

ATTACHMENT TO AGENDA ITEM

Ordinary Meeting

21 October 2014

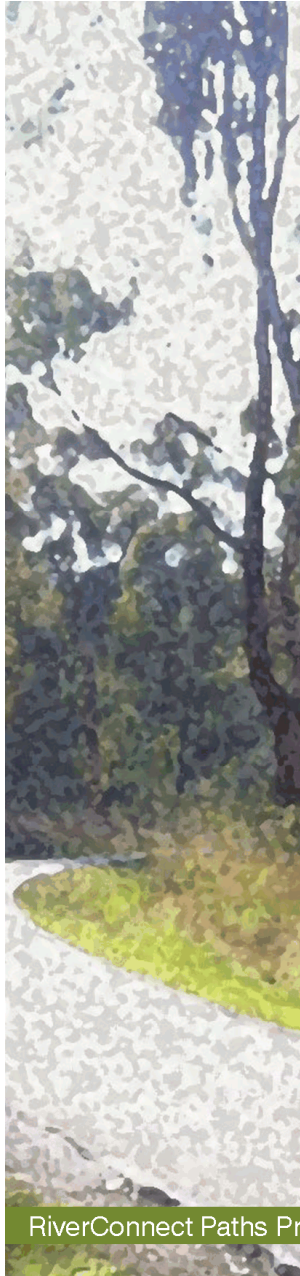
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RiverConnect Paths Master Plan

Draft 25 August 2014





This report has been prepared by Spiire for RiverConnect



144 Welsford Street Shepparton Victoria 3632

Acknowledgements

Spiire acknowledges the input of RiverConnect and City of Greater Shepparton staff and a range of stakeholders who contributed to this document.

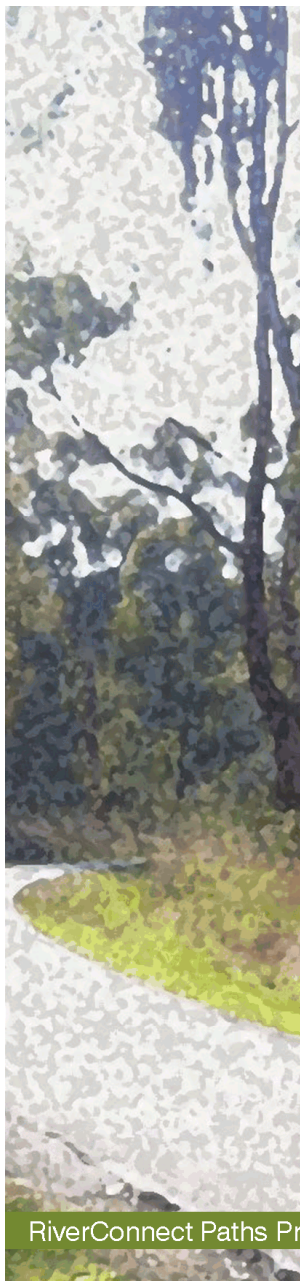
Issue Date	Revision No	Author	Checked	Approved
25 August 2014	Draft 2	FJS/FMS	FMS	SE
15 August 2014	Draft 1	FJS	SE	FMS

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Introduction

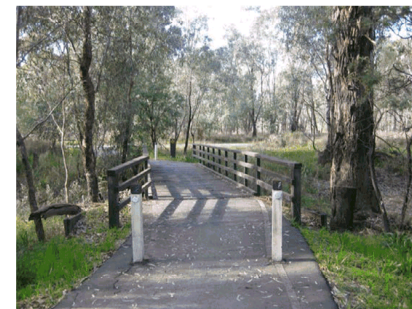
The regional settlements of Shepparton and Mooroopna are separated by the Goulburn and Broken Rivers and their surrounding floodplains, sandhills, wetlands and swamps. The Rivers sustain this community on multiple levels, yet in many ways the cities of Mooroopna and Shepparton 'turn away' from the rivers. Ironically the dense floodplain vegetation which provides such an environmental asset to the cities, also 'hides' the Rivers from view. This project provides the opportunity to not only physically connect people with the Rivers, the floodplains and each other, but just as importantly, provide a means for connecting people to an understanding of the culture and knowledge of this landscape through interpretive signage and information.

Through numerous plans and strategies, the Shepparton and Mooroopna communities have identified a desire for increased linkages between the twin cities and to establish a greater connectedness to each other and to the natural environment. Investigating the extension of the existing path network has become a priority for Greater Shepparton City Council under the auspice of the RiverConnect program. This project, the RiverConnect Paths Project Master Plan was conceived as a direct result of this priority.

The overall objective of the project, is to develop a master plan which meets community and local agency needs and expectations regarding connectedness and accessibility to the floodplain environments.

