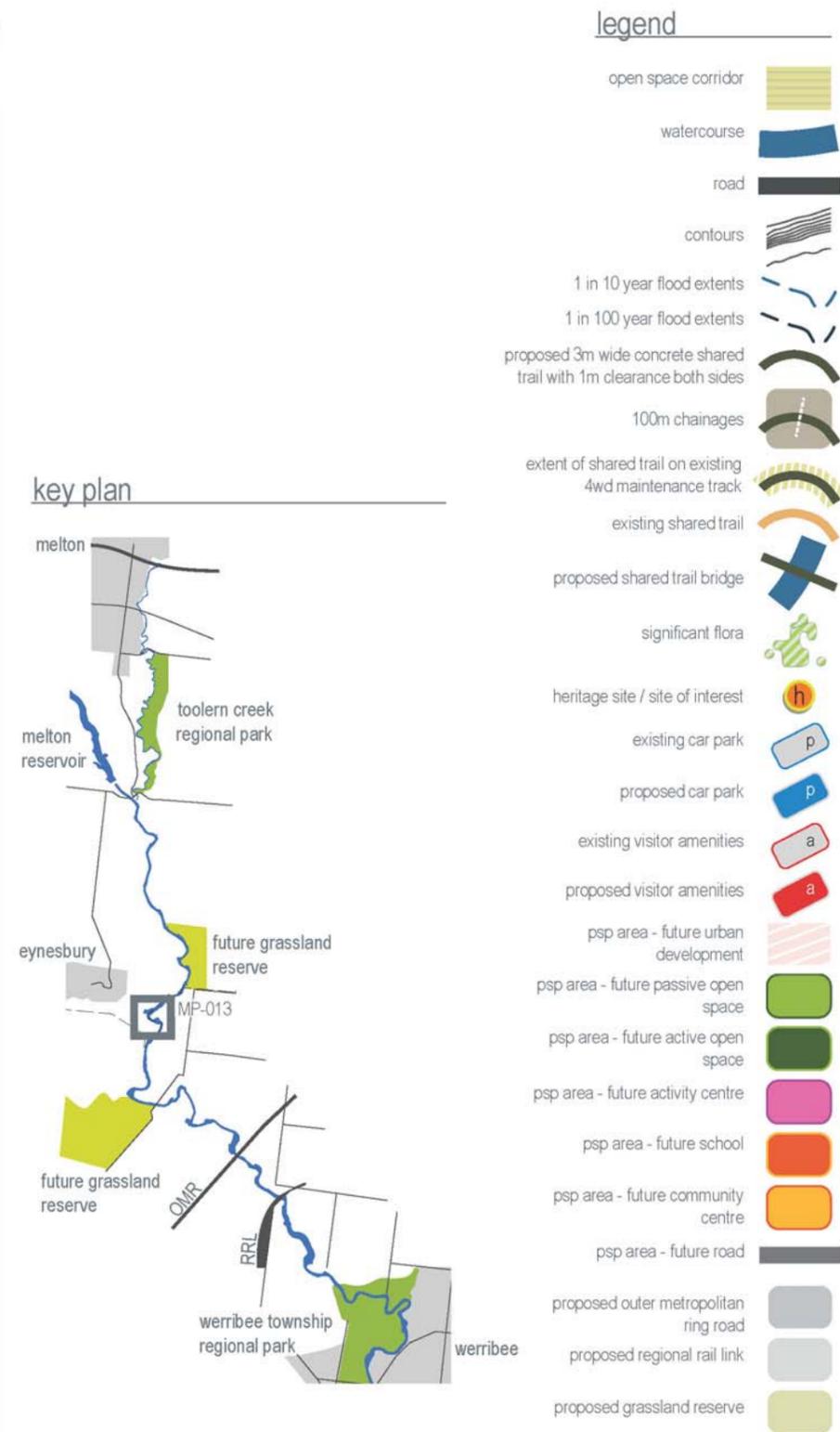
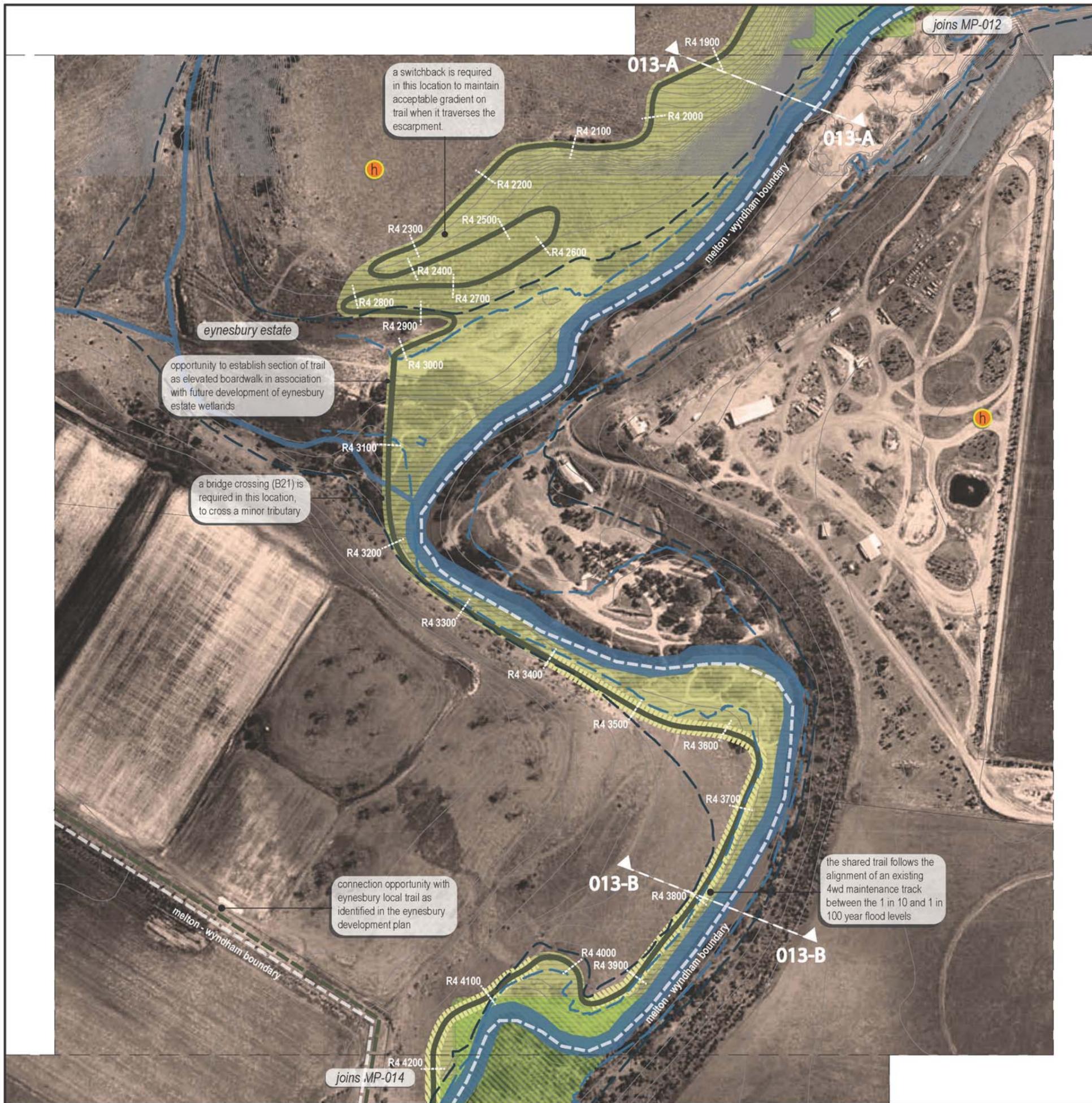


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figure 25: trail alignment map 12

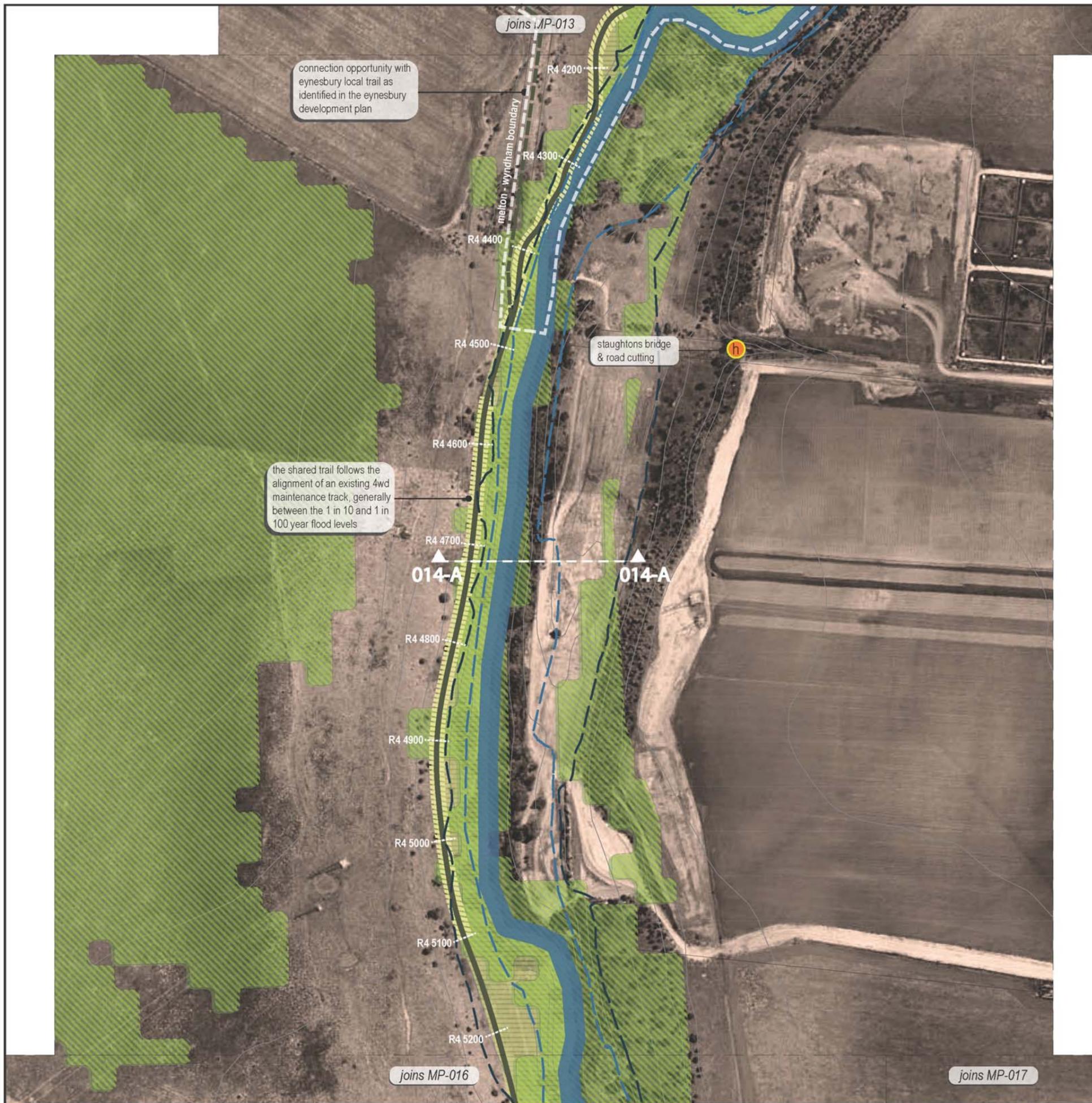


## werribee river shared trail strategy trail alignment masterplan MP-013

Project Ref: 2010.464  
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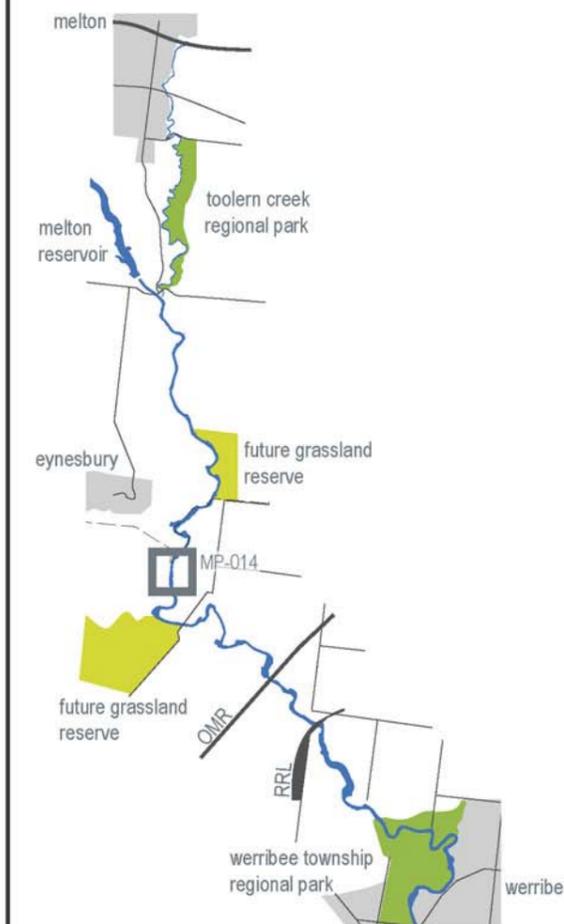
figure 26: trail alignment map 13



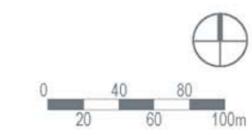
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- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
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- proposed 3m wide concrete shared trail with 1m clearance both sides
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- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
- proposed grassland reserve

key plan



werribee river shared trail strategy  
trail alignment masterplan  
MP-014

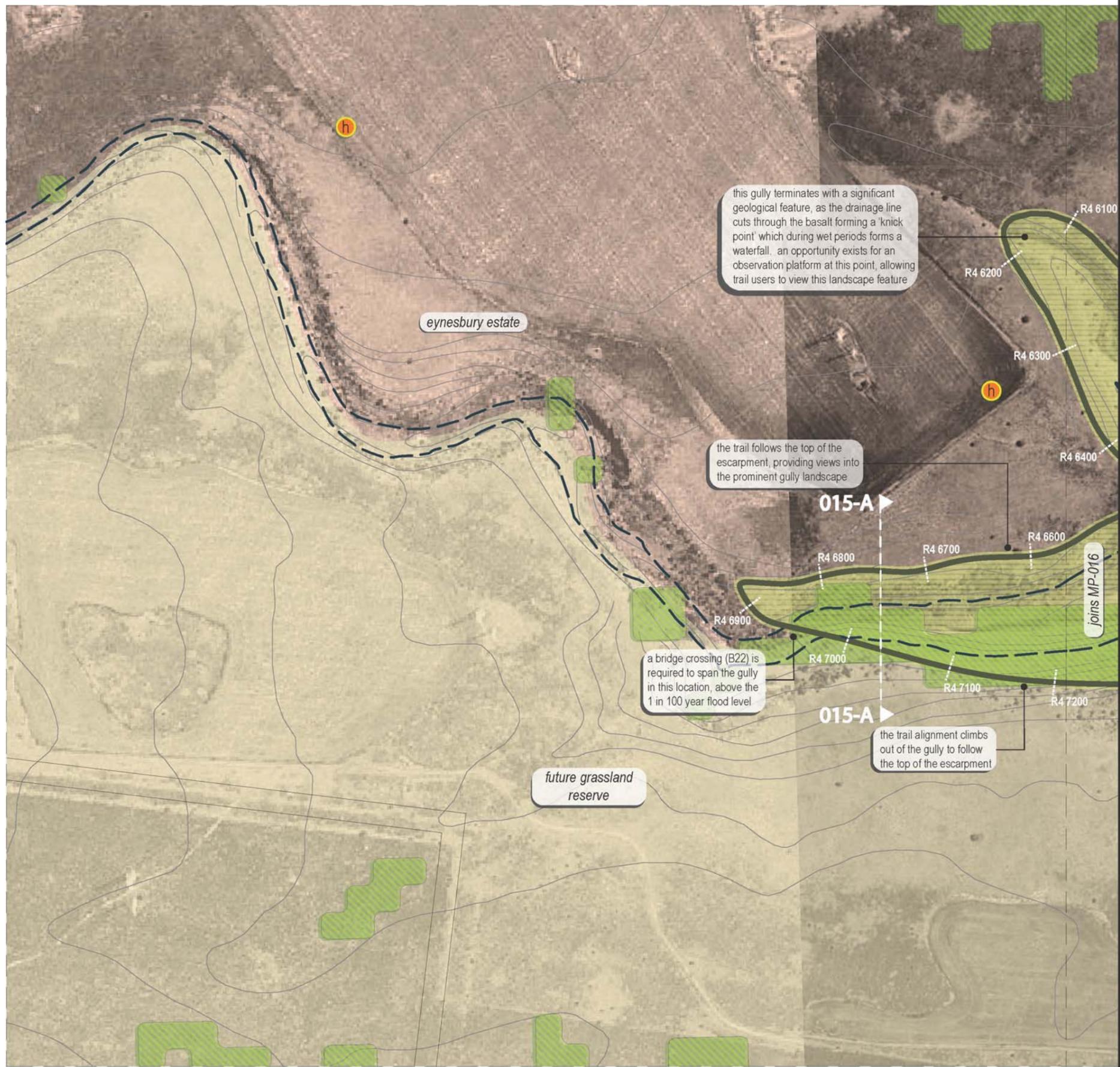


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Revision: F

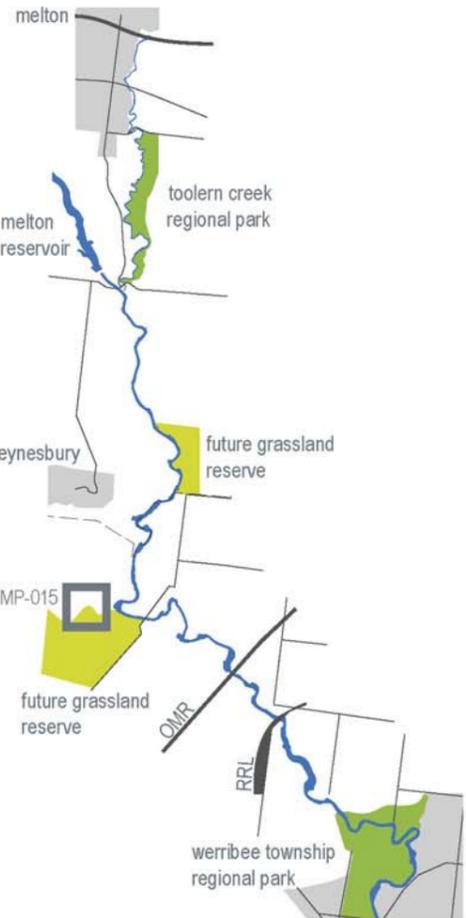
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figure 27: trail alignment map 14



key plan

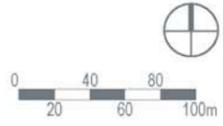


legend

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- watercourse
- road
- contours
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- 100m chainages
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- proposed regional rail link
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werrabee river shared trail strategy  
trail alignment masterplan

MP-015



Project Ref: 2010.464  
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figure 28: trail alignment map 15

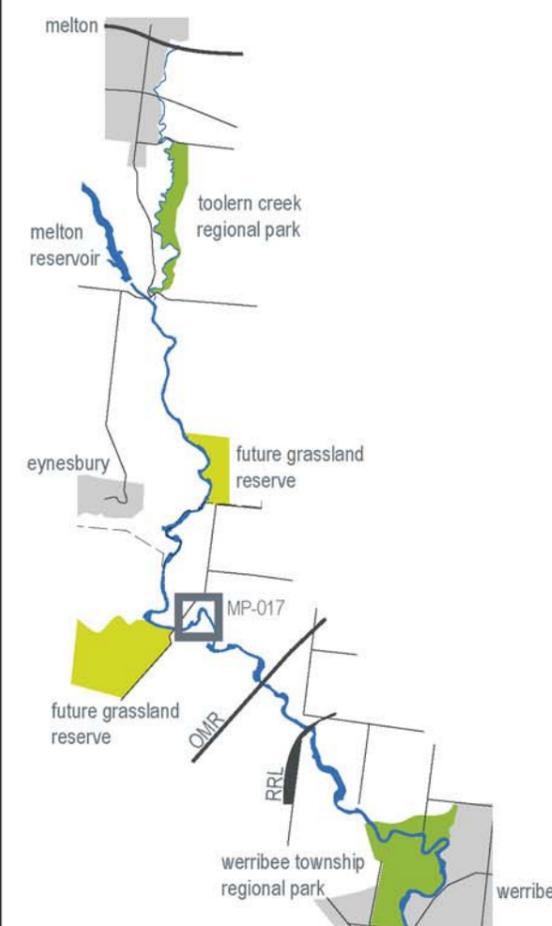




legend

- open space corridor
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- road
- contours
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key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-017