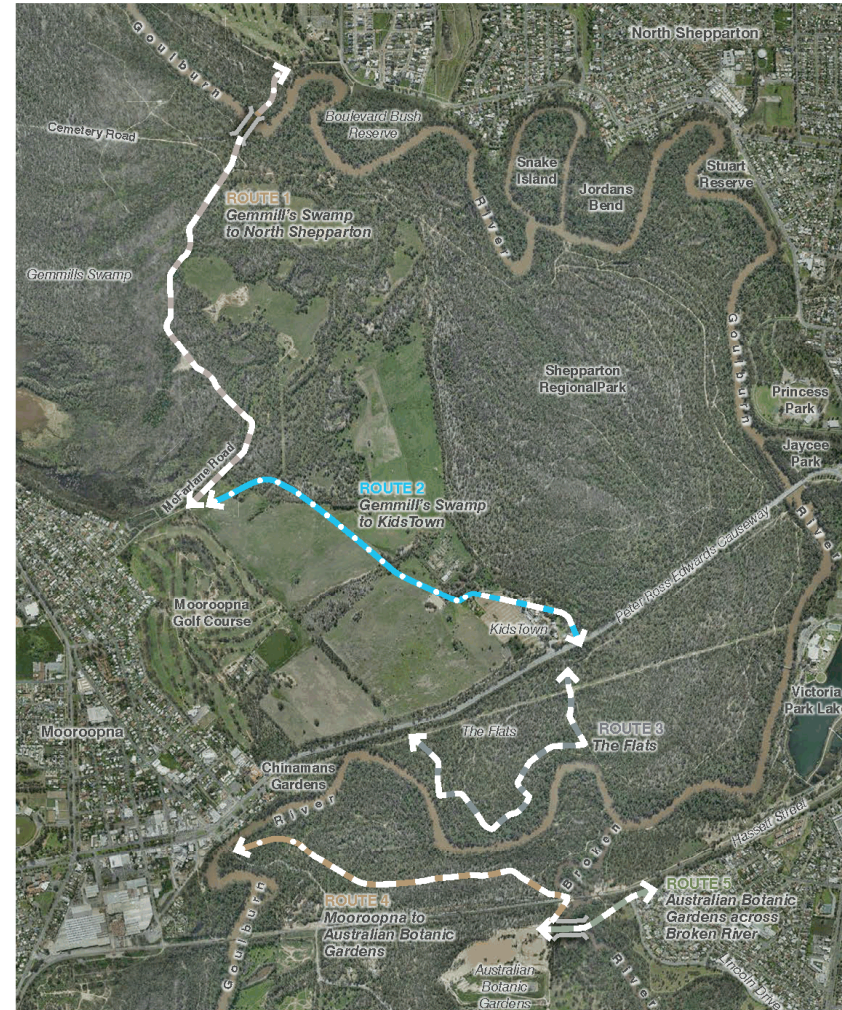
The specific objectives of the brief were:

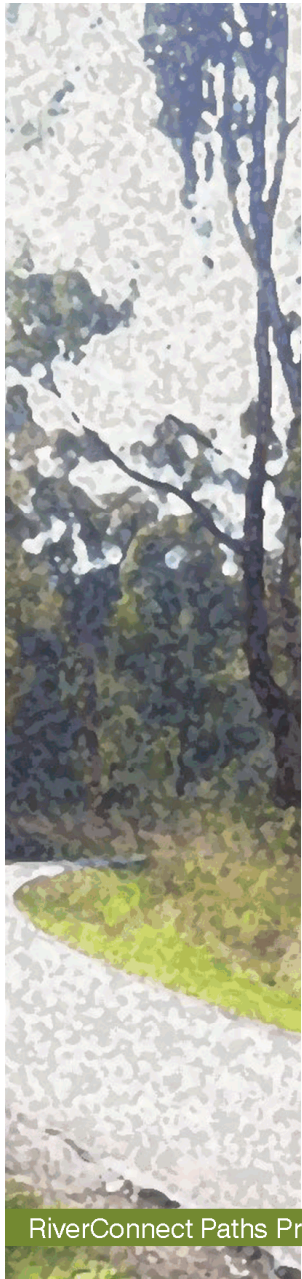
- > An increase in new and upgrades to existing infrastructure within the Shepparton Regional Park.
- > Provide a document for Council to use as a guide for implementing extensions to the existing path network.
- > An increased opportunity for a greater appreciation and understanding of the natural and cultural environments
- > An increased connectedness of communities within Shepparton and Mooroopna.
- > An increase in tourism opportunities.
- > Improved community wellbeing.



The following 5 preferred path routes were investigated:

- ROUTE 1** Gemmills Swamp to North Shepparton
- ROUTE 2** Gemmills Swamp to KidsTown
- ROUTE 3** The Flats
- ROUTE 4** Mooroopna to the Australian Botanic Gardens
- ROUTE 5** Australian Botanic Gardens across the Broken River