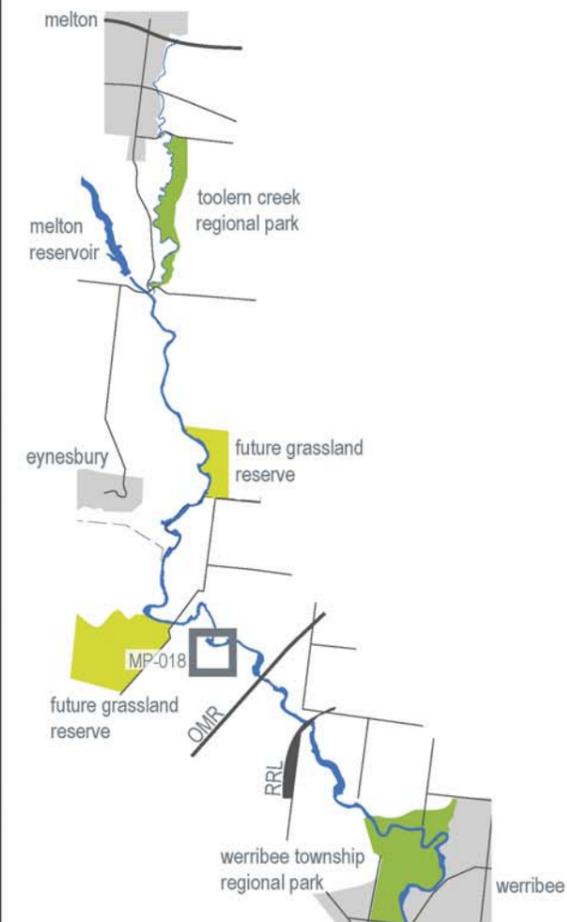
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figure 30: trail alignment map 17



key plan



legend

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- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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- psp area - future community centre
- psp area - future road
- proposed outer metropolitan ring road
- proposed regional rail link
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werribee river shared trail strategy  
trail alignment masterplan

MP-018

Project Ref: 2010.464  
 Dwg No.: MP-018  
 Scale: 1:4000@A3  
 Date: 03.05.12  
 Revision: F

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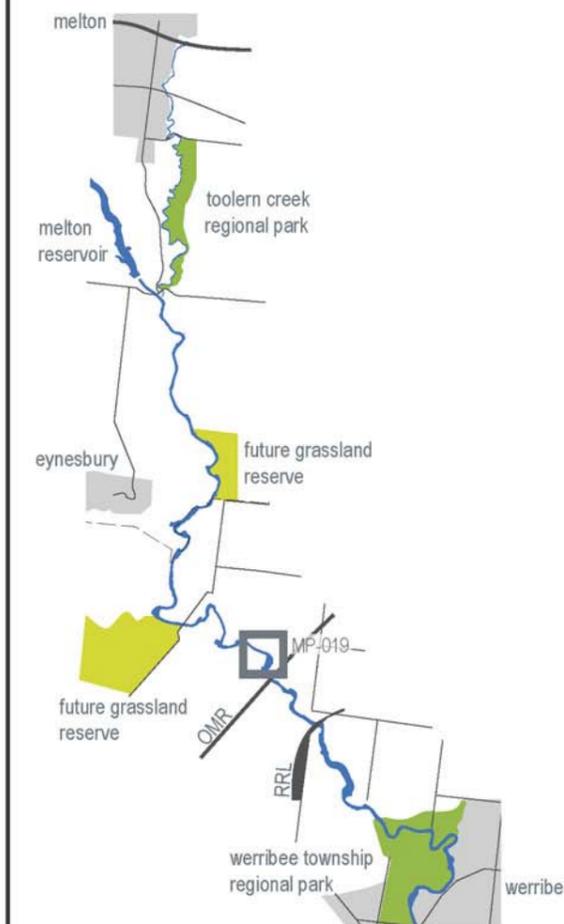
figure 31: trail alignment map 18



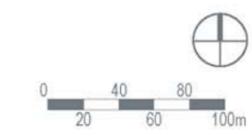
legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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key plan



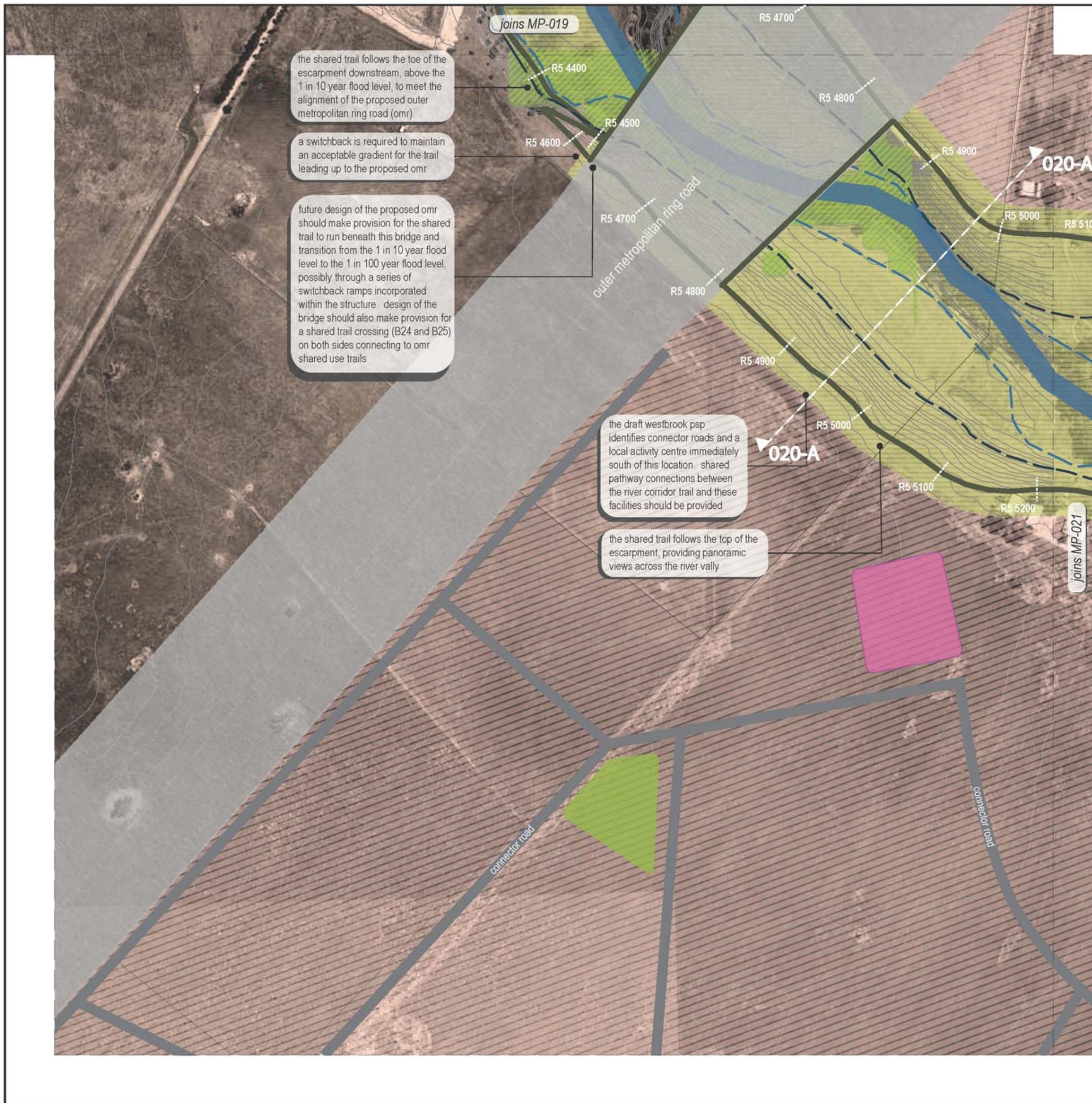
werribee river shared trail strategy  
trail alignment masterplan  
MP-019



Project Ref: 2010.464  
Dwg No.: MP-019  
Scale: 1:4000@A3  
Date: 03.05.12  
Revision: F

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figure 32: trail alignment map 19



the shared trail follows the toe of the escarpment downstream, above the 1 in 10 year flood level, to meet the alignment of the proposed outer metropolitan ring road (omr)

a switchback is required to maintain an acceptable gradient for the trail leading up to the proposed omr

future design of the proposed omr should make provision for the shared trail to run beneath this bridge and transition from the 1 in 10 year flood level to the 1 in 100 year flood level, possibly through a series of switchback ramps incorporated within the structure. design of the bridge should also make provision for a shared trail crossing (B24 and B25) on both sides connecting to omr shared use trails

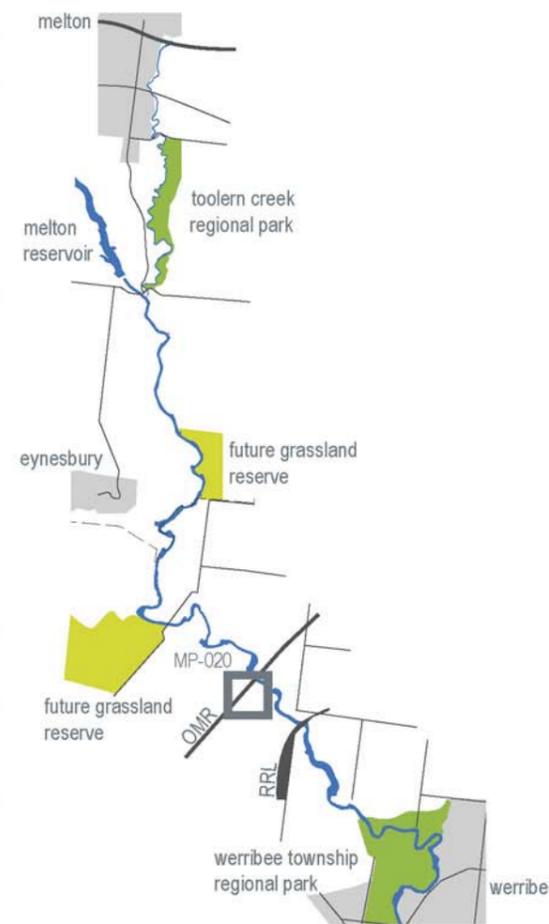
the draft westbrook psp identifies connector roads and a local activity centre immediately south of this location. shared pathway connections between the river corridor trail and these facilities should be provided

the shared trail follows the top of the escarpment, providing panoramic views across the river vally

### legend

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- watercourse
- road
- contours
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### key plan



## werribee river shared trail strategy trail alignment masterplan MP-020



Project Ref: 2010.464  
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Scale: 1:4000@A3  
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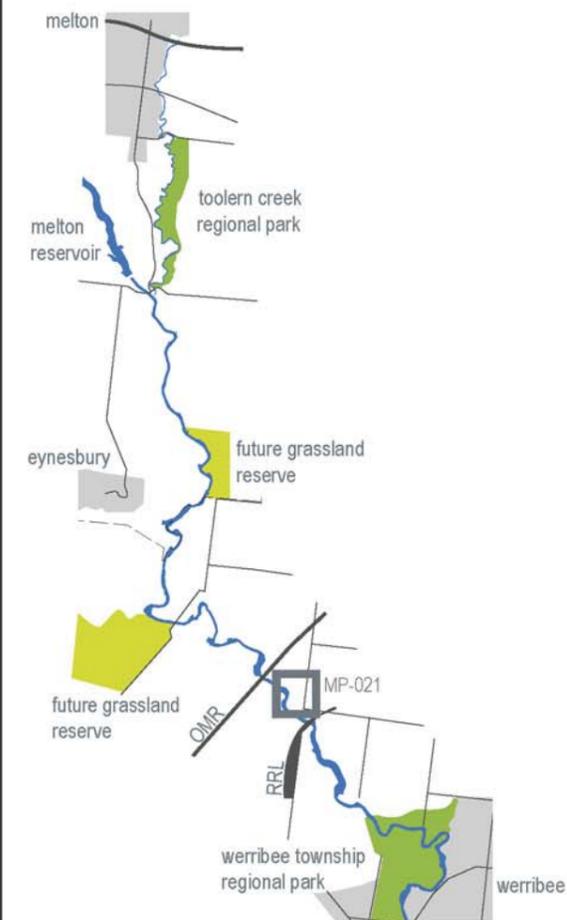
figure 33: trail alignment map 20



legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
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key plan



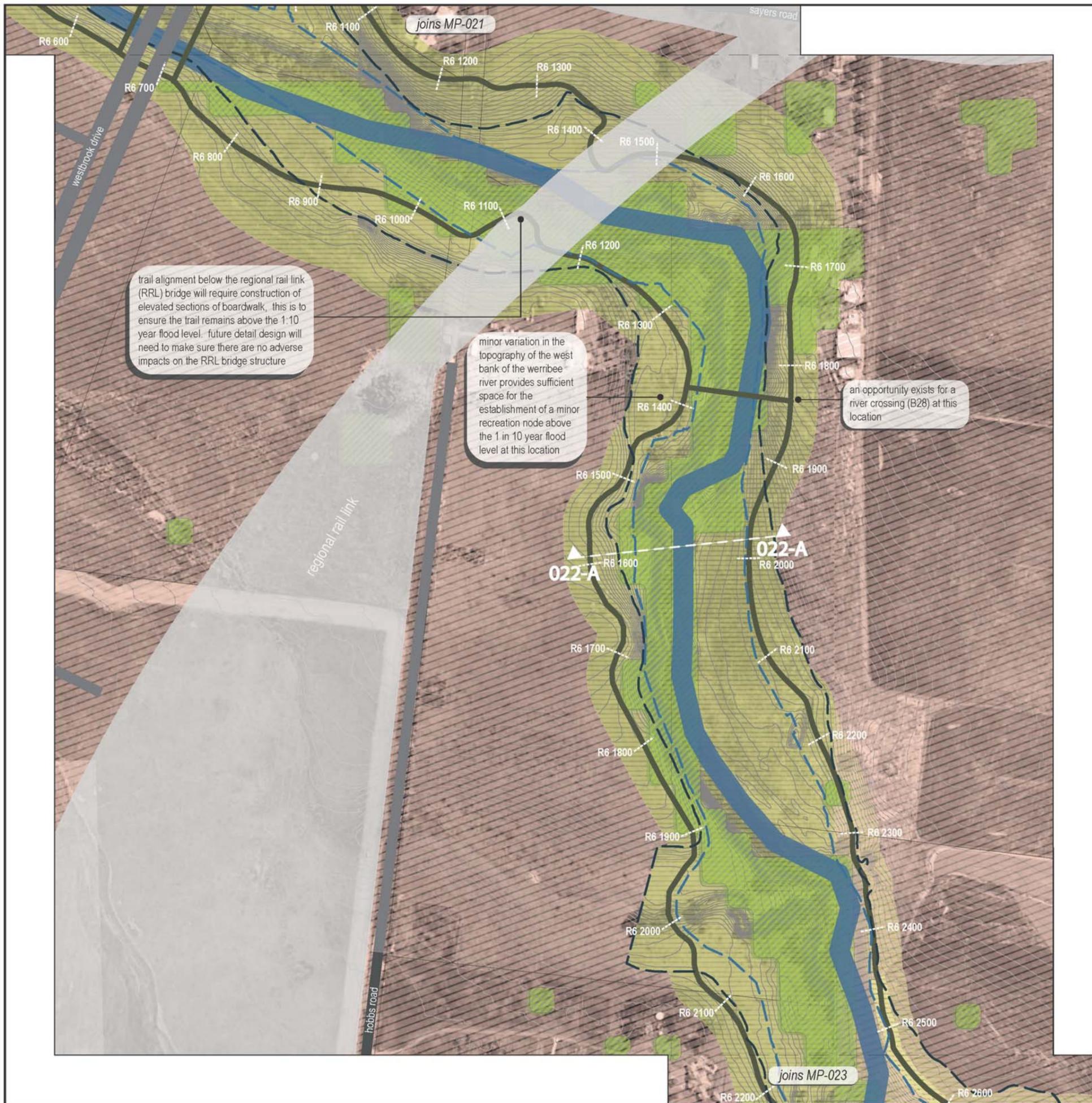
werribee river shared trail strategy  
trail alignment masterplan

MP-021

Project Ref: 2010.464  
 Dwg No.: MP-021  
 Scale: 1:4000@A3  
 Date: 22.03.13  
 Revision: 1

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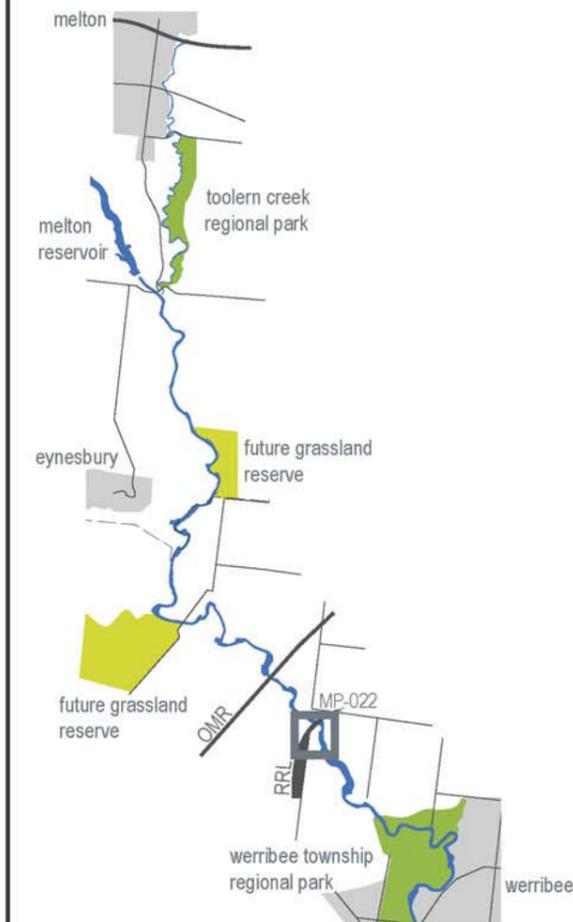
figure 34: trail alignment map 21



legend

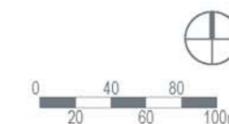
- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
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key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-022



Project Ref: 2010.464  
Dwg No.: MP-022  
Scale: 1:4000@A3  
Date: 22.03.13  
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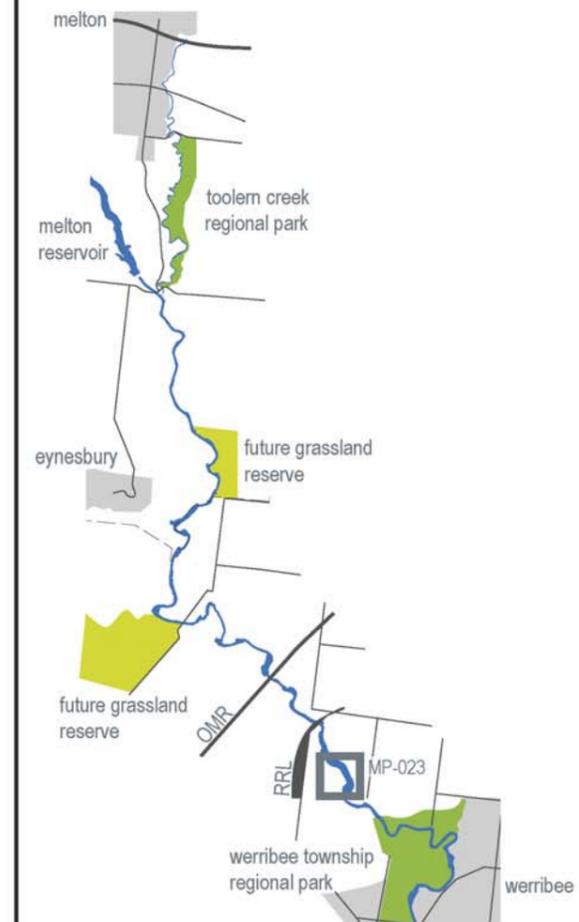
figure 35: trail alignment map 22



### legend

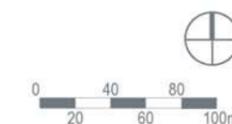
- open space corridor
- watercourse
- road
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- 1 in 100 year flood extents
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- psp area - future road
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### key plan