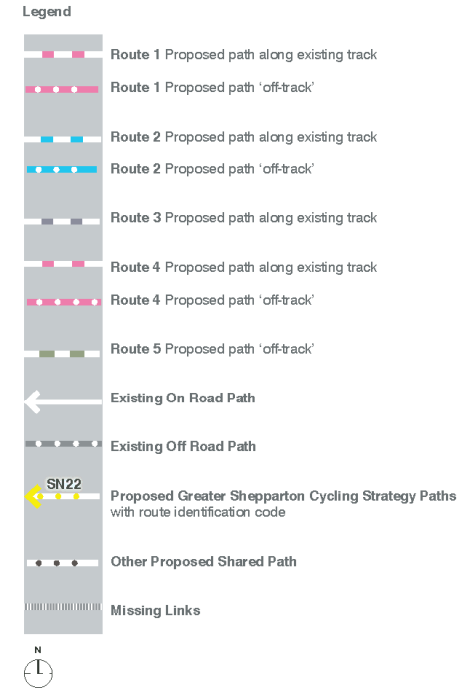
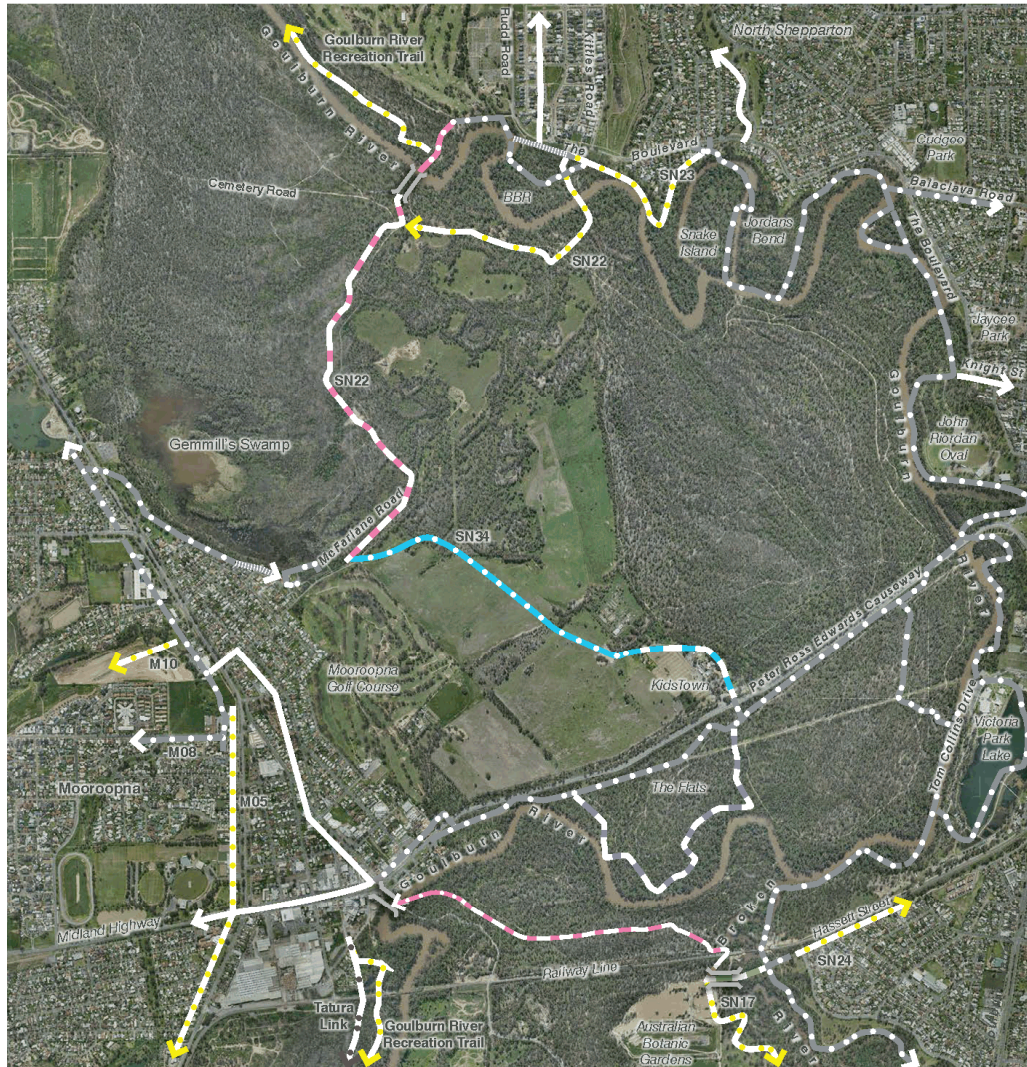
Network Connectivity

Two strategies are relevant to this project with regard to proposed path networks within Shepparton and Moorcoopna and the region beyond:

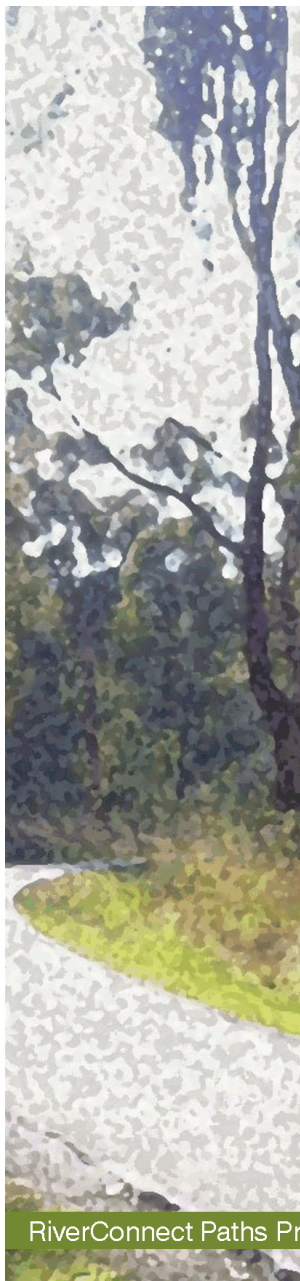
- > Greater Shepparton Cycling Strategy 2013-2017
- > Hume Region Significant Tracks and Trails Strategy 2013-2022

The adjoining plan illustrates how the preferred 5 routes interact with the existing and proposed path networks in Shepparton and Moorcoopna. Routes 1, 2 and 5 are identified proposed routes in the Greater Shepparton Cycling Strategy.





Network Connectivity 7



Issues & Opportunities

The first stage of the project involved research and evaluation in order to identify key issues and opportunities which will, in turn, inform the Draft Master Plan.

Issues and opportunities have been identified through a process of desktop review of existing strategy and policy, technical investigations, site analysis and stakeholder consultation.

The symbols contained on the issues and opportunities plans indicate the following:



Green - support for the project or opportunities.



Amber - issues to note or requiring further investigation.



Red - constraints to the project or issues of concern.

The following issues and opportunities apply to all of the routes under investigation:

Strategy & Policy

A desktop review of the relevant strategies and policies identified the following:

Relevant strategy plans, including the *Greater Shepparton Strategy Plan 2030*, *Council Plan 2013-2017*, *Greater Shepparton Environmental Sustainability Strategy (2013-2030)* and *Action Plan (2014-2017)*, *Mooroopna Community Plan (2010-2020)* and *RiverConnect Strategic Plan* generally support the notion of developing the shared path network between Shepparton and Mooroopna.

The strategies talk of an increased population for the Greater Shepparton area which is more self-sustaining, less reliant on fossil fuel and car use and a more active population which will prioritise walking and cycling networks.

The Goulburn Valley Wayfinding Strategy provides guidance with regard to locational, directional and identification signage across the municipality and beyond. Parks Victoria also has a suite of standard signage, some of which already exists in the Shepparton Regional Park. There is also a wide variety of other existing sign types throughout the area.

Heritage, Ecology, & Planning

Key specialists in ecology, archaeology and statutory planning have undertaken assessments and provided advice regarding any site constraints or issues. These specialist reports are contained in Appendices 1, 2 and 3.

The Cultural Heritage assessment did not identify any significant cultural materials during the survey. Artefact scatters and scar trees do, however, exist in some locations close to the proposed routes. A more detailed Cultural Heritage Management Plan is required for those locations where paths are proposed off existing tracks.

The ecological assessment advised that the proposed works were not likely to have a significant effect on threatened biodiversity. Detailed ecological assessment of the chosen river crossing locations was recommended, as was involvement of suitably qualified personnel when setting out the final alignments on site. Further, any native vegetation removal will require offsetting.

The works are generally exempt from a planning permit if the works are undertaken by Council and do not exceed the value of \$1,000,000 and if they do not involve the removal of native vegetation.

Management

The majority of the preferred routes are proposed within the Parks Victoria managed Shepparton Regional Park, therefore the issue of who will construct and maintain the proposed assets will need to be resolved. The routes also encroach on service corridors, land subject to flooding and the railway corridor and as such, approvals and permits will also be required from the various bodies and authorities in order to proceed with implementation.

Access to build and maintain the majority of these paths is also limited, due to the existence of established trees or the lack of access tracks.

Safety

The proposed works present real and perceived safety threats for people using the paths. Some sections of the routes are quite remote and isolated and people may feel unsafe using them. Flooding, bushfire and limb drop may also threaten public safety.

Strategy + Policy

- Greater Shepparton Strategy Plan 2030**
- Layout of municipality, including new residential areas and design of built form, will prioritise walking and cycling networks.
 - Less fuel use per head of population and a more active community.
 - Network of public open space extended into growth corridors and along rivers.