## werribee river shared trail strategy trail alignment masterplan

MP-023

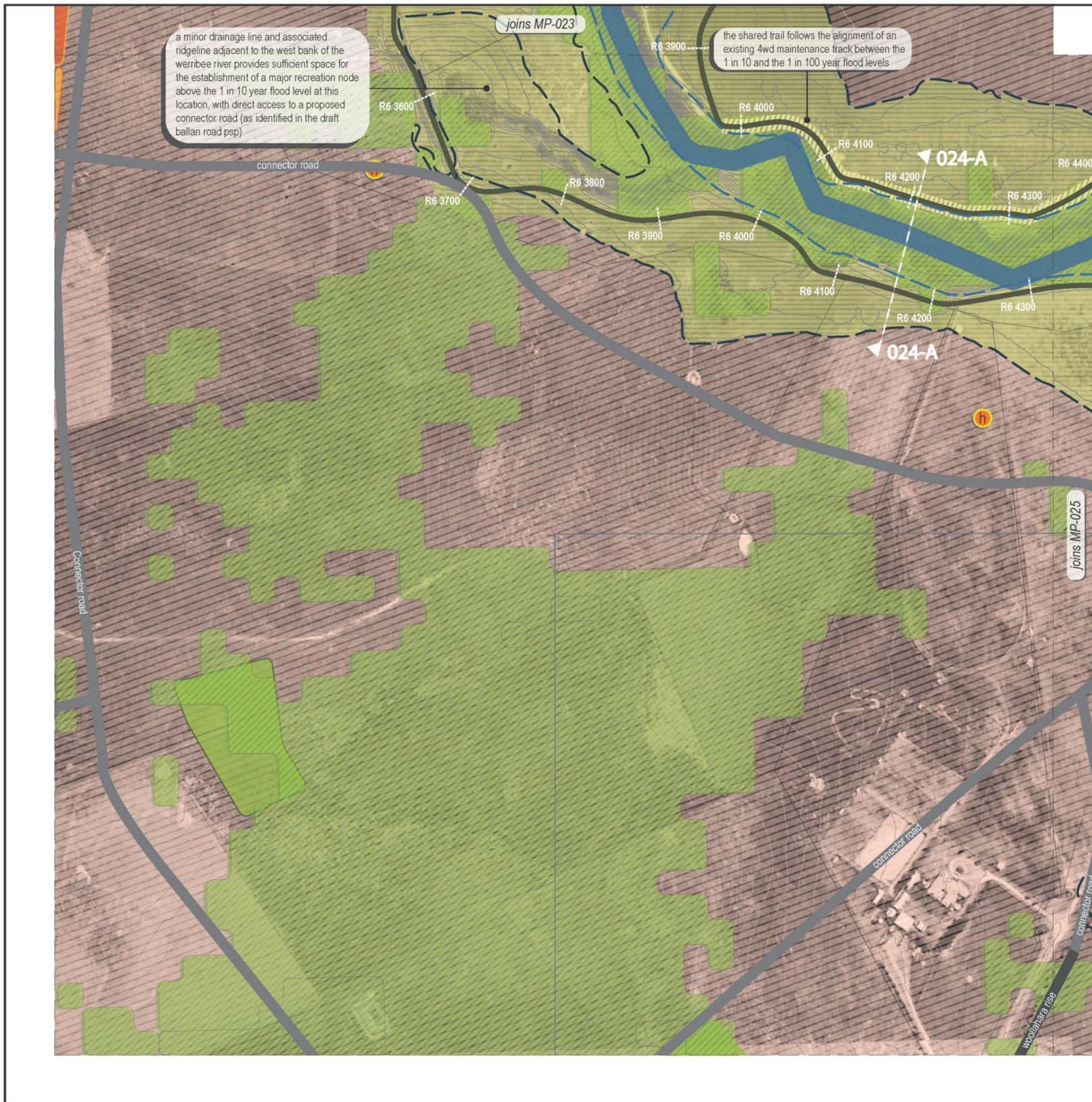


Project Ref: 2010.464  
 Dwg No.: MP-023  
 Scale: 1:4000@A3  
 Date: 22.03.13  
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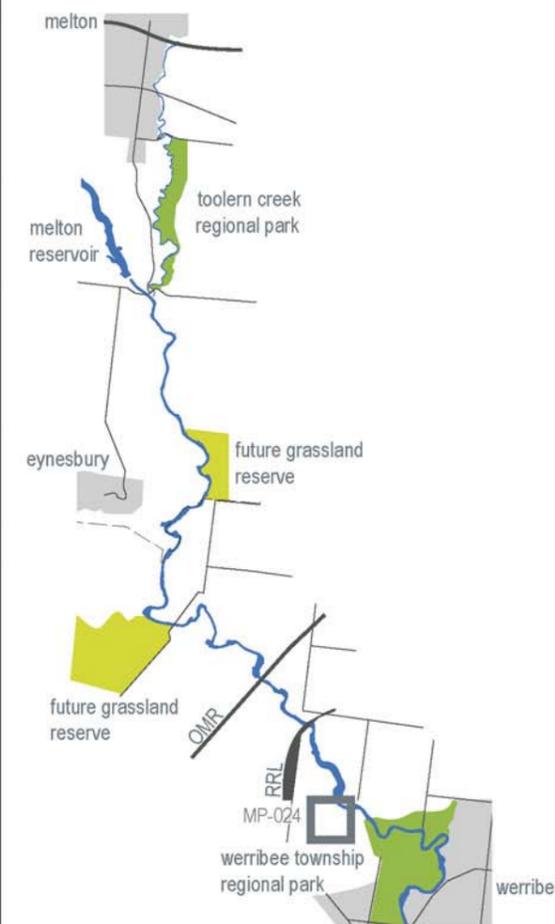
figure 36: trail alignment map 23



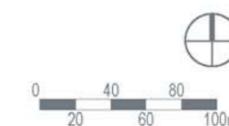
Legend

- open space corridor
- watercourse
- road
- contours
- 1 in 10 year flood extents
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- psp area - future road
- proposed outer metropolitan ring road
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- proposed grassland reserve

key plan



werribee river shared trail strategy  
trail alignment masterplan  
MP-024

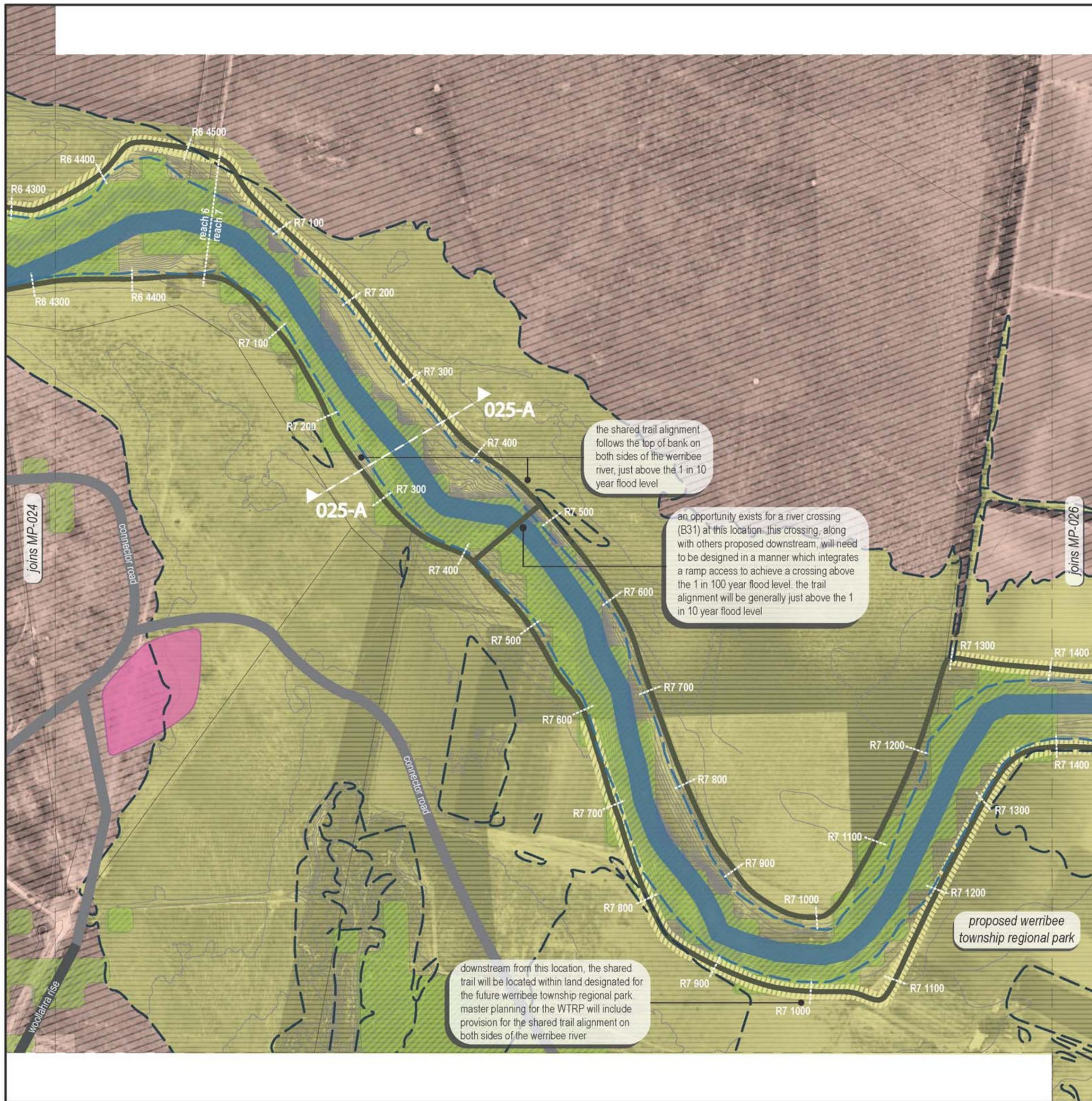


Project Ref: 2010.464  
Dwg No.: MP-024  
Scale: 1:4000@A3  
Date: 22.03.13  
Revision: H

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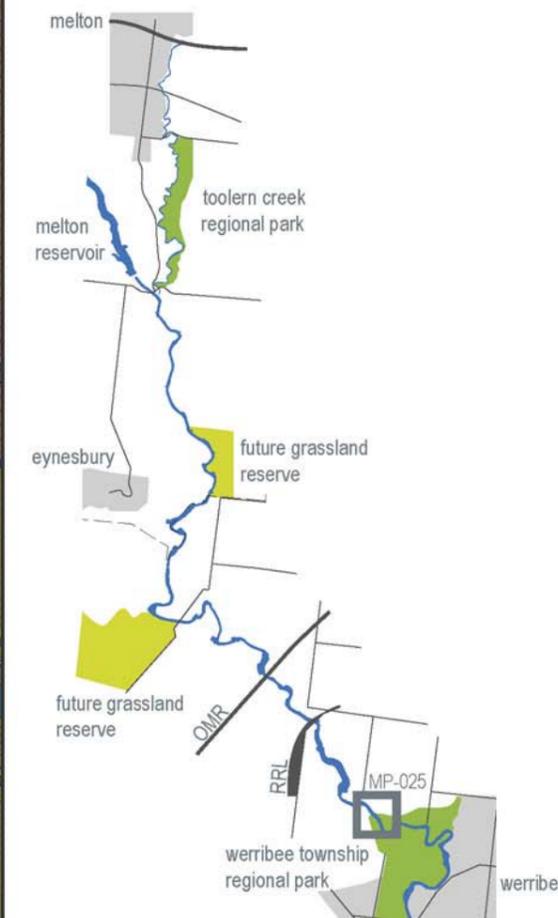
figure 37: trail alignment map 24



legend

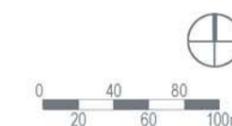
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- watercourse
- road
- contours
- 1 in 10 year flood extents
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- psp area - future road
- proposed outer metropolitan ring road
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key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-025

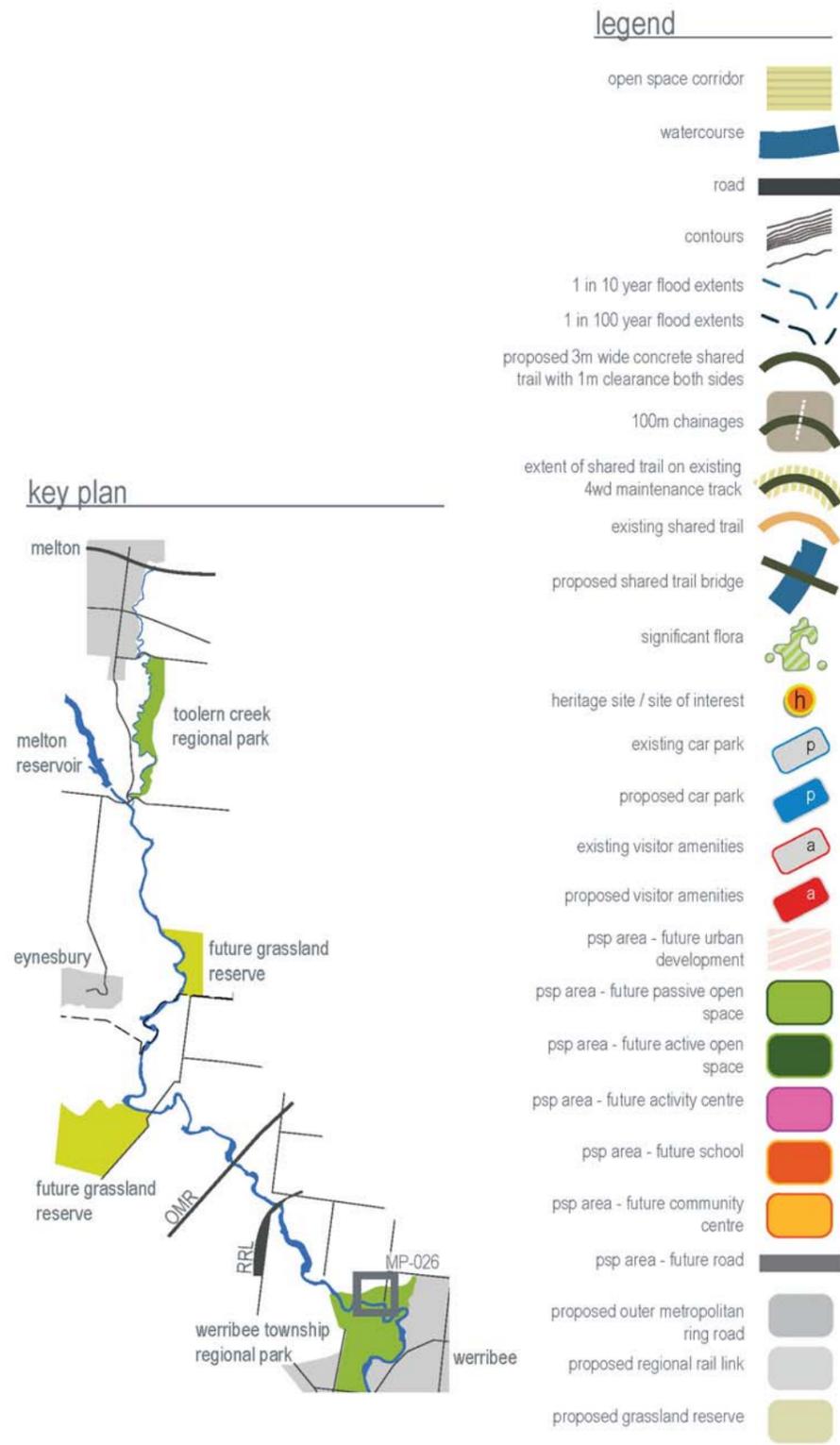
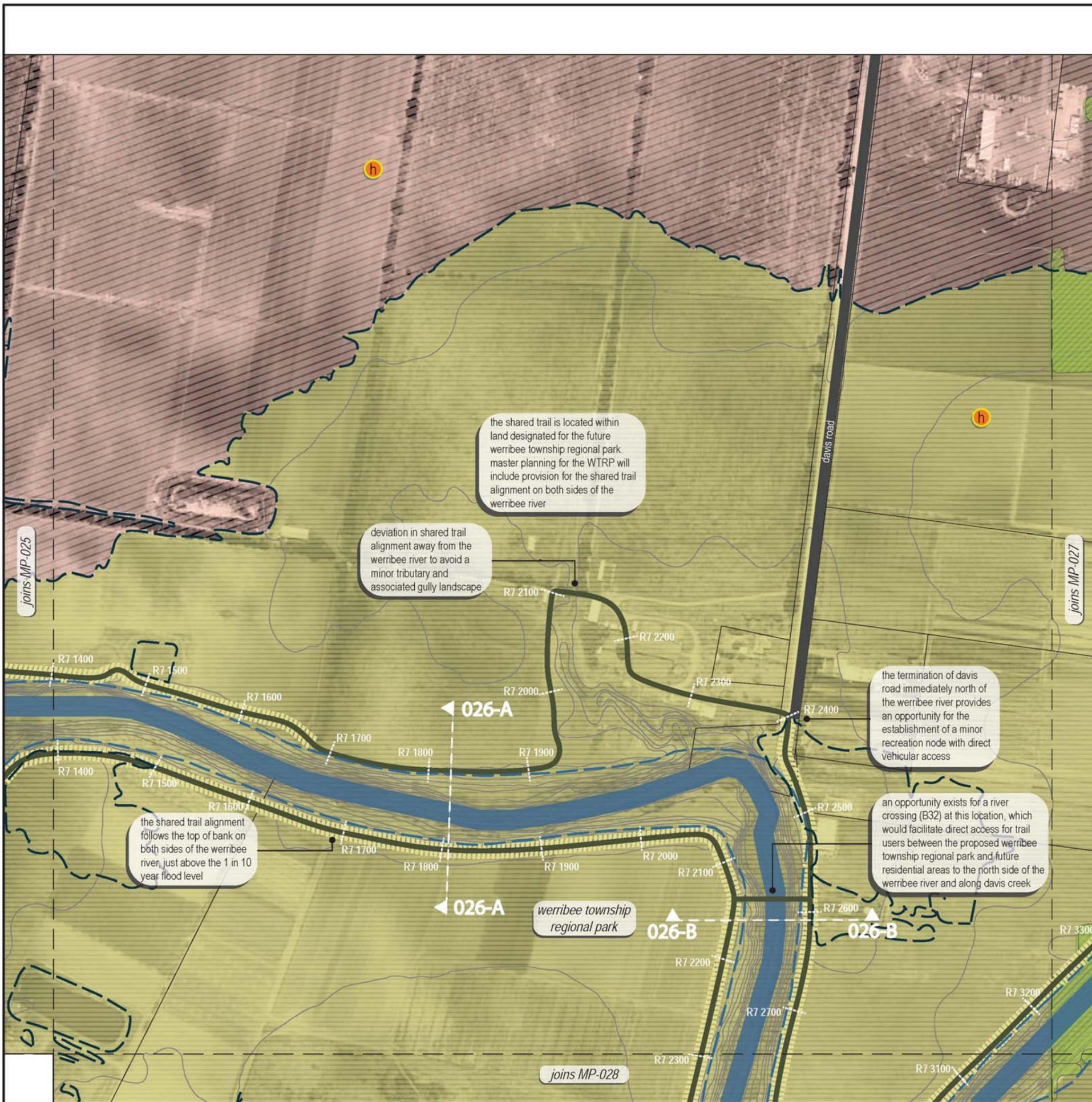


Project Ref: 2010.464  
Dwg No.: MP-025  
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figure 38: trail alignment map 25



## werribee river shared trail strategy trail alignment masterplan MP-026

0 20 40 60 80 100m

Project Ref: 2010.464  
 Dwg No.: MP-026  
 Scale: 1:4000@A3  
 Date: 26.03.13  
 Revision: G

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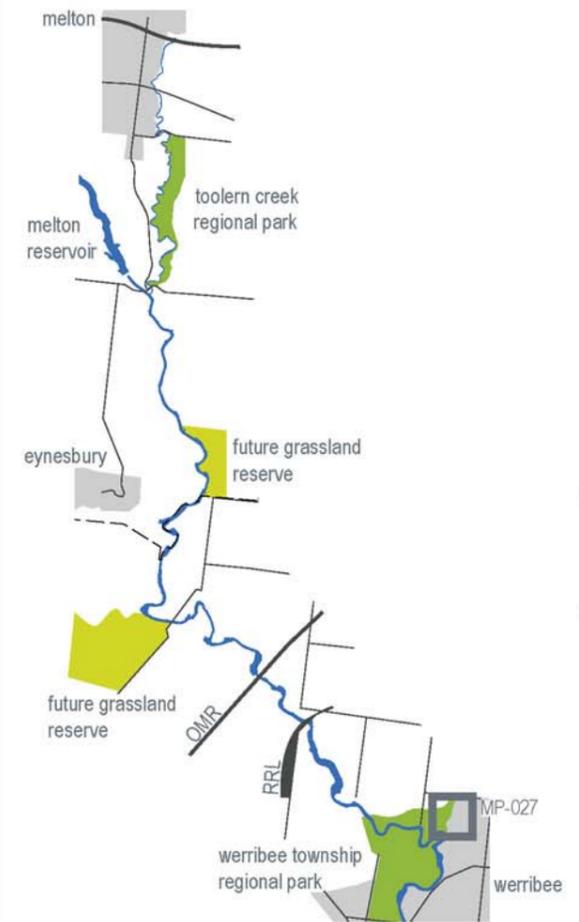
figure 39: trail alignment map 26



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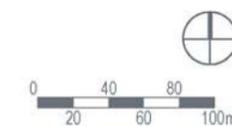
- open space corridor
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- road
- contours
- 1 in 10 year flood extents
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- psp area - future road
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- proposed regional rail link
- proposed grassland reserve

key plan



werribee river shared trail strategy  
trail alignment masterplan

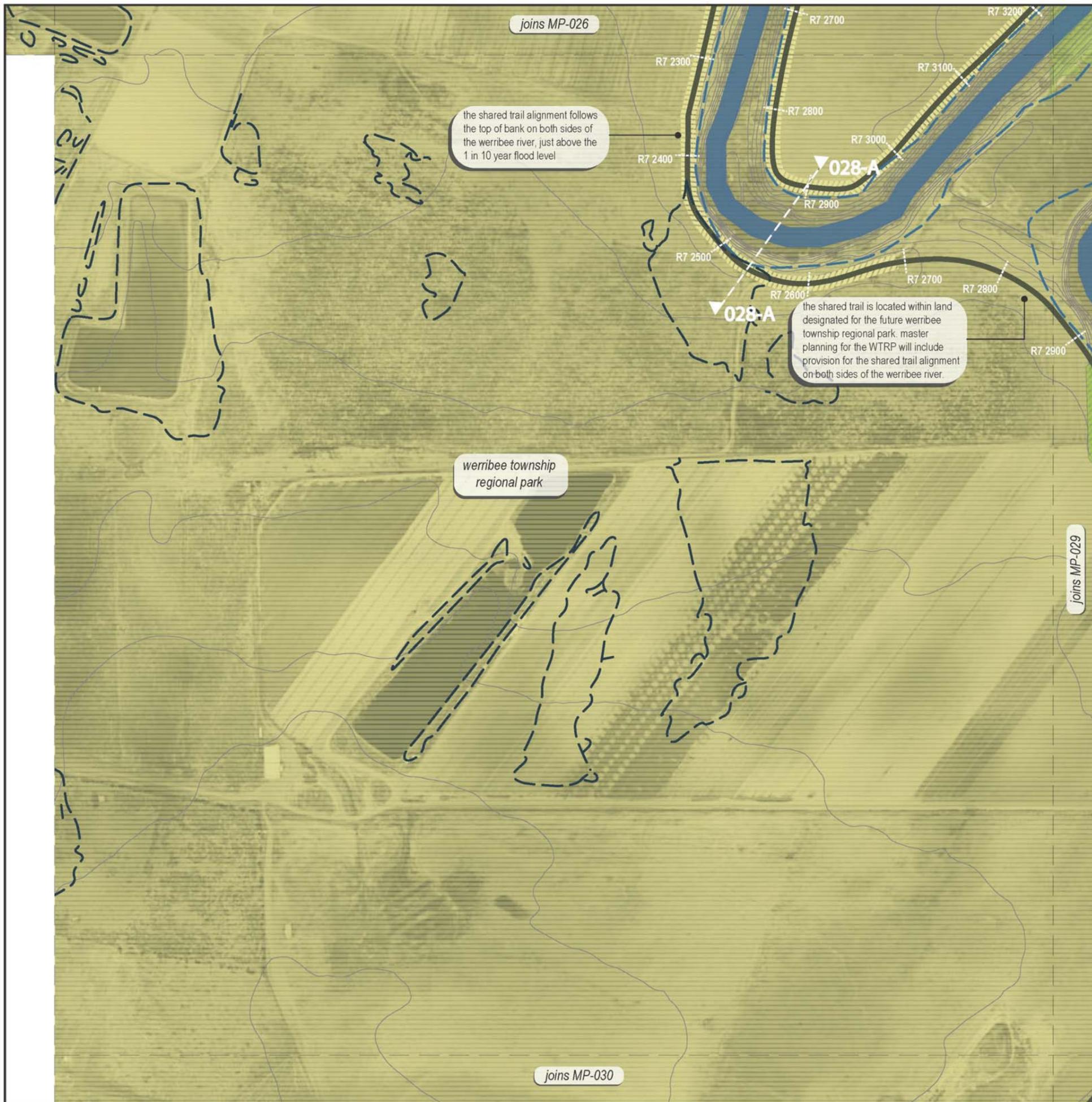
MP-027



Project Ref: 2010.464  
Dwg No.: MP-027  
Scale: 1:4000@A3  
Date: 26.03.13  
Revision: H

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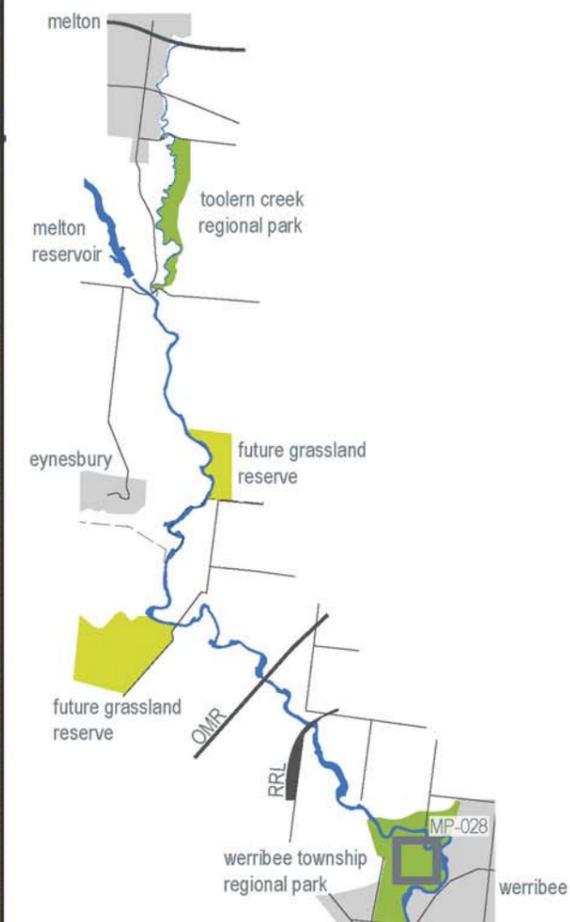
figure 40: trail alignment map 27



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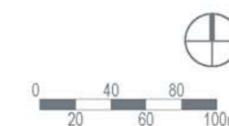
- open space corridor
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key plan



werribee river shared trail strategy  
trail alignment masterplan

MP-028



Project Ref: 2010.464  
Dwg No.: MP-028  
Scale: 1:4000@A3  
Date: 03.05.12  
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figure 41: trail alignment map 28

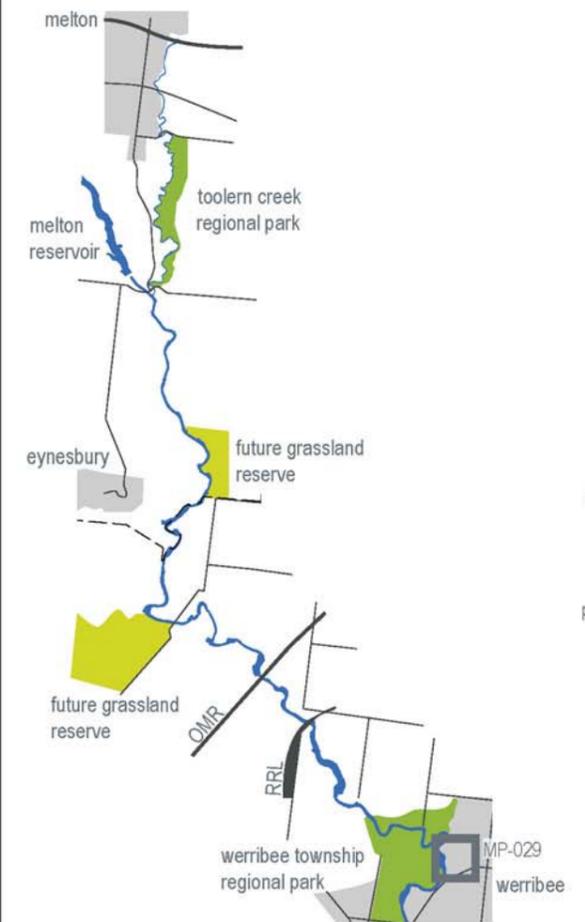


figure 42: trail alignment map 29

legend

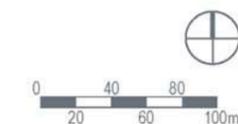
- open space corridor
- watercourse
- road
- contours
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- 1 in 100 year flood extents
- proposed 3m wide concrete shared trail with 1m clearance both sides
- 100m chainages
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key plan



werribee river shared trail strategy  
trail alignment masterplan

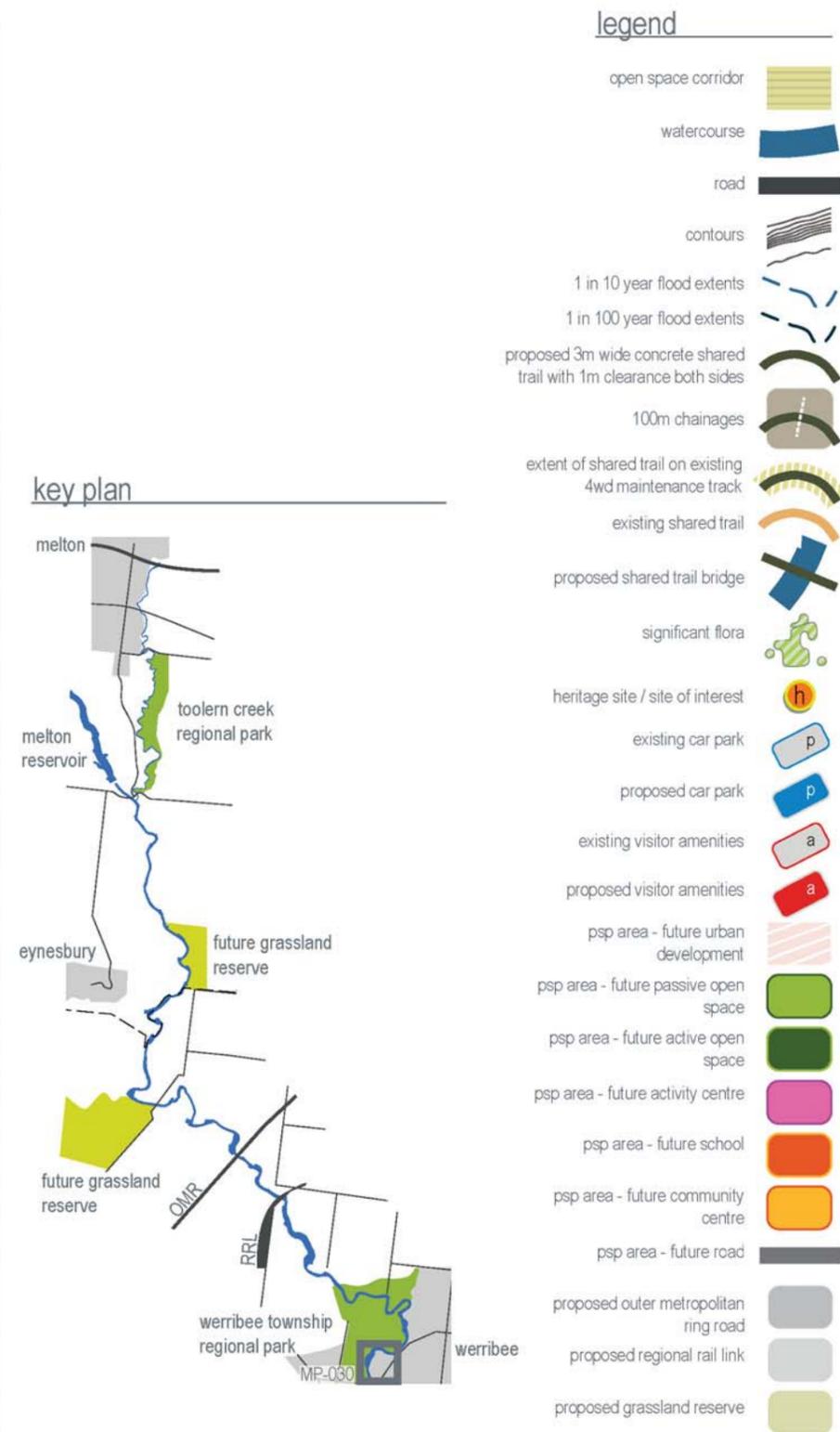
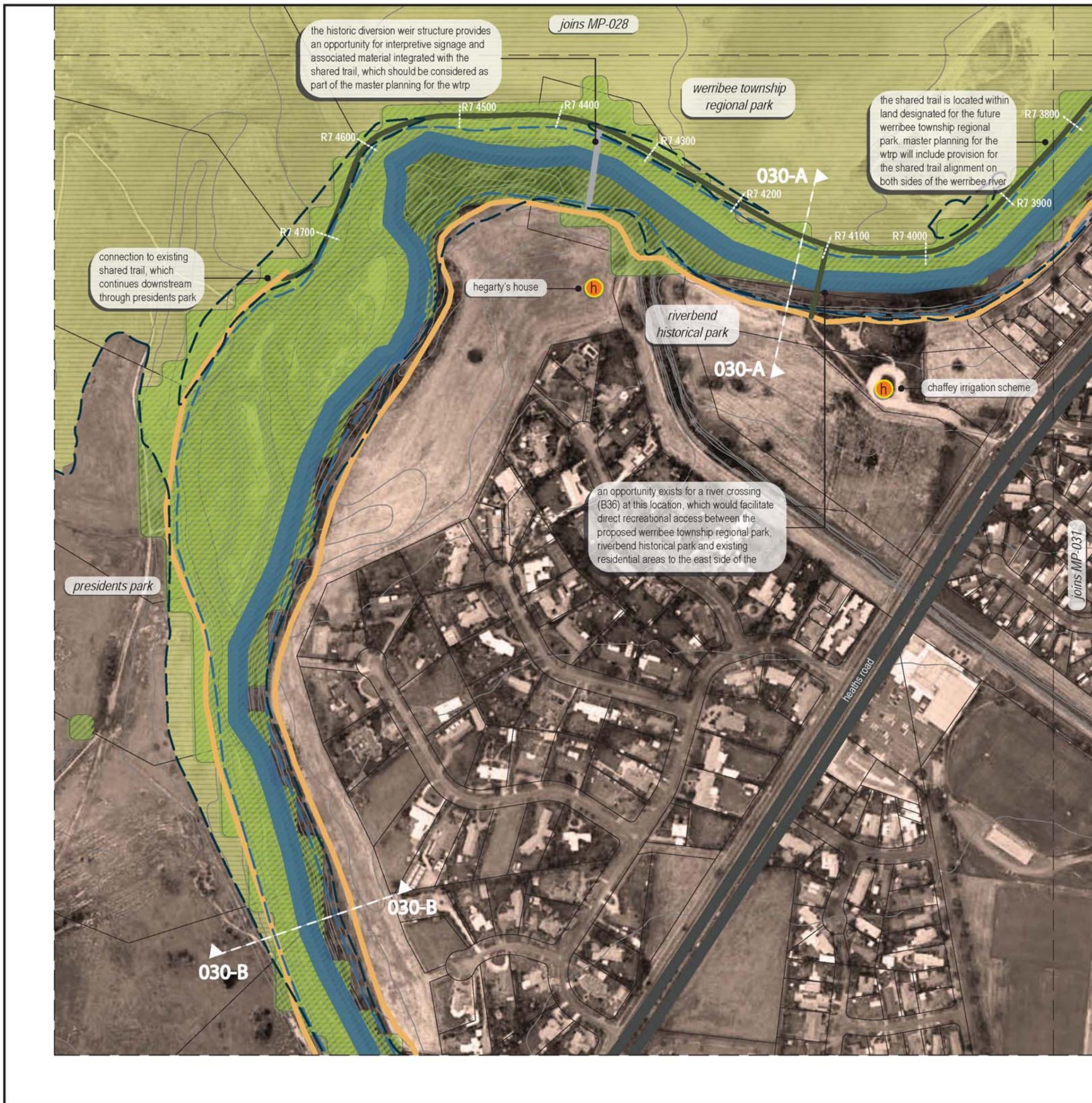
MP-029



Project Ref: 2010.464  
Dwg No.: MP-029  
Scale: 1:4000@A3  
Date: 26.03.13  
Revision: H

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## werribee river shared trail strategy trail alignment masterplan MP-030

 Project Ref: 2010.464  
 Dwg No.: MP-030  
 Scale: 1:4000@A3  
 Date: 08.05.12  
 Revision: G

0 20 40 60 80 100m

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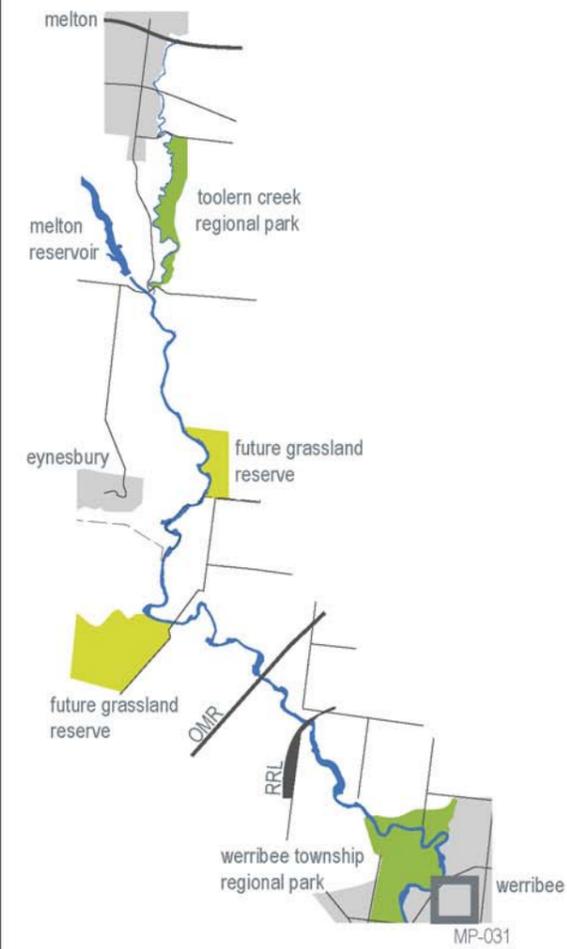
figure 43: trail alignment map 30



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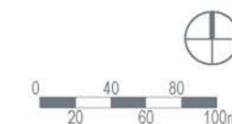
- open space corridor
- watercourse
- road
- contours
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- proposed 3m wide concrete shared trail with 1m clearance both sides
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key plan



werrabee river shared trail strategy  
trail alignment masterplan

MP-031



Project Ref: 2010.464  
Dwg No.: MP-031  
Scale: 1:4000@A3  
Date: 03.05.12  
Revision: F

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figure 44: trail alignment map 31

# 11 cross sections

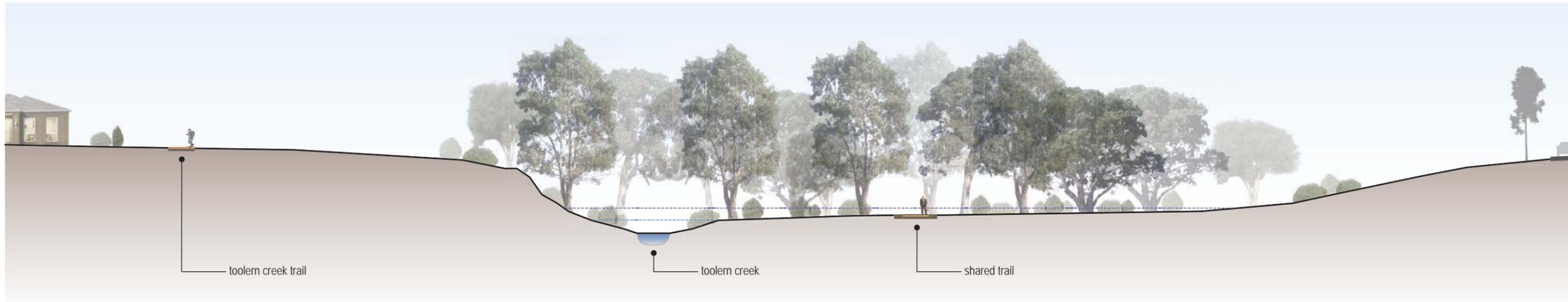


figure 45: section AA - map 1 (1:500 @ A3)

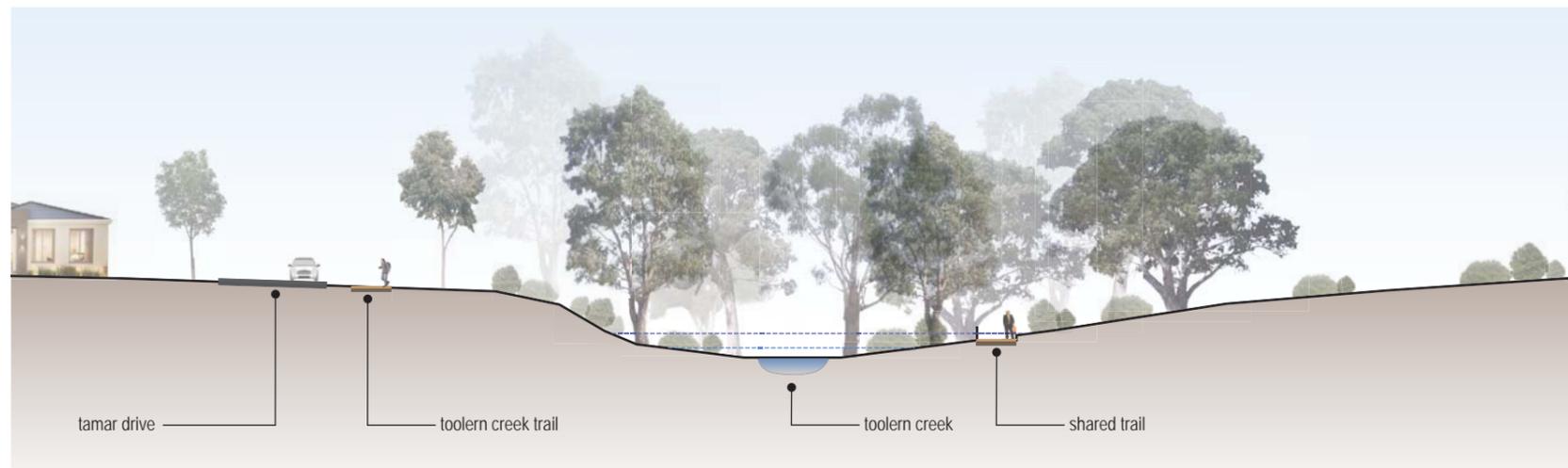


figure 46: section AA - map 2 (1:500 @ A3)