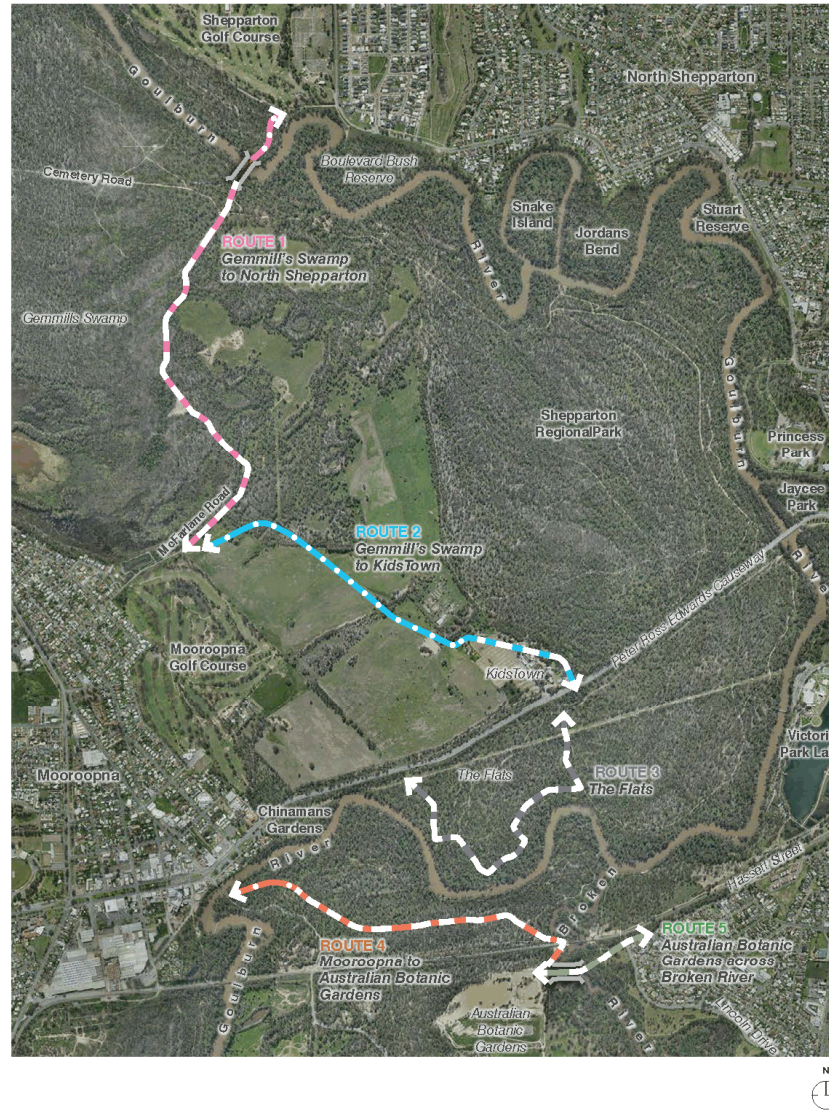
- Council Plan 2013-2017**
- 'Active and engaged community' – ensure liveability options are always considered in our decision-making activities.
 - 'Enhancing the environment' – ensure the environment is a major priority in planning for the future.
 - 'Quality infrastructure' – ensure the community has access to high quality facilities, including Australian Botanic Gardens and adoption and implementation of Greater Shepparton Cycling Strategy 2013-2017.

- Greater Shepparton Environmental Sustainability Strategy (2014-2030) and Action Plan (2014-2017)**
- A return to a more self-sustaining, resilient local communities, decreasing fossil fuel use and car use by developing infrastructure for walking and cycling.
 - Implement 75% of the Cycling Strategy's action within specified timeframes.
 - Provide funding for bicycle infrastructure projects above the Victorian rural Council average spend annually.
 - Utilising new communication methods eg social media and Quick Reference (QR) technology.

- Mooroopna Community Plan 2010-2020**
- More walking and bike track links, and seating along the river.
 - Riverside development including cultural and recreational tourism.

- Goulburn Valley Wayfinding Strategy**
- Identifies 4 no. signage types (wayfinding plinth, directional fingerboard, site identification and trail markers) as well as colour and material palettes.
 - Recommend minutes instead of distances are used for directional signs where relevant.
 - Parks Victoria signage vs Goulburn Valley Wayfinding signage.

- RiverConnect Strategic Plan**
- Shared path network expanded & improved river access.
 - Access to river edge upgraded & improved access for those with a disability.
 - Encouraging use via tours.
 - Improve disabled access: existing paths and bridges to be made wheelchair friendly.
 - Encourage use of facilities via access maps, tours, bike and/or canoe hire business, group activities.



Heritage

- No Aboriginal cultural material located during survey.
- Need complex CHMP where paths are proposed off existing tracks.

Ecology

- 2 fauna species identified (Brown Tree-creeper & Azure Kingfisher) are listed as Near Threatened in the FFG Act.
- No flora or fauna (including Endangered Ecological Communities) listed under the EPBC Act were identified throughout.
- The proposal is not likely to have a significant effect on threatened biodiversity.
- Detailed ecological assessment of the chosen river crossing locations should be undertaken.
- Involvement of suitably qualified personnel is also encouraged during placement of the final alignment through 'off-track' areas.

Safety

- High risk bushfire and area.
- Limb drop area.
- Remote and isolated location.
- Area subject to flooding.

Planning

- All routes are exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000, otherwise a planning permit is required.
- Planning permit is required if the works require native vegetation removal.