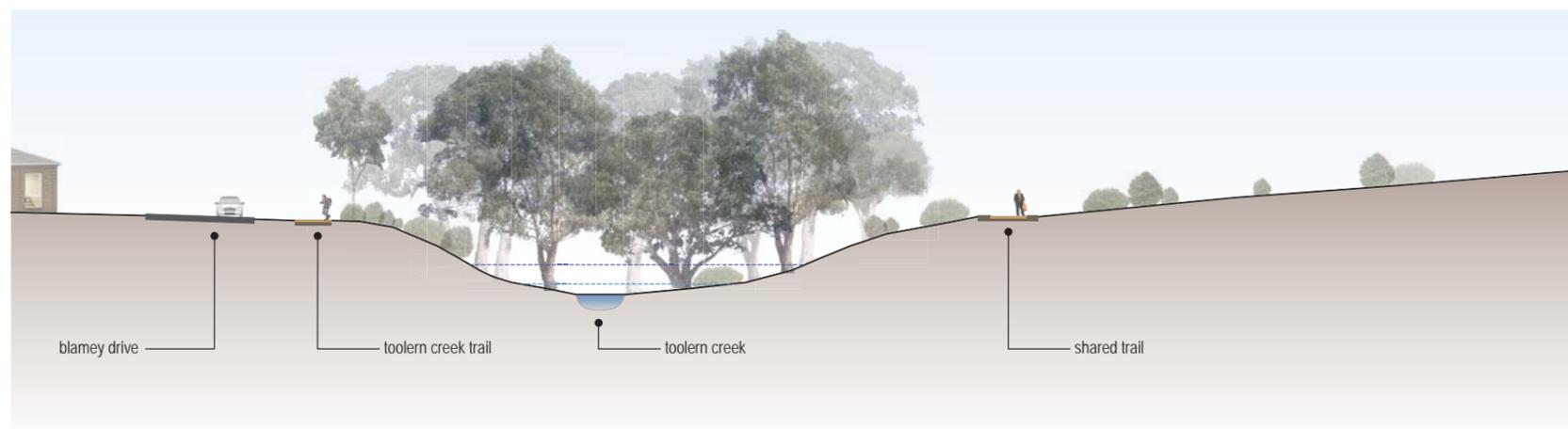


figure 47: section AA - map 3 (1:500 @ A3)

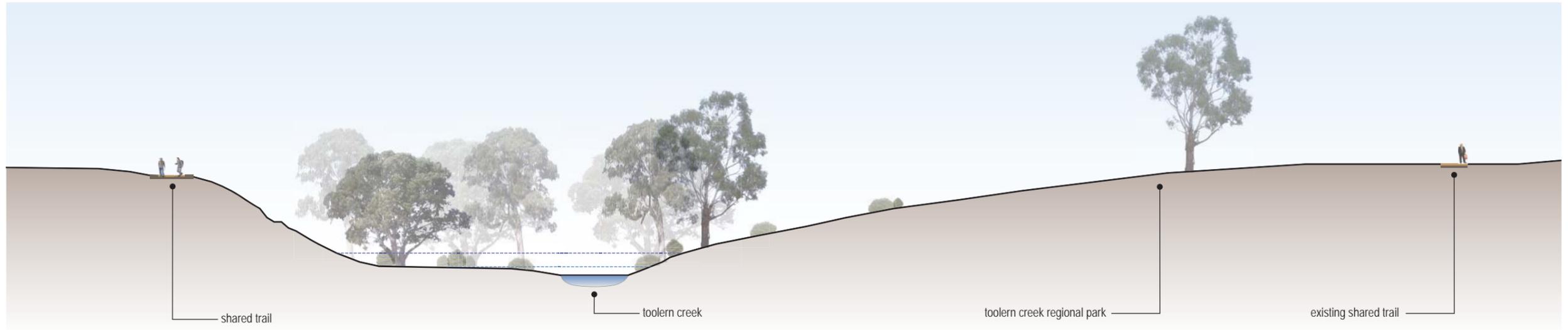


figure 48: section AA - map 4 (1:500 @ A3)

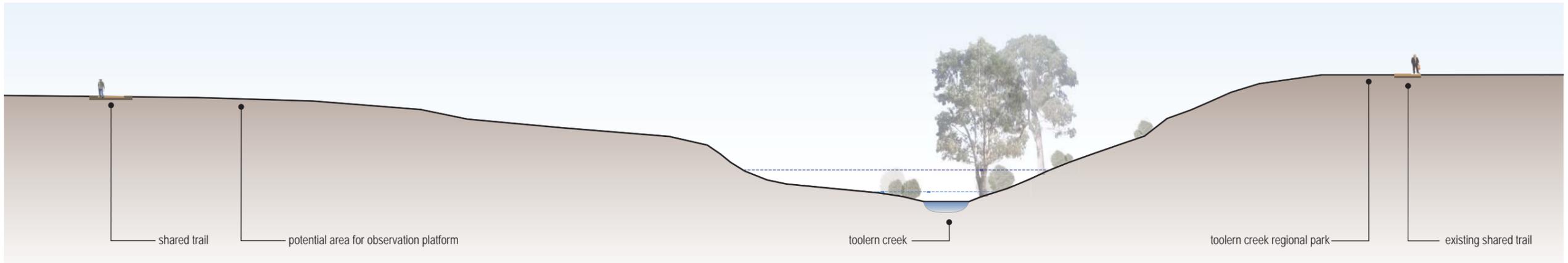


figure 49: section AA - map 5 (1:500 @ A3)

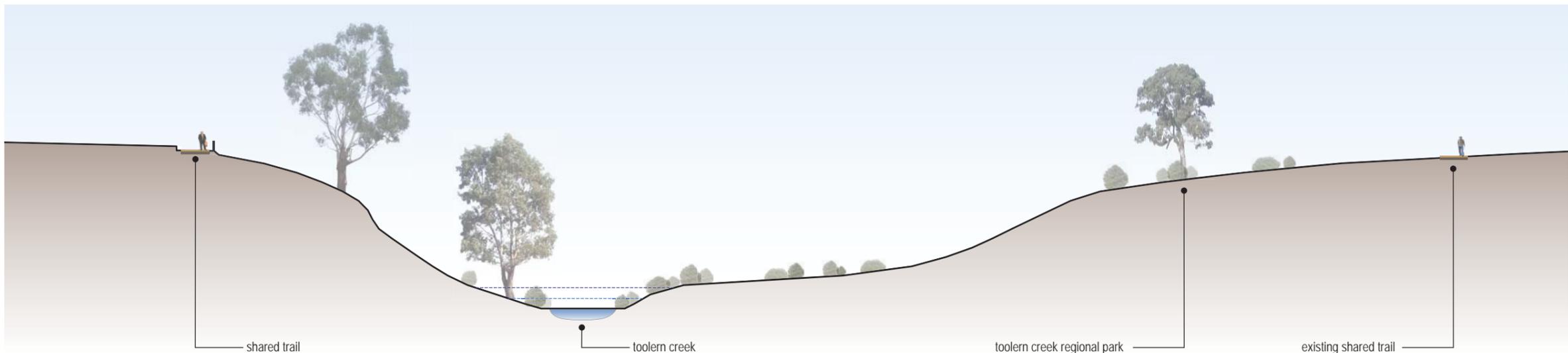


figure 50: section BB - map 5 (1:500 @ A3)

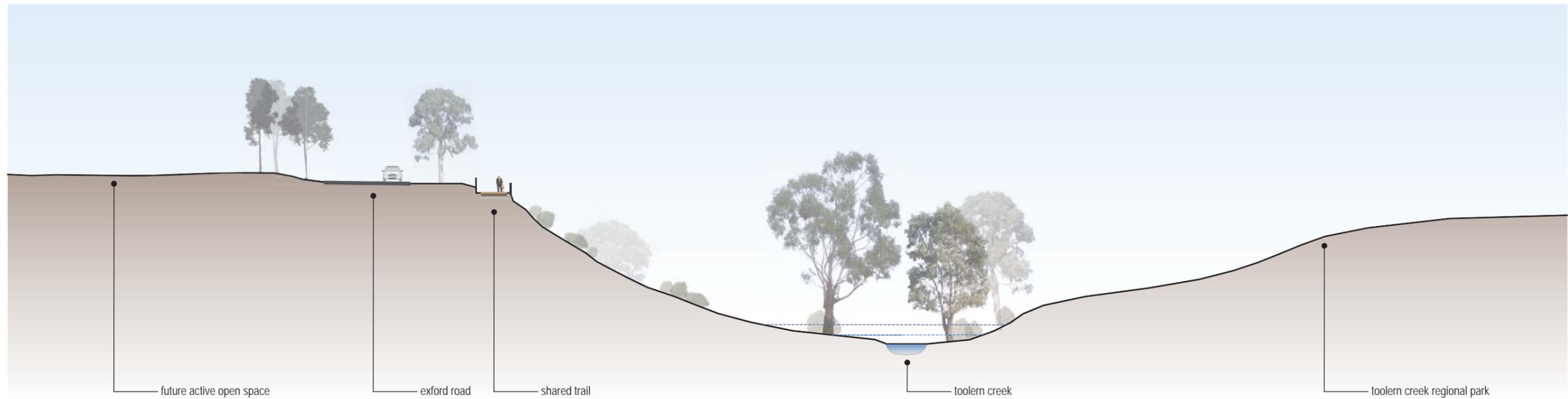


figure 51: section AA - map 6 (1:500 @ A3)

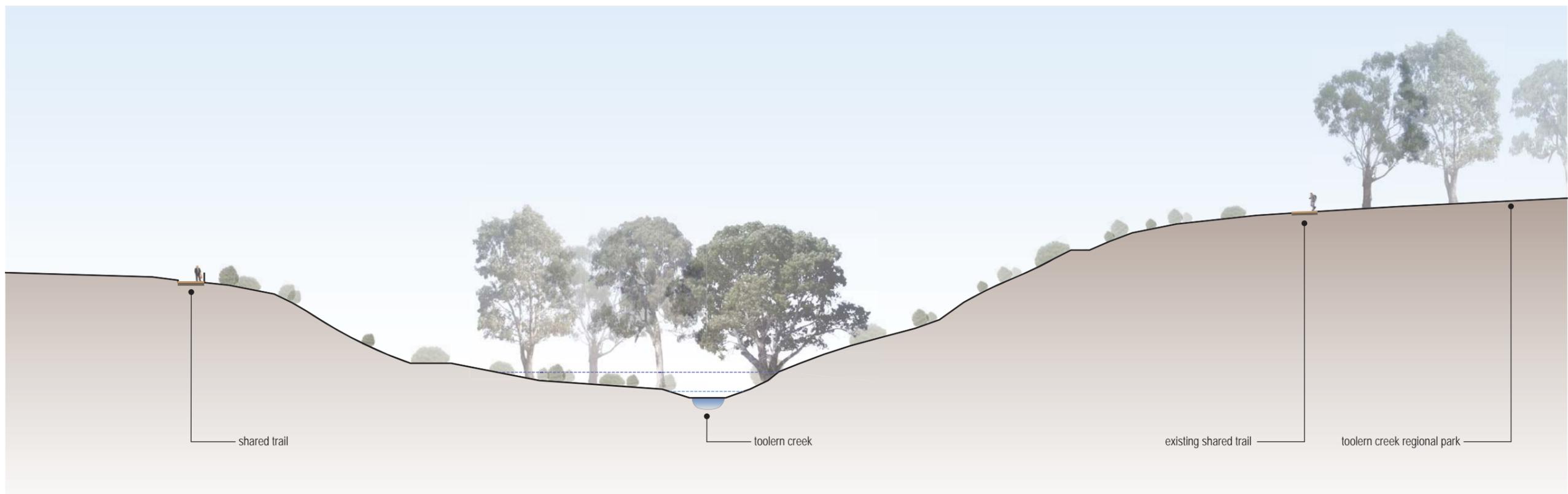


figure 52: section BB - map 6 (1:500 @ A3)

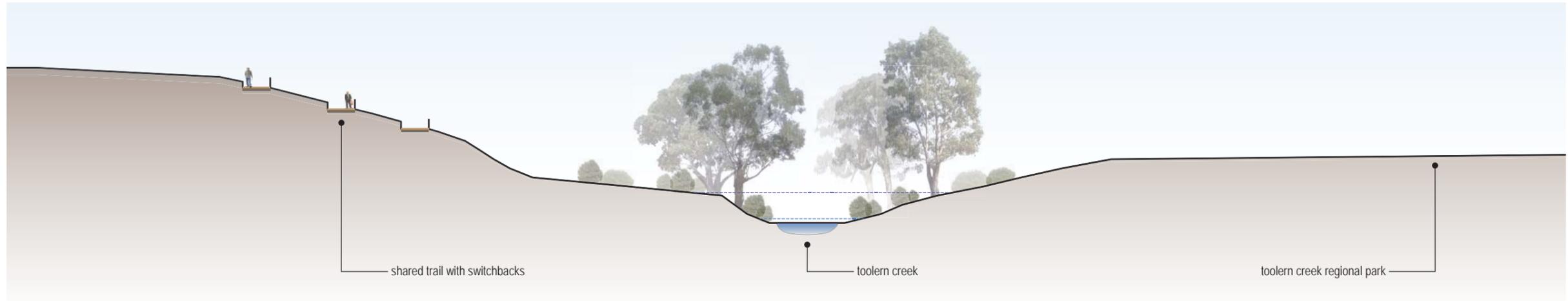


figure 53: section AA - map 7 (1:500 @ A3)

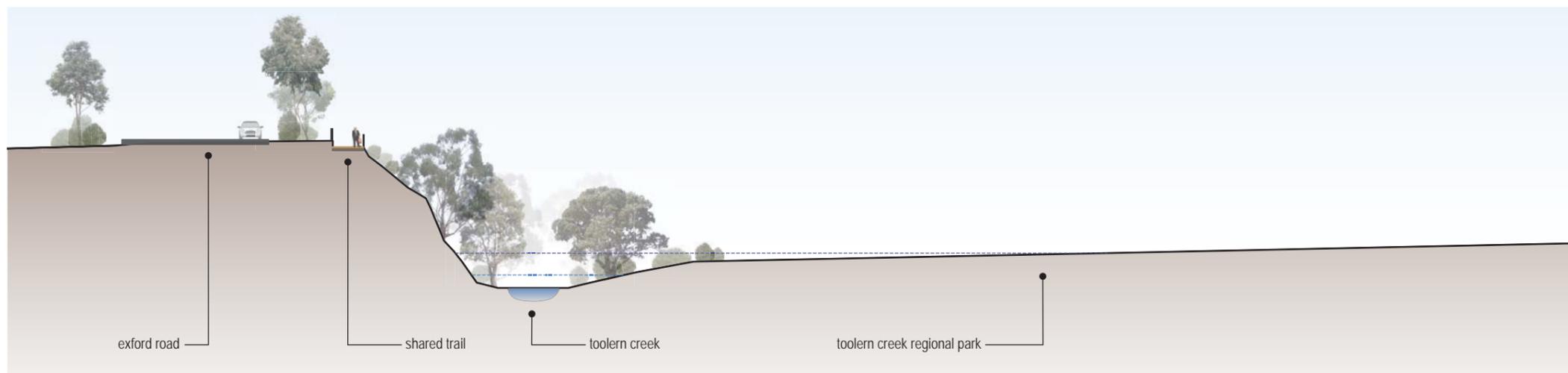


figure 54: section BB - map 7 (1:500 @ A3)

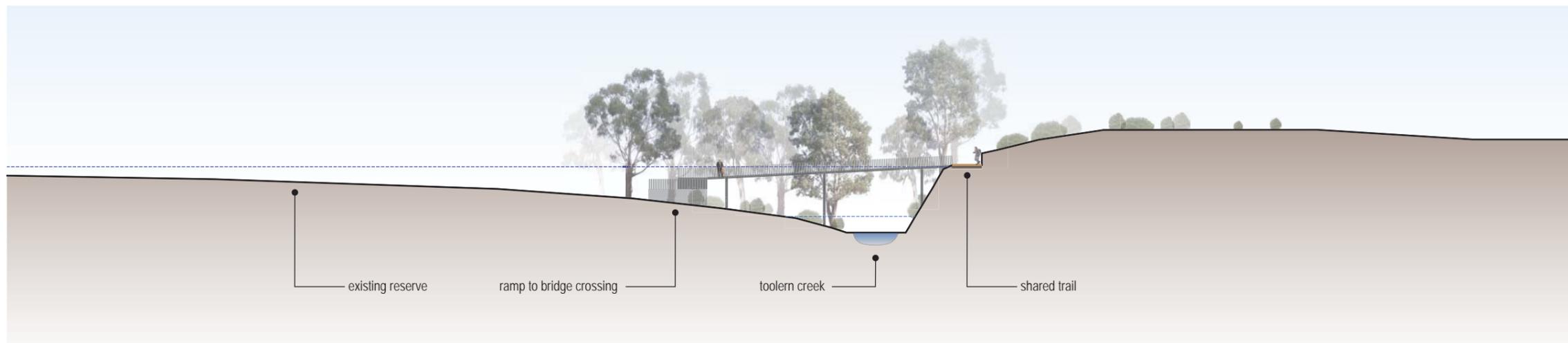


figure 55: section CC - map 7 (1:500 @ A3)

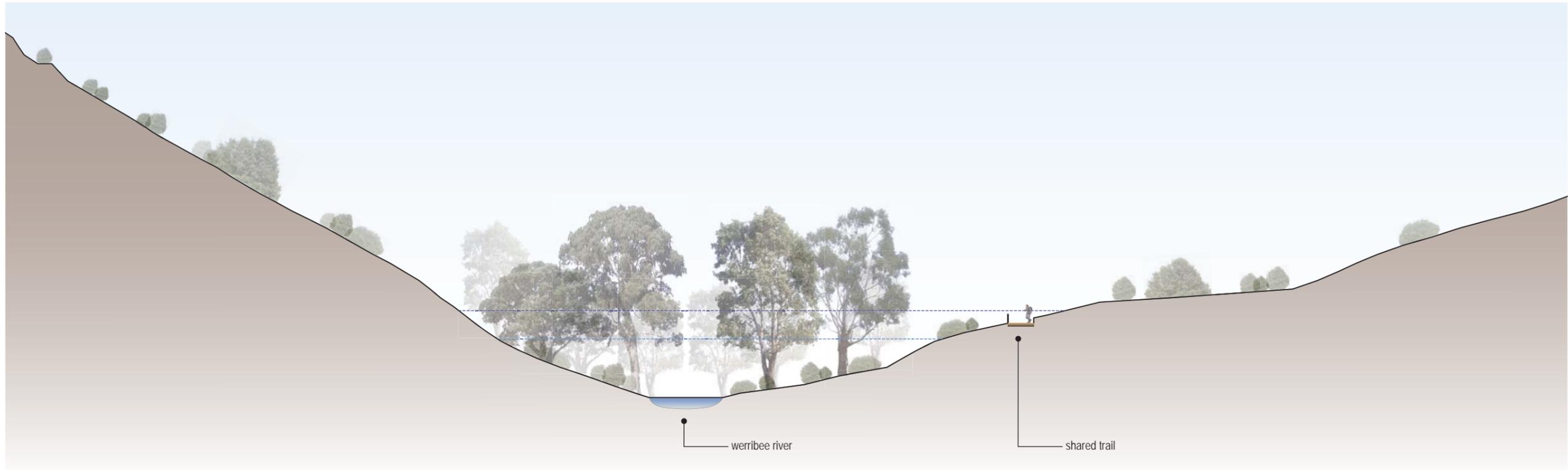


figure 56: section AA - map 8 (1:500 @ A3)

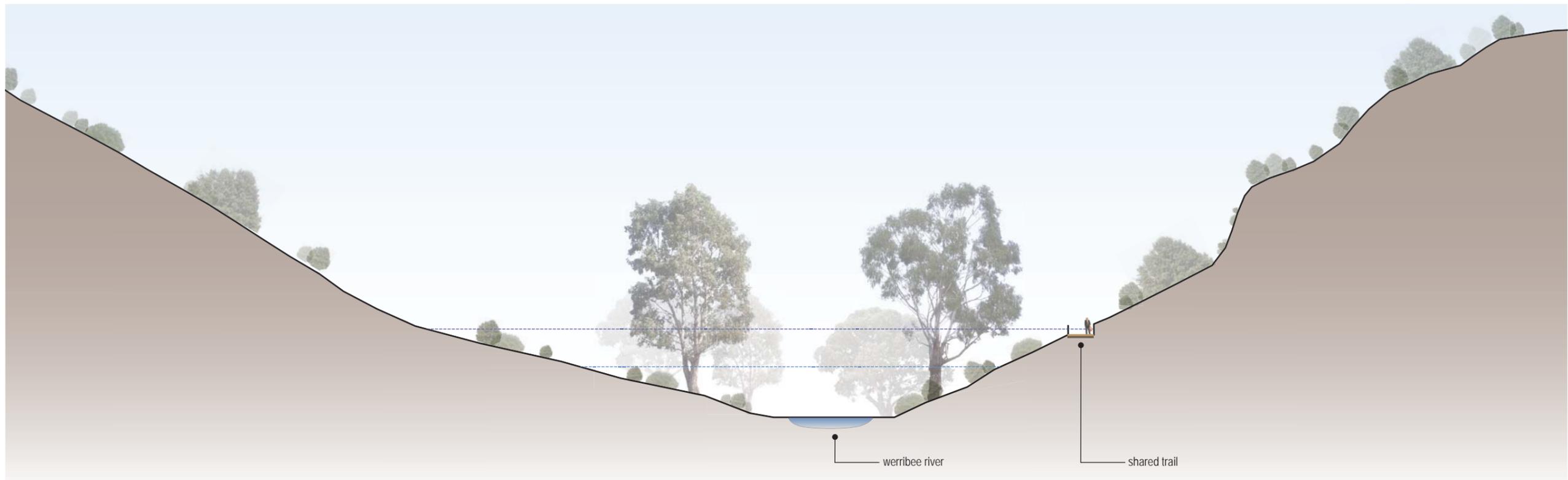


figure 57: section AA - map 9 (1:500 @ A3)

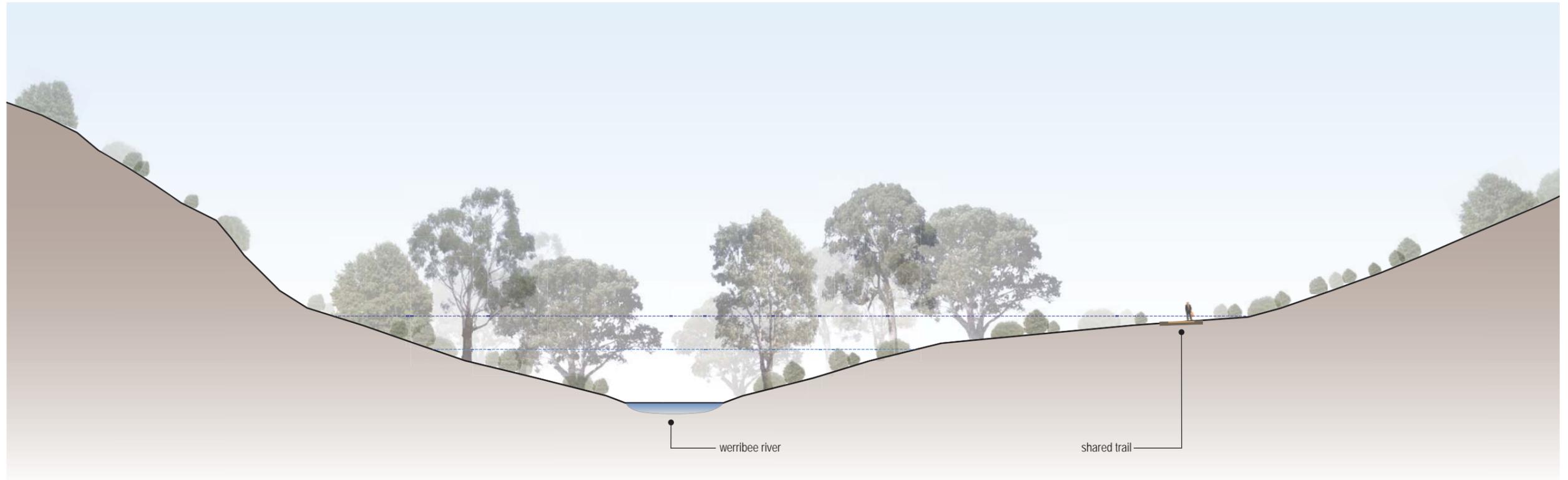


figure 58: section AA - map 10 (1:500 @ A3)

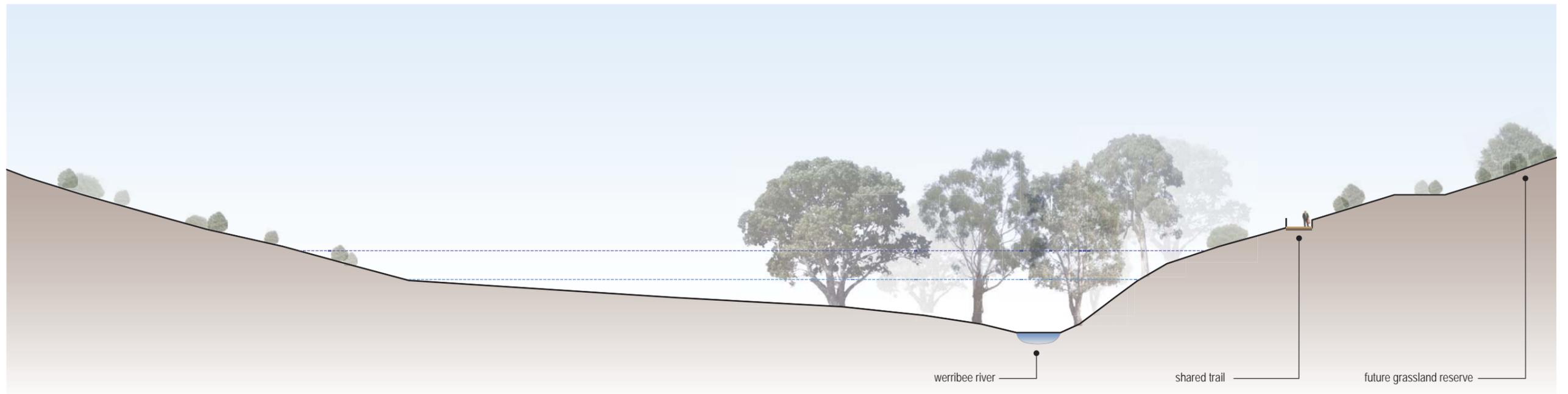


figure 59: section AA - map 11 (1:500 @ A3)

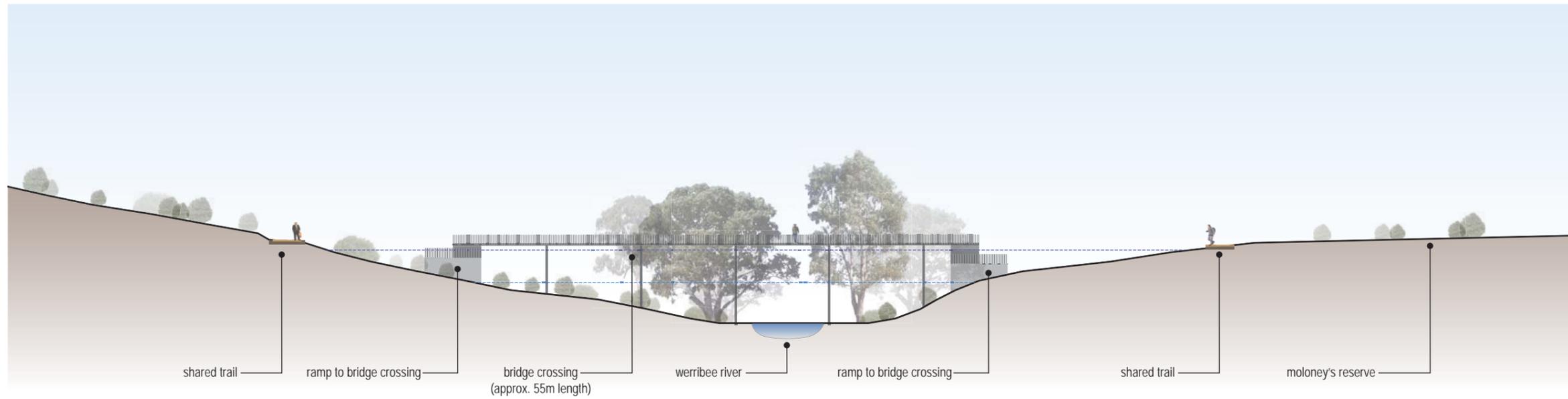


figure 60: section AA - map 12 (1:500 @ A3)

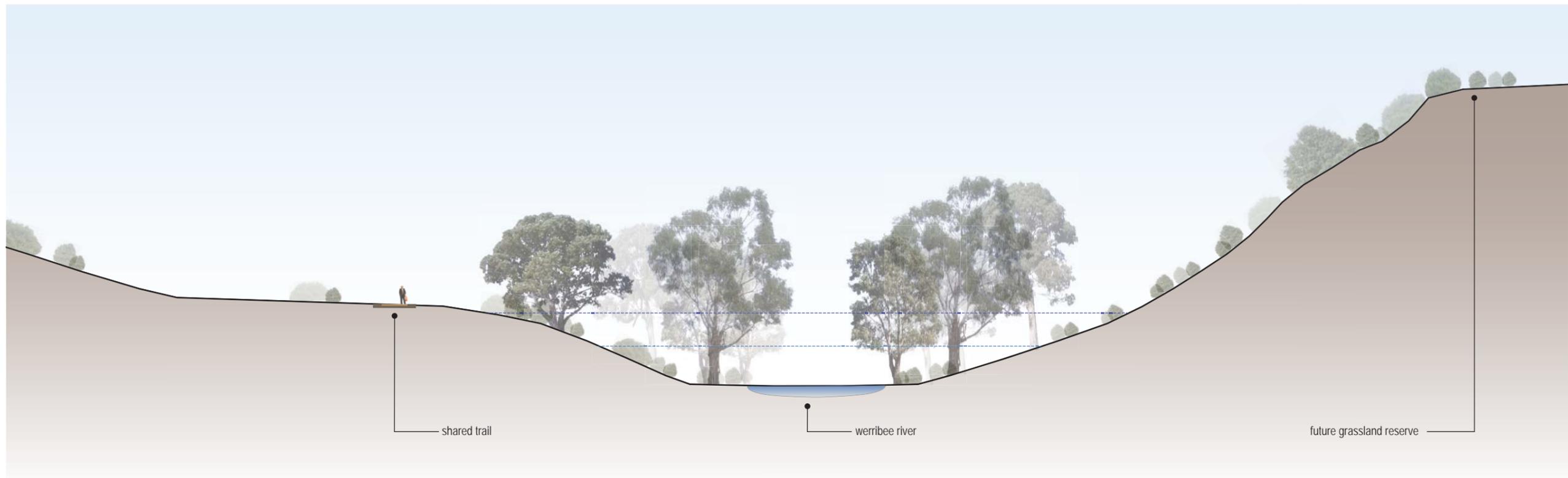


figure 61: section BB - map 12 (1:500 @ A3)

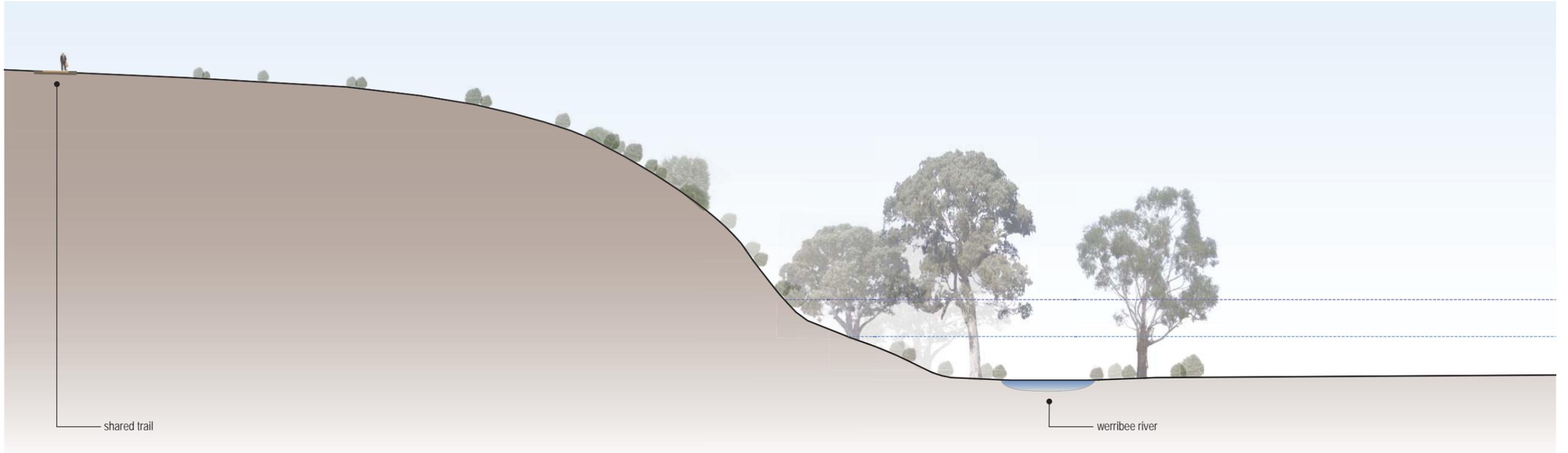


figure 62: section AA - map 13 (1:500 @ A3)

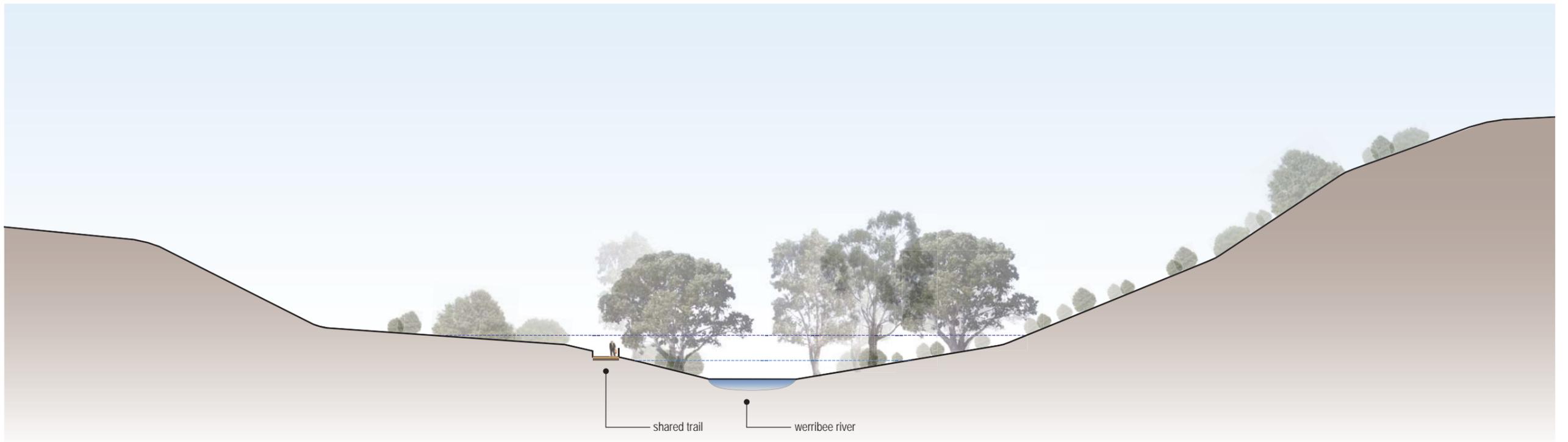


figure 63: section BB - map 13 (1:500 @ A3)

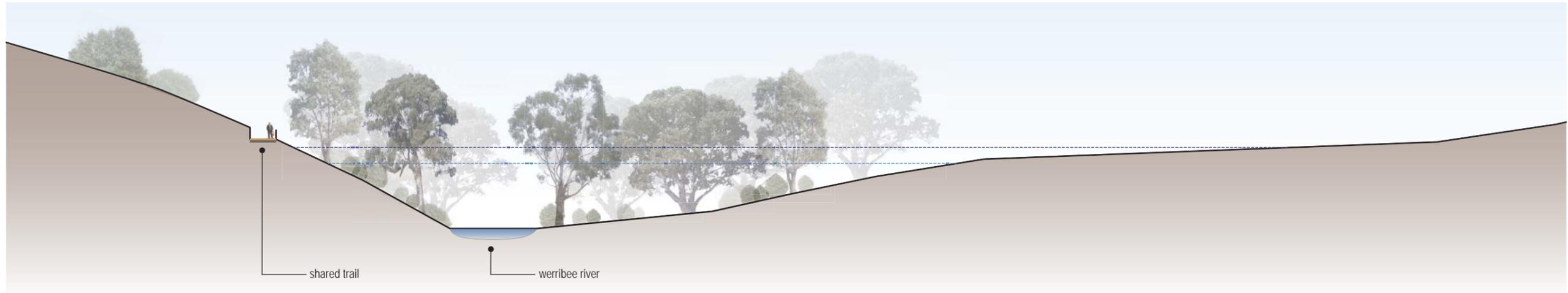


figure 64: section AA - map 14 (1:500 @ A3)

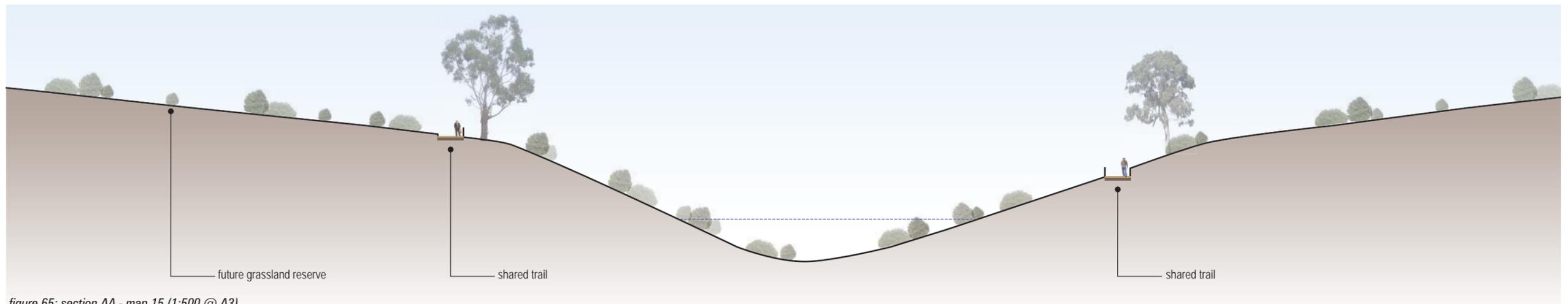


figure 65: section AA - map 15 (1:500 @ A3)

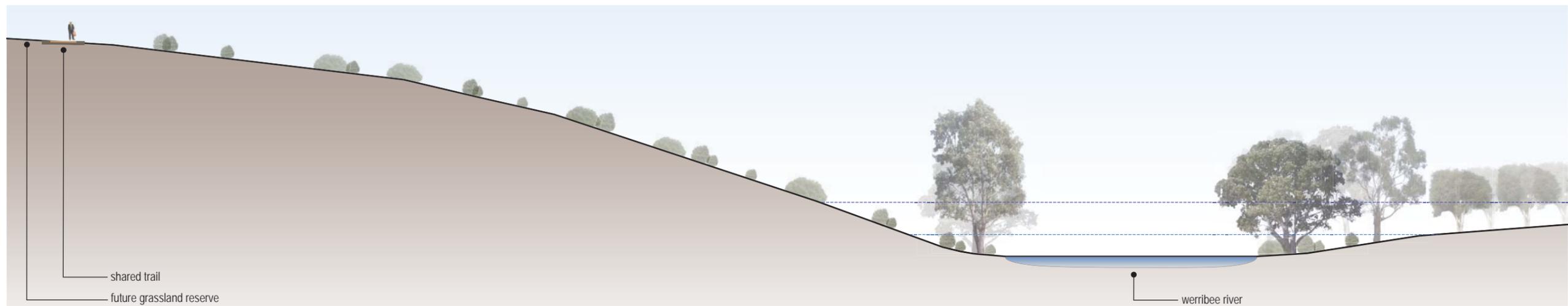


figure 66: section AA - map 16 (1:500 @ A3)

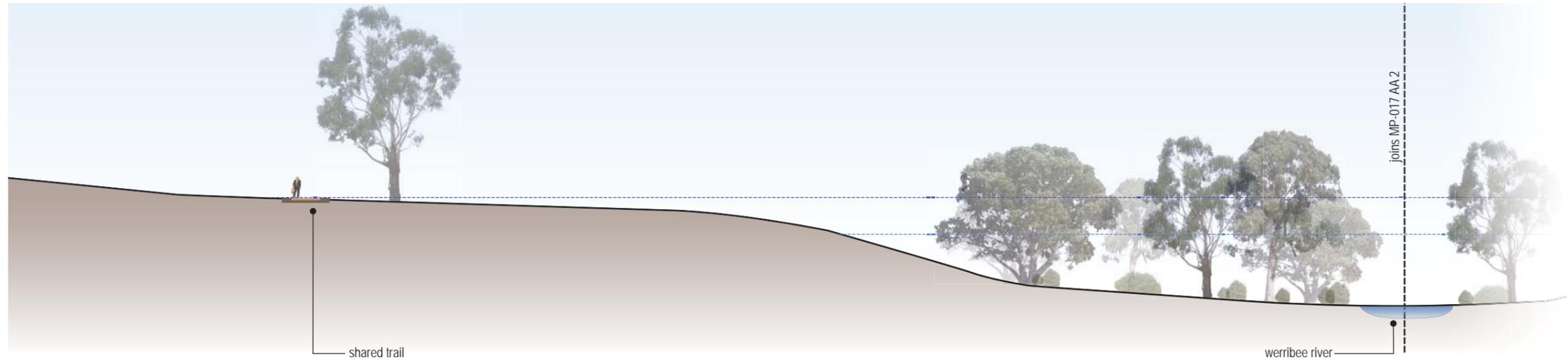


figure 67: section AA (1) - map 17 (1:500 @ A3)

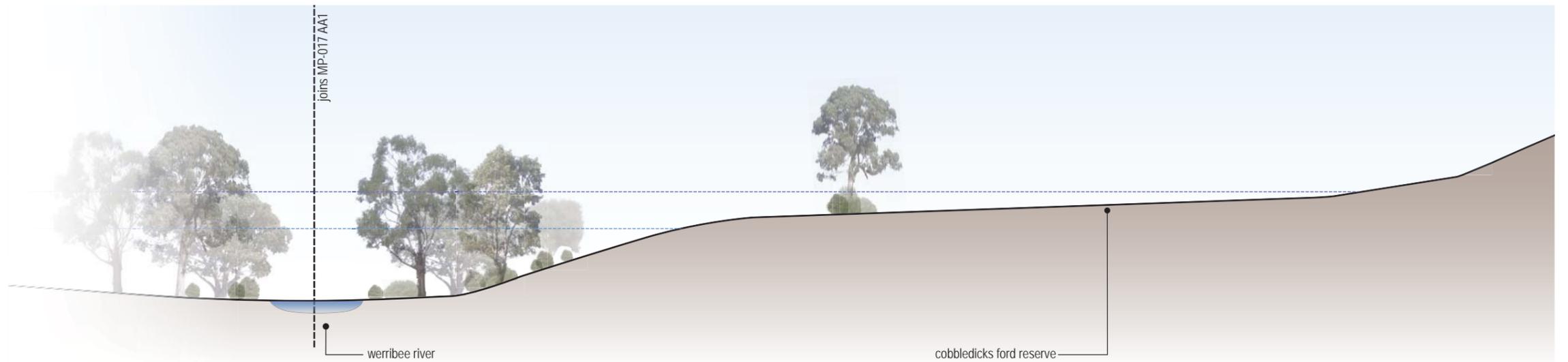


figure 68: section AA (2) - map 17 (1:500 @ A3)