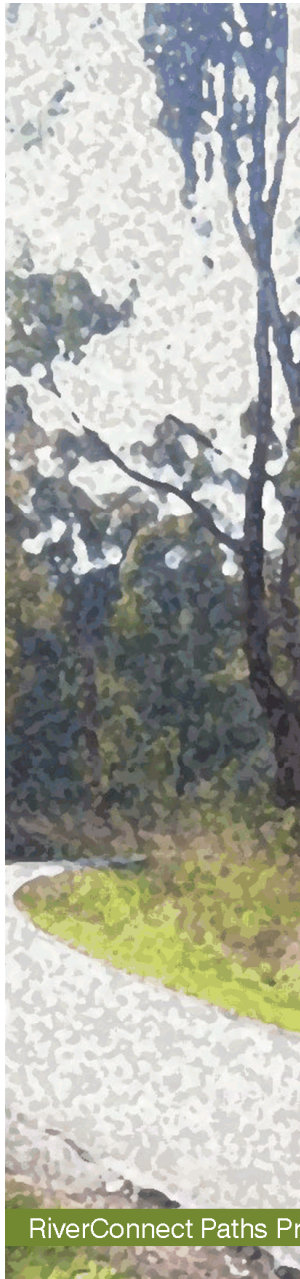
Management

- Service authority (GV Water – town water supply and sewer, Powercor – elec, CFA, APA – gas, Telstra/NBN) approvals for locations where the paths or related structures encroach on service corridors.
- CMA approvals for paths or related structures to be located in areas subject to inundation.
- Meet any CMA requirements for bridge structures at river crossings.
- Geotechnical investigations for major structures (river crossings).
- Vic Track approvals for areas where paths or related structures encroach on rail corridor.
- Parks Victoria approvals and agreements required for path implementation and maintenance requirements.

Legend

- | | | | |
|--|-------------------|--|-------------------|
| | Route 1 on track | | Route 3 on track |
| | Route 1 off-track | | Route 4 on track |
| | Route 2 on track | | Route 4 off-track |
| | Route 2 off-track | | Route 5 off-track |





Route 1: Gemmill's Swamp to North Shepparton

The issues and opportunities of Route 1 are summarised on the adjoining page.

The photos on this page illustrate the existing site conditions along the route.



Strategy + Policy

Greater Shepparton Cycling Strategy

- Route 1 is an identified proposed route in the Greater Shepparton Cycling Strategy.

Gemmill's Swamp Wildlife Reserve Masterplan 2005

- Controlled access is required at the intersection of the shared trail. Shared trail and maintenance access only for habitat values protection.
- Shared trail improvements – granitic gravel path with interpretive signage creating a link around the swamp.

RiverConnect Boulevard Property Masterplan

- Location of City of Greater Shepparton 3.0m sealed shared path shown to east of Boulevard Bushland Reserve adjacent to car park and linking to shared path system.

RiverConnect Strategic Plan

- Northern Shared path network connection from Mooroopna to Shepparton Weir area, including a bridge over the Goulburn River

Engineering

- Cemetery and McFarlane Roads are designated roads - closure or cross sections must incorporate both pedestrians and vehicles.

Management

- Parks Victoria to upgrade Cemetery Road to fire access track.
- Non-designated roads to remain accessible by vehicles.
- Who will construct and maintain path in Parks Victoria managed land?



Ecology

- Soils in the northern section along Cemetery Road are highly erodible and dominated by sandy loam. Consider developing an Erosion & Sediment Control Plan - as the probability of intensified flow resulting in erosion in these environments is very high.

Heritage

- A section is off existing track and a complex assessment is required to identify any sites of potential cultural sensitivity.
- 5 no. Artefact Scatters have been identified within specified distance of the path.
- 1 no. Scarred tree has been identified within specified distance of the path.

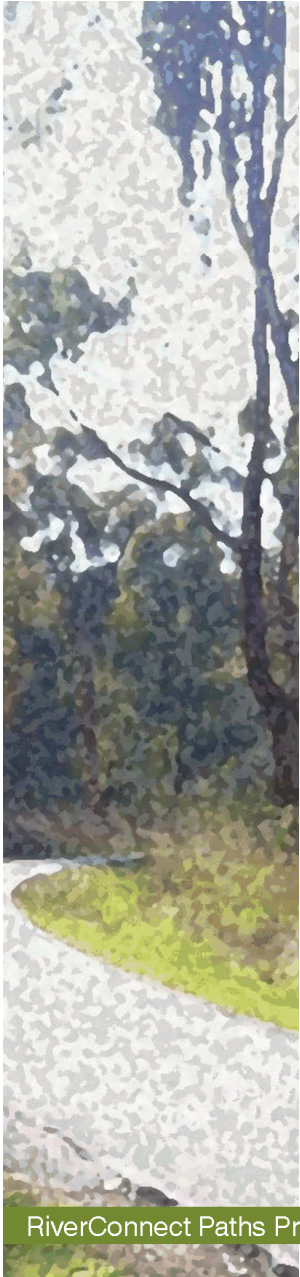
Planning

- Zones - Urban Floodway + Farming
- Overlays - Bushfire Management
- Permit required, unless otherwise exempt under clause 62.02-2.