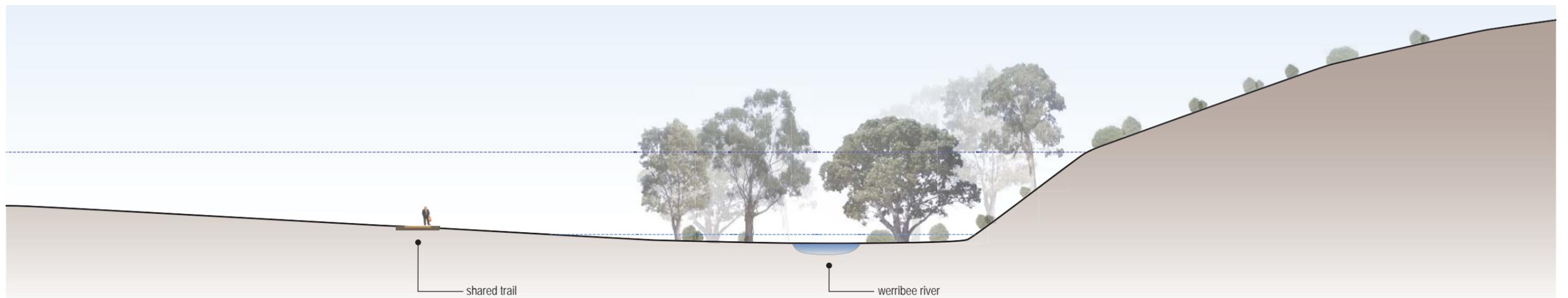


figure 69: section BB - map 17 (1:500 @ A3)

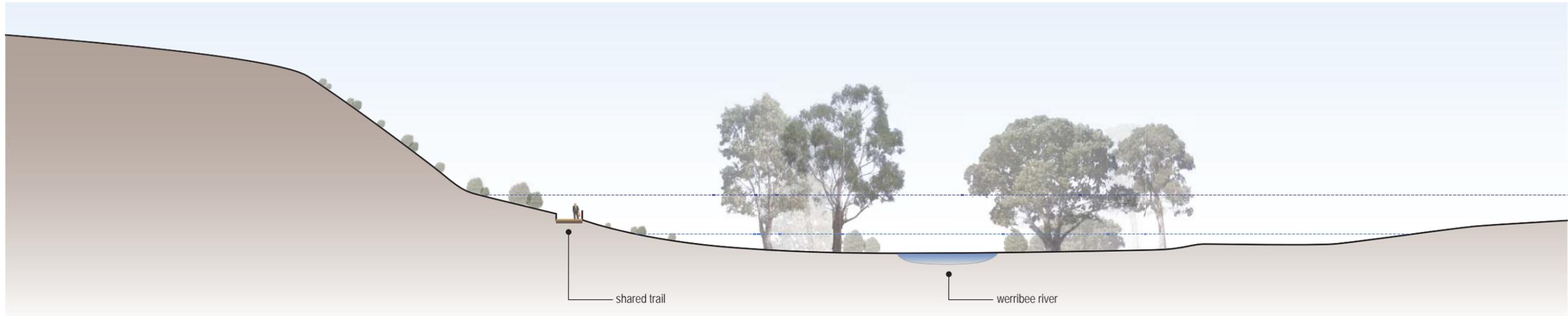


figure 70: section AA - map 18 (1:500 @ A3)

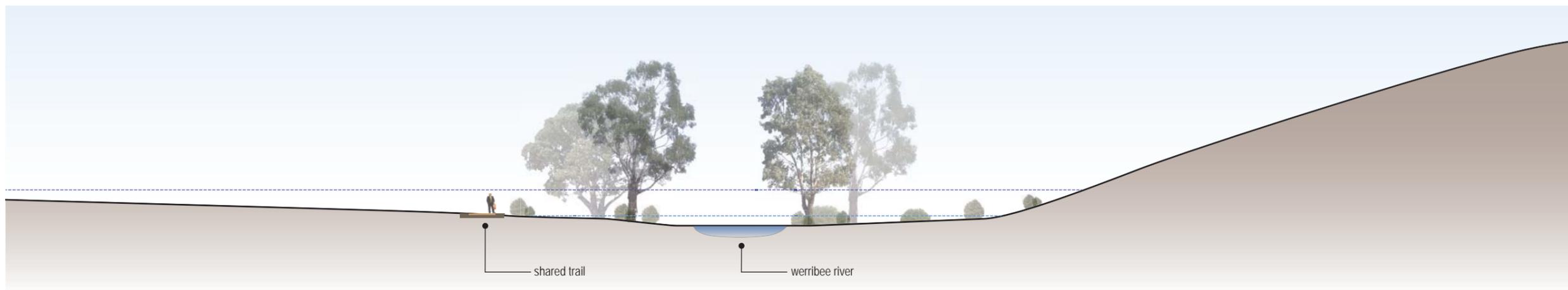


figure 71: section AA - map 19 (1:500 @ A3)

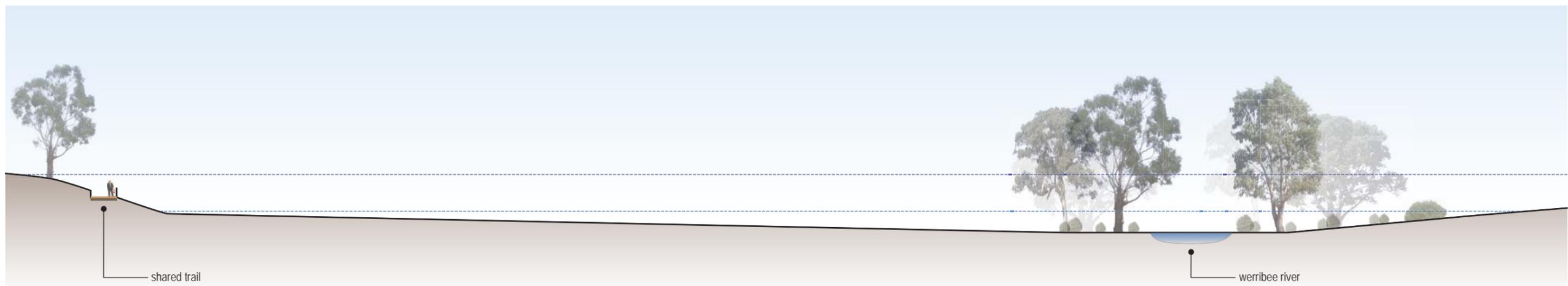


figure 72: section BB - map 19 (1:500 @ A3)

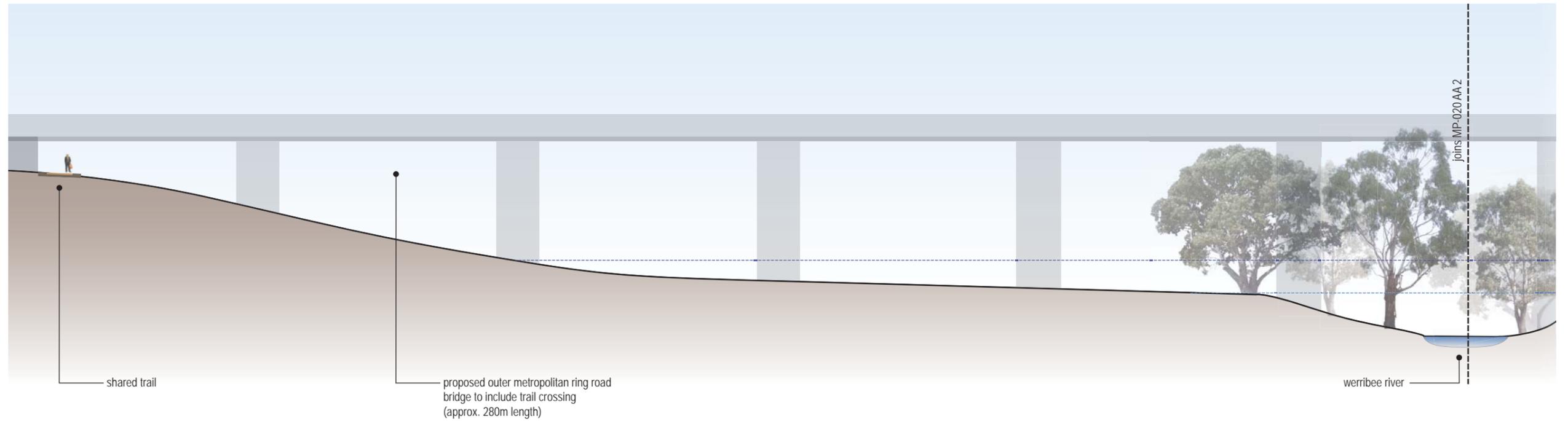


figure 73: section AA (1) - map 20 (1:500 @ A3)

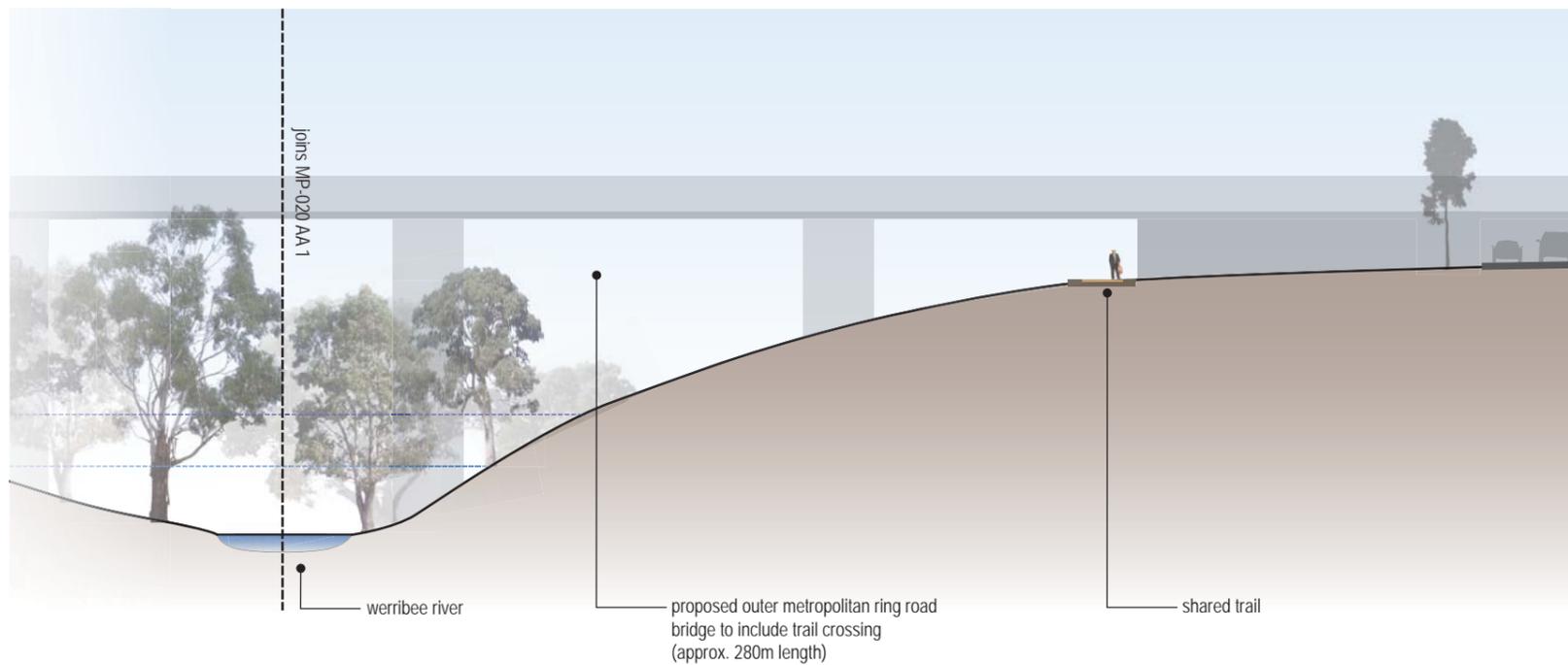


figure 74: section AA (2) - map 20 (1:500 @ A3)

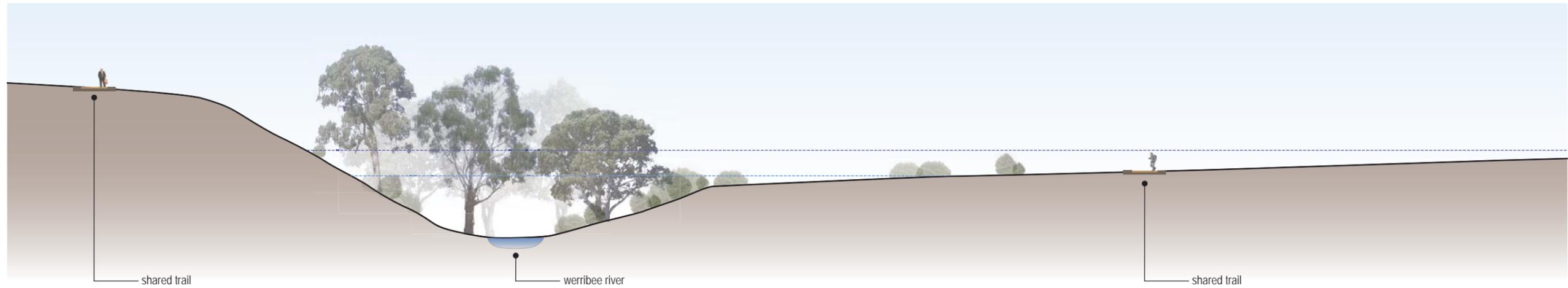


figure 75: section AA - map 21 (1:500 @ A3)

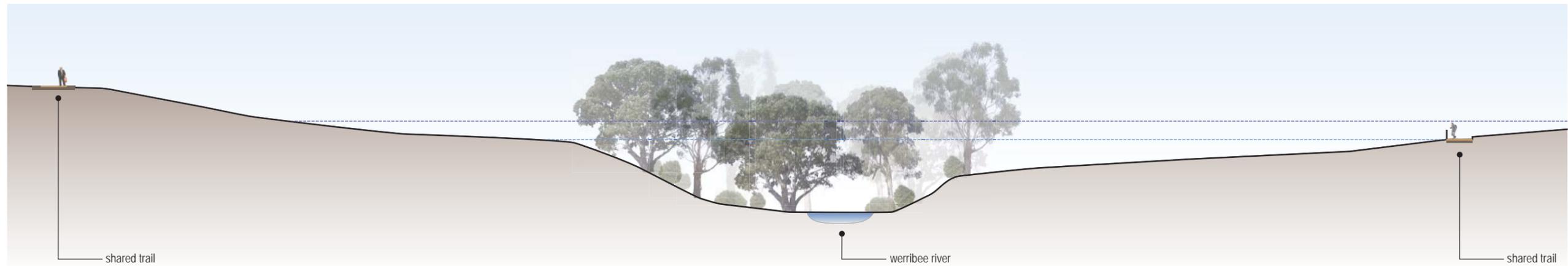


figure 76: section AA - map 22 (1:500 @ A3)

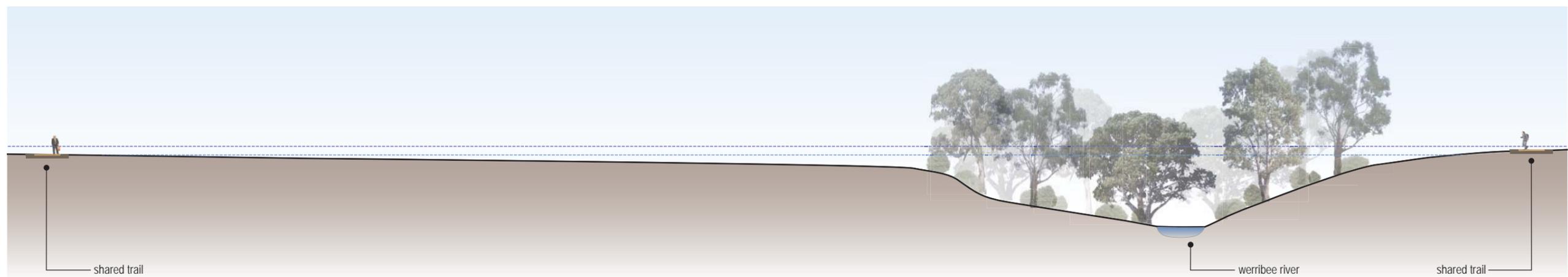


figure 77: section AA - map 23 (1:500 @ A3)

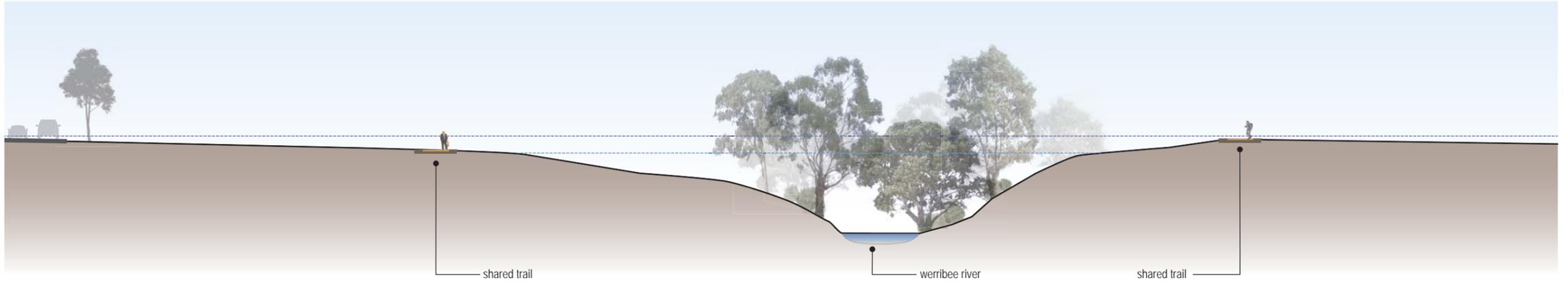


figure 78: section AA - map 24 (1:500 @ A3)

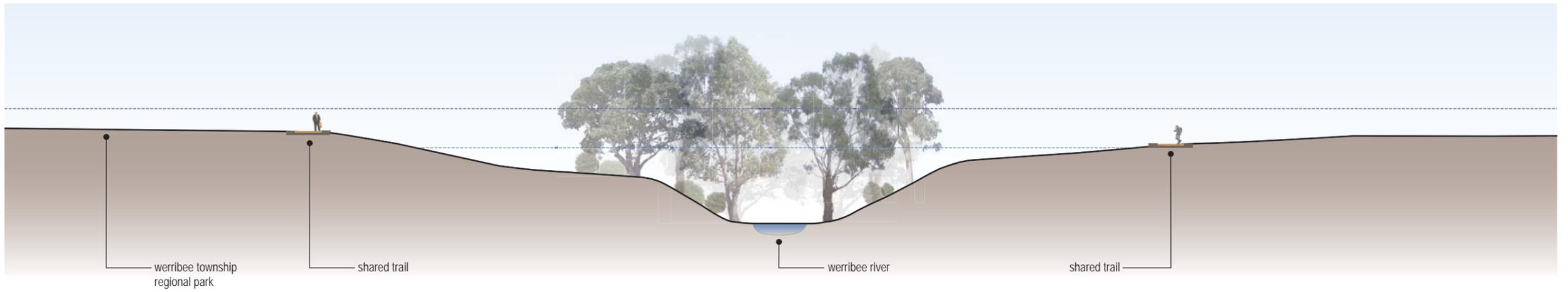


figure 79: section AA - map 25 (1:500 @ A3)

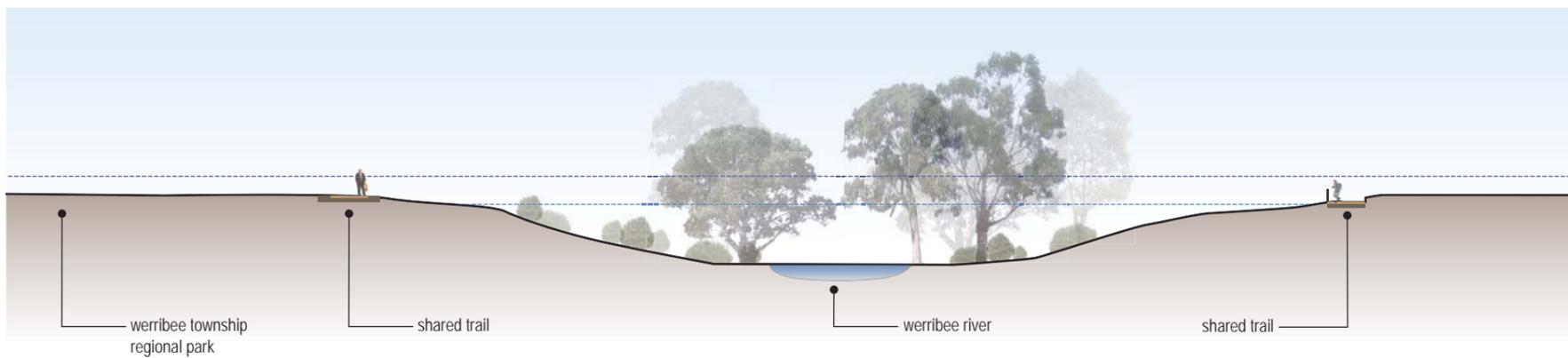


figure 80: section AA - map 26 (1:500 @ A3)

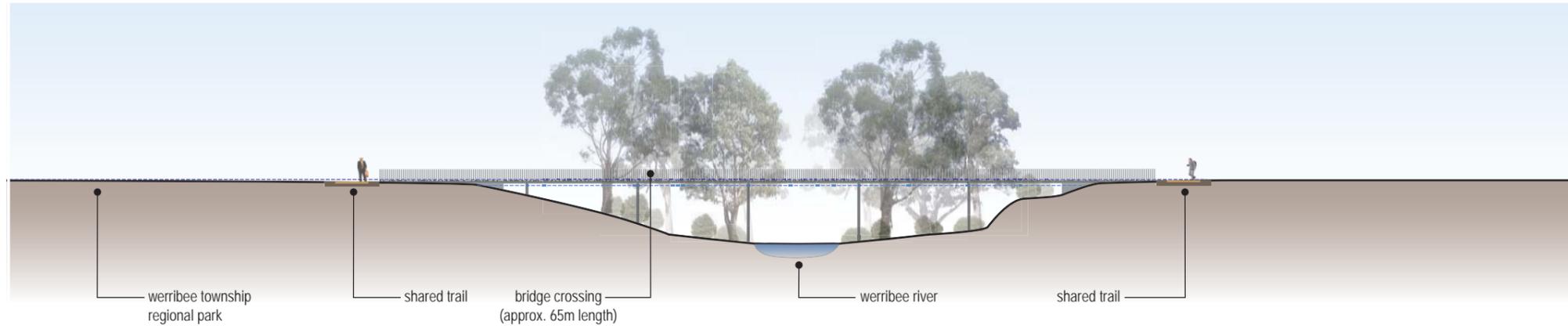


figure 81: section BB - map 26 (1:500 @ A3)

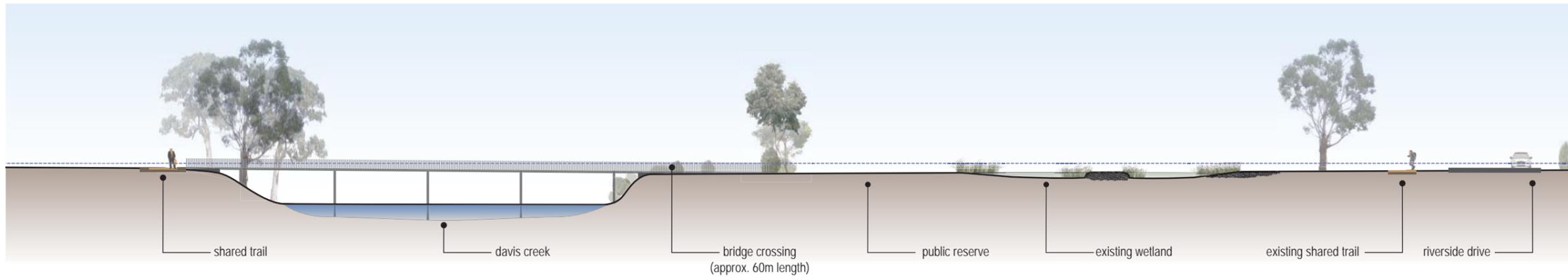


figure 82: section AA - map 27 (1:500 @ A3)

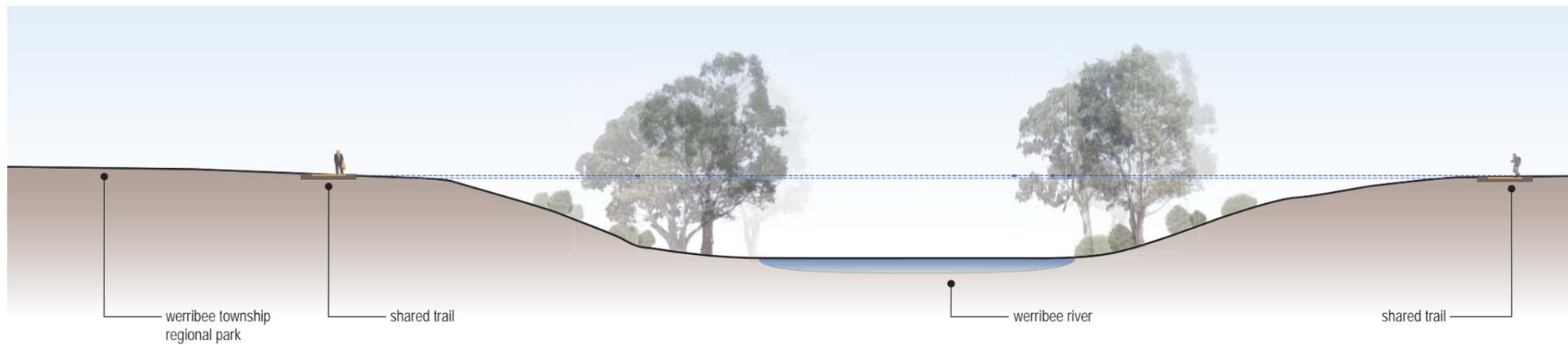


figure 83: section AA - map 28 (1:500 @ A3)

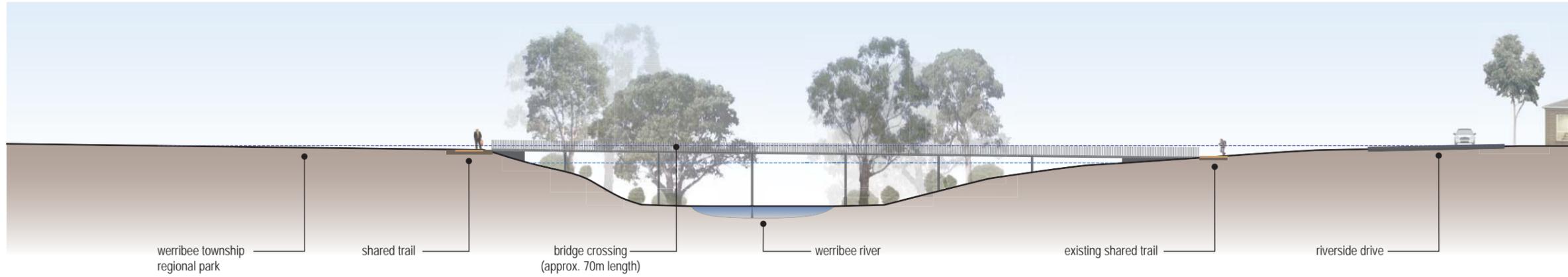


figure 84: section AA - map 29 (1:500 @ A3)

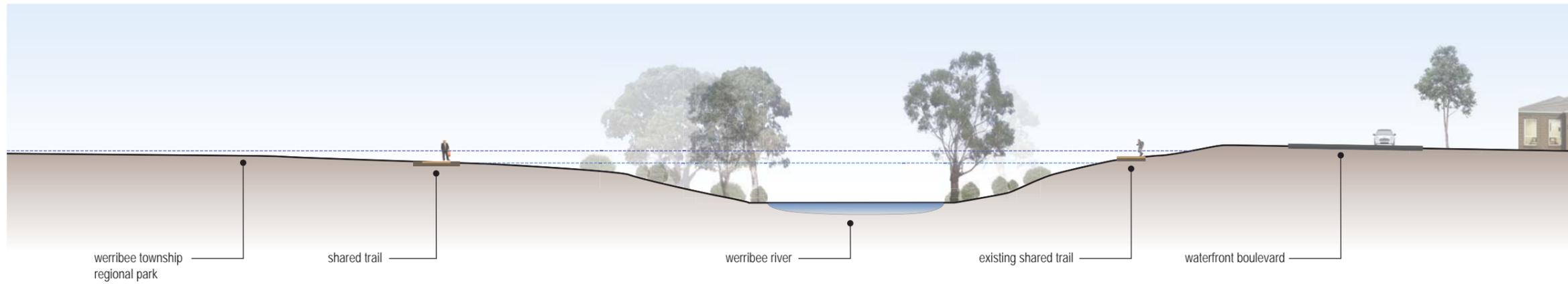


figure 85: section BB - map 29 (1:500 @ A3)

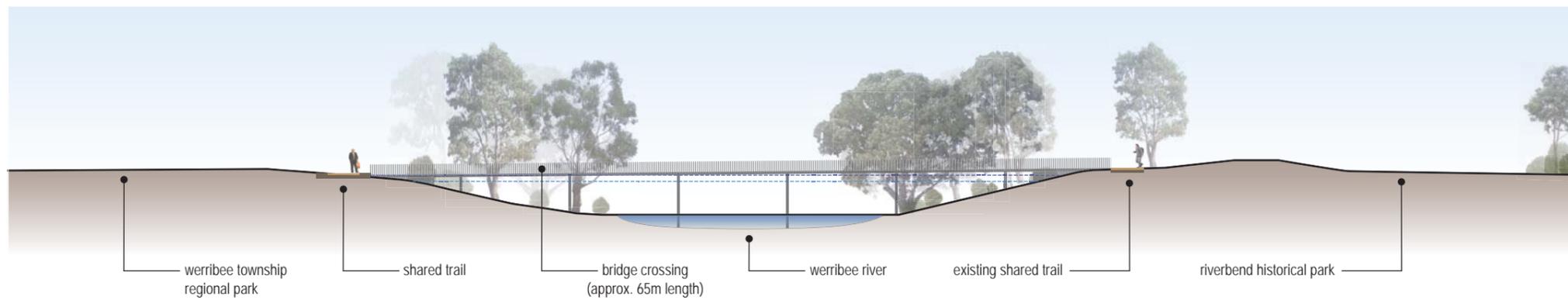


figure 86: section AA - map 30 (1:500 @ A3)

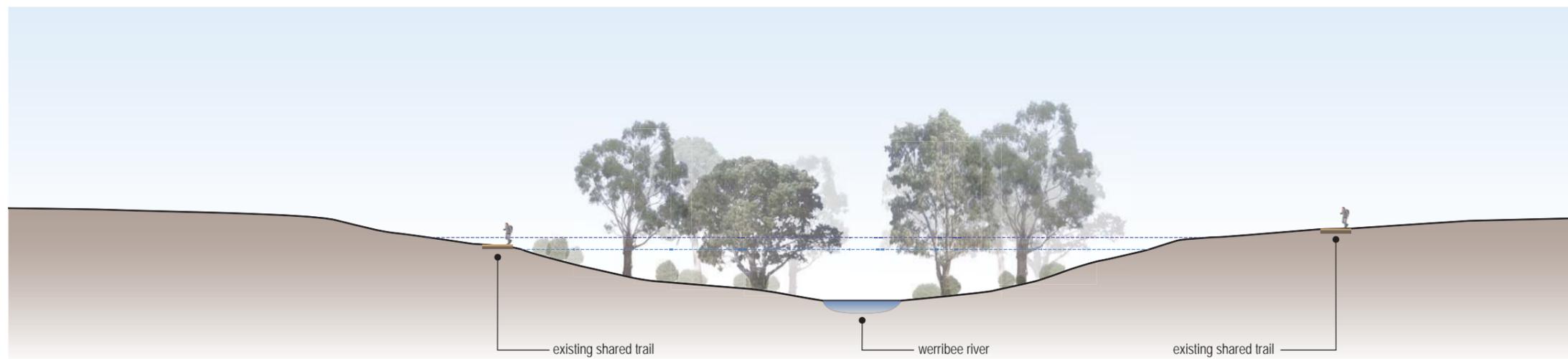


figure 87: section BB - map 30 (1:500 @ A3)

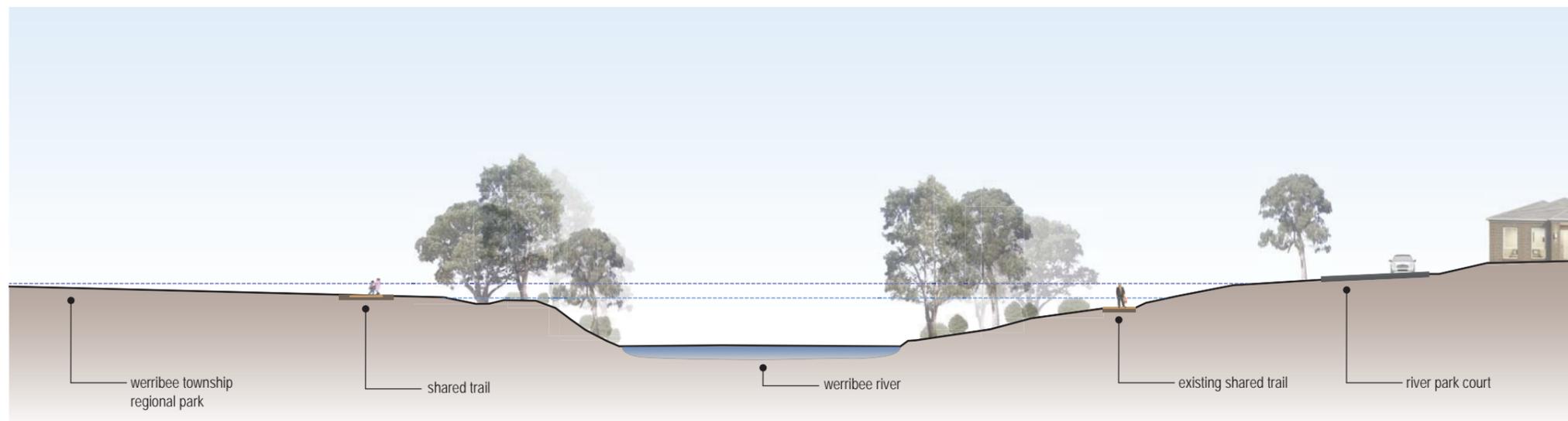


figure 88: section AA - map 31 (1:500 @ A3)



figure 89: typical concrete path section (1:50 @ A3)

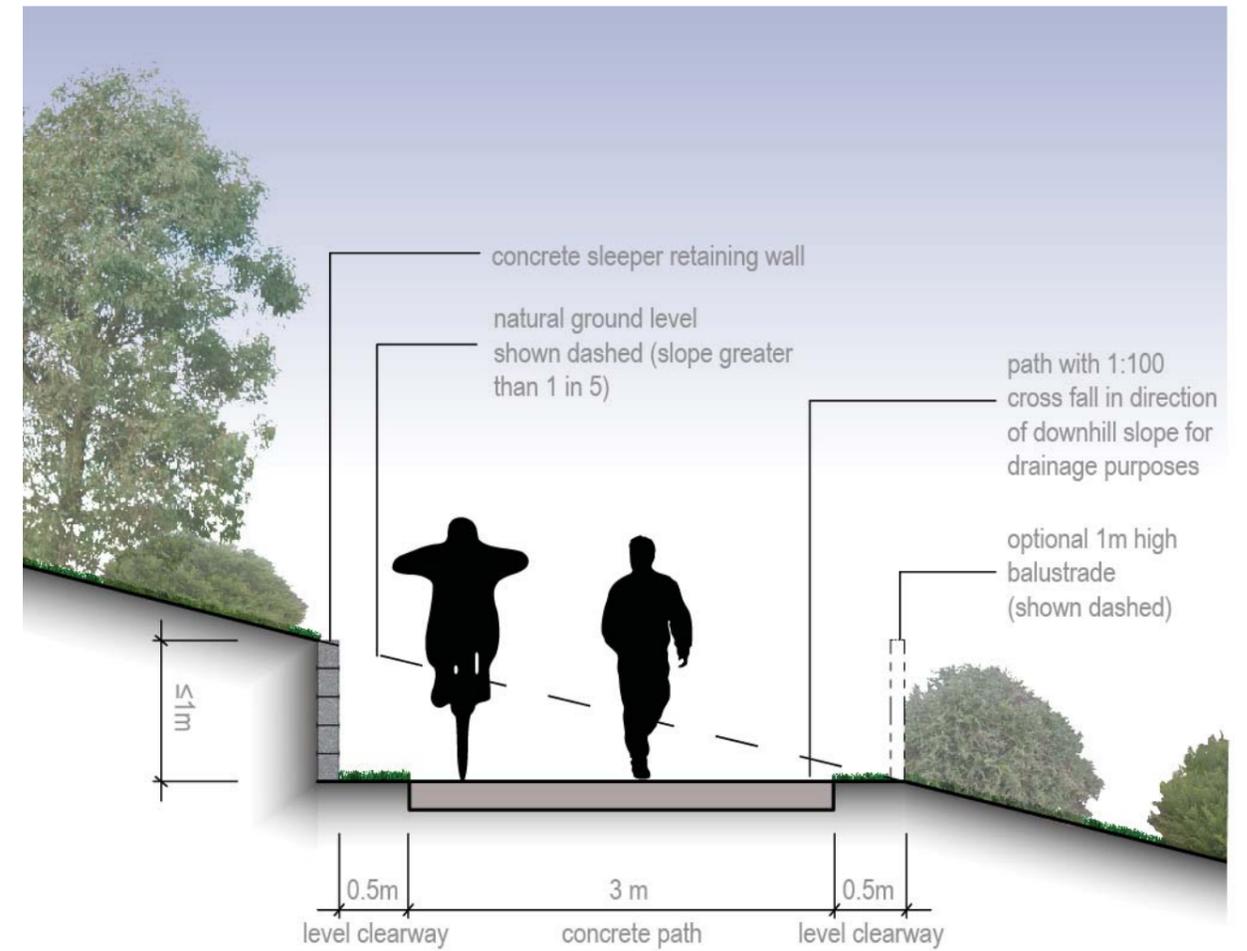


figure 90: concrete path section on slope greater than 1:5 (1:50 @ A3)

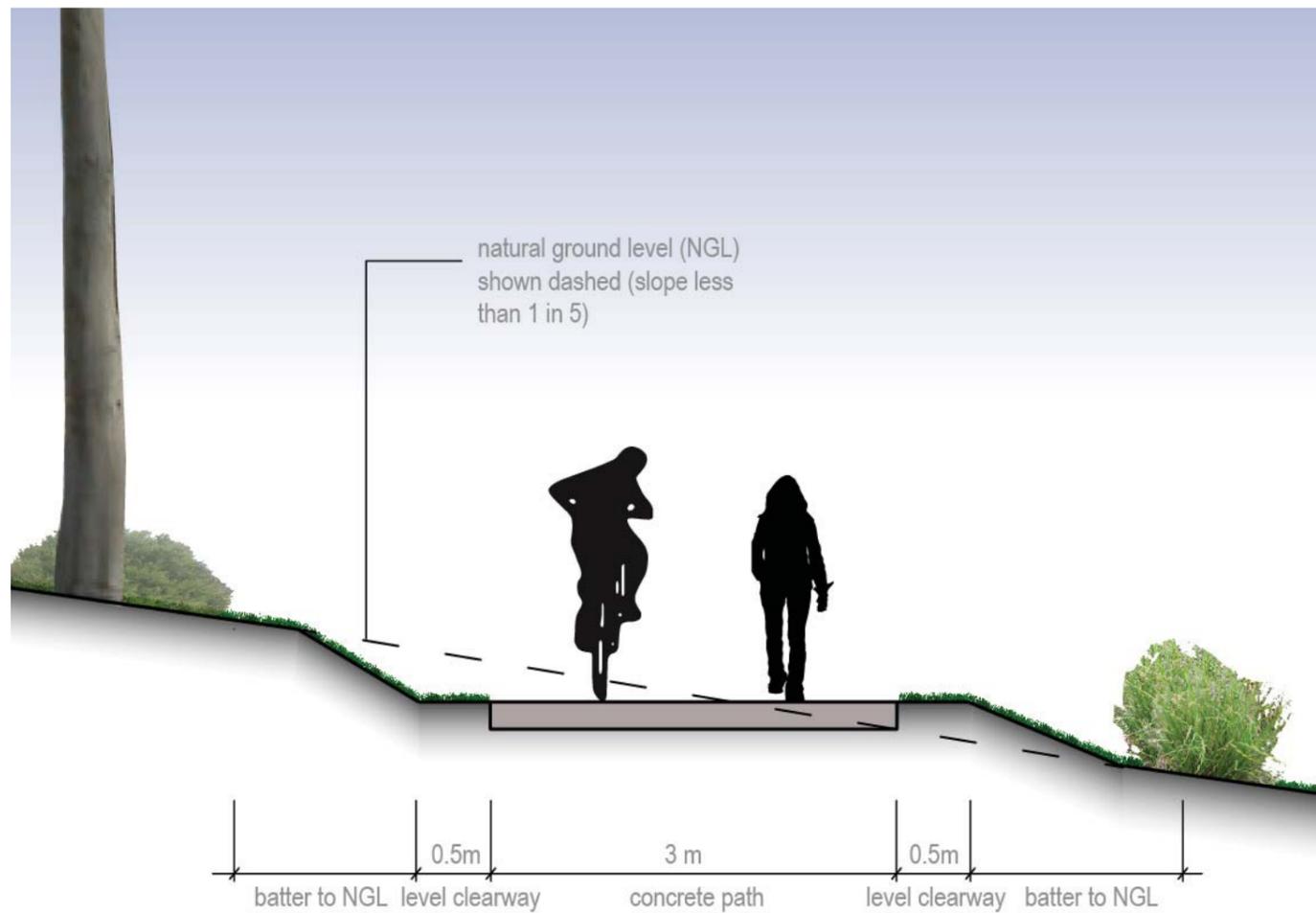


figure 91: concrete path section on slope less than 1:5 (1:50 @ A3)