Stakeholder Response

- Create a loop around Gemmill Swamp and links North Shepp to Mooroopna.
- Potential for sharing of cultural stories.
- Potential for shorter section across the Shepparton weir.
- Natural values of BBR and Gemmill Swamp to be protected/enhanced.
- Public safety - snakes
- Uncontrolled vehicle access
- Location & cost of building a crossing?
- Pest animals crossing the river
- Access vs private ownership
- Native vegetation impacts (eg fragmentation)
- Need to go around swamp to Jim Douglass Park to complete the North Mooroopna link
- Weeds being spread
- Short term impact of machinery on the environment
- Rubbish
- Vehicle vs pedestrian conflicts
- Parking requirements
- Consider impact on BBR
- Should have a shared path south of golf club boundary





Route 2: Gemmill's Swamp to KidsTown

The issues and opportunities of Route 2 are summarised on the adjoining page.

The photos on this page illustrate the existing site conditions along the route.



Strategy + Policy

Mooroopna Community Plan 2010-2020

- The community of Mooroopna would like to see Gemmill Swamp developed and a boardwalk installed from the Swamp to Kidstown and linking to Shepparton. Gemmill Swamp walkway and signage was identified as a priority/quick win.

RiverConnect Strategic Plan

- Kidstown to Gemmill Swamp shared path network connection identified.

- 1 Extend historic trail to other points of Aboriginal history at Daish's and Sandhills area (McFarlane Rd).

Greater Shepparton Cycling Strategy

- Route 2 is an identified proposed route in the Greater Shepparton Cycling Strategy.

Greater Shepparton Environmental Sustainability Strategy (2014-2030) and Action Plan (2014-2017)

- Utilising new communication methods QR codes at Gemmill Swamp bioremediation wetland to provide 24/7 online resources.

Engineering

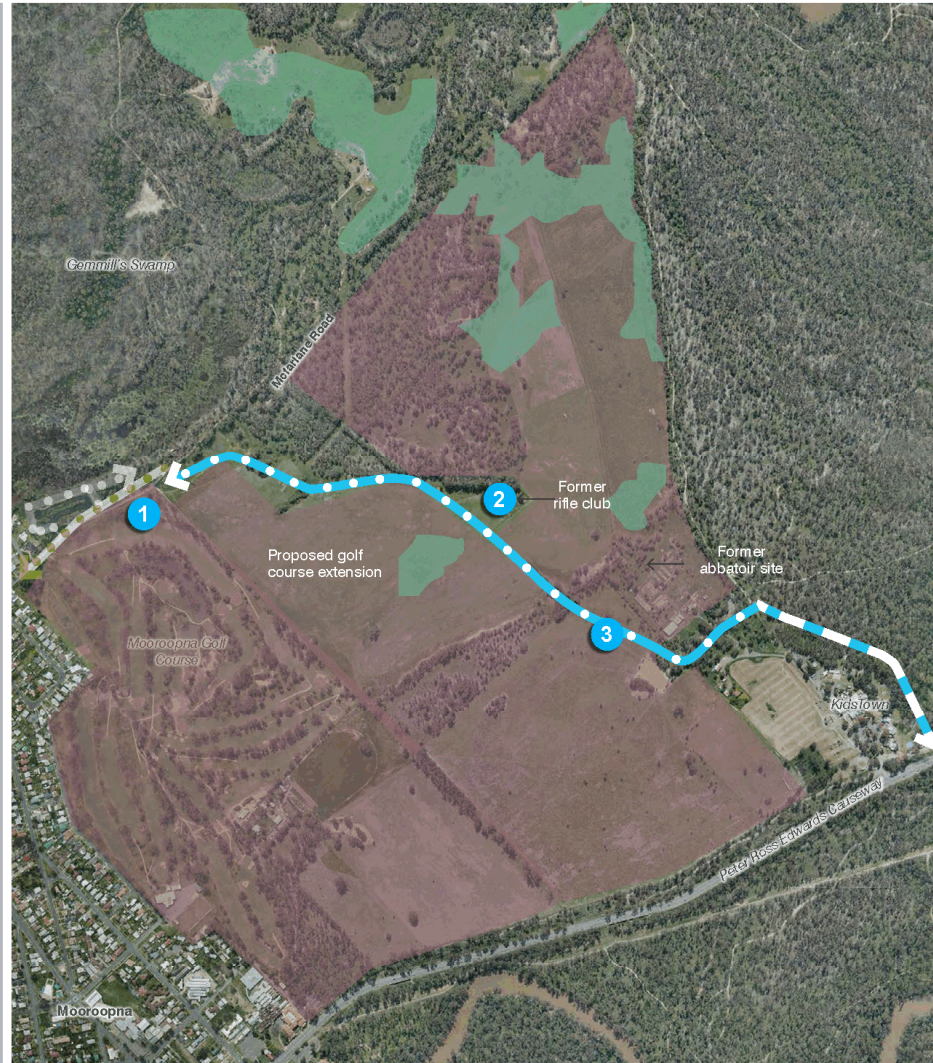
- Cemetery and McFarlane Roads are designated roads - closure or cross sections must incorporate both pedestrians and vehicles.
- 2 There is a high level of lead in the soil which is above acceptable tolerances. This is adjacent to an old rifle range bund. A more detailed investigation is required.

Ecology

- A section is off the existing track, thus an Ecologist or suitably qualified personnel be engaged to flag tape the final alignment.

Heritage

- A section is off the existing track a complex assessment is required.
- 2 no. Artefact Scatters have been identified within specified distance of the path.



Planning

- Zones - Urban Floodway + Farming
- Overlays - Bushfire Management + Land Subject to Inundation
- Permit required, unless otherwise exempt under clause 62.02-2.
- 3 Section of proposed route across private land.

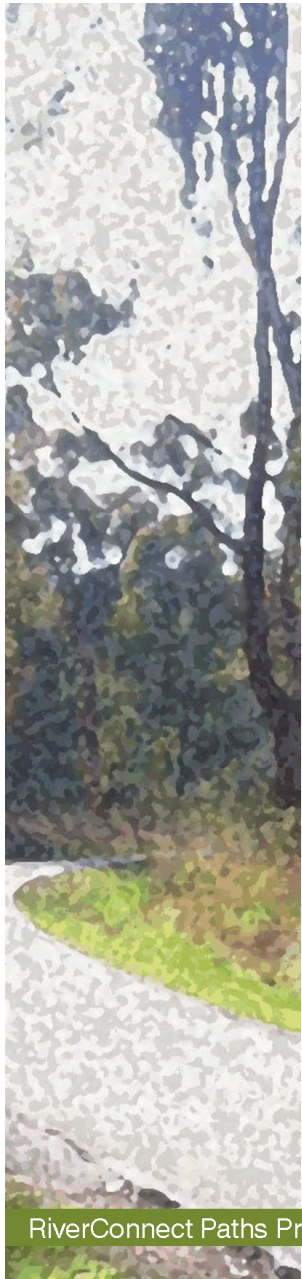
Safety

- Proposed route is adjacent to proposed golf course extension.
- Former rifle club contains high levels of lead.

Community Response

- Connection of growth corridor to Kidstown
- Tourist walks from Kidstown
- Link to bioremediation wetland at Gemmill Swamp
- Opportunity for historical information (eg Cobb and Co, indigenous, rifle range, etc)
- Biodiversity link/corridor with native veg enhancement
- This route is the easiest stretch – used by bike groups, families
- Maintenance issues
- Weed infestation
- Land acquisition/agreement necessary – easement, Private property issues
- Vehicular vs pedestrian issues





Route 3: The Flats

The issues and opportunities of Route 3 are summarised on the adjoining page.

The photos on this page illustrate the existing site conditions along the route.



Strategy + Policy

Mooroopna Community Plan 2010-2020

- Interest in providing interpretive signage to better inform history and significance of 'The Flats' between Shepparton and Mooroopna.

RiverConnect Strategic Plan

- Development of a trail of Aboriginal history at 'The Flats'.
- Design and construct access path network for 'The Flats' area with appropriate interpretive signage to detail Aboriginal habitation on 'The Flats'.
- Improving river access with tracks, parking and signage at 'The Flats'.

Management

- Surface and cross-section of path?
- Type of path?
- Extent of interpretive signage?
- Clear directional signage required due to numerous tracks.
- Who will construct and maintain path in Parks Victoria managed land?

Heritage

- 1 no. Scarred Tree and 1 no. Artefact Scatter have been identified within specified distance of the path.

Planning

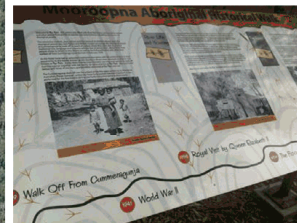
- Zones - Urban Floodway
- Overlays - Bushfire Management
- Permit required, unless otherwise exempt under clause 62.02-2



Community Response

- Already existing so cheap to upgrade
- Culturally significant / historic
- Education and tourism opportunities (e.g. educational walk)
- Close to Kidstown – achievable walk
- Ecological diversity
- Funding from Rumbalara/YYN – have them fully involved and take ownership

- Permission and possible issues relating to indigenous cultural heritage
- Some families living near Goulburn River adjacent to Tom Collins Drive
- Need to minimize disturbance.





Route 4: Mooroopna to the Australian Botanic Gardens

The issues and opportunities of Route 4 are summarised on the adjoining page.

The photos on this page illustrate the existing site conditions along the route.



Strategy + Policy

RiverConnect Strategic Plan

- Identified southern shared path network connection from Mooroopna to Kialla Landfill (Australian Botanic Gardens) and connecting to Shepparton path network

Ecology

- 1** The terrain east of the Watts road bridge is difficult and includes several secondary 'runners' that drain the floodplain post flood. The shared path is to be therefore located adjacent to the roadside verge of Watts Road.

Engineering

- Track is currently much lower than its surrounds and crosses heavy black to grey cracking clays - will need to be built up such that it is higher than the surrounding floodplain.
- Design of path to consider flood flows and should be designed with a definite 'crown' to facilitate movement of overland flow away from the alignment.
- Proposed upgrade of Watt Road bridge.

Safety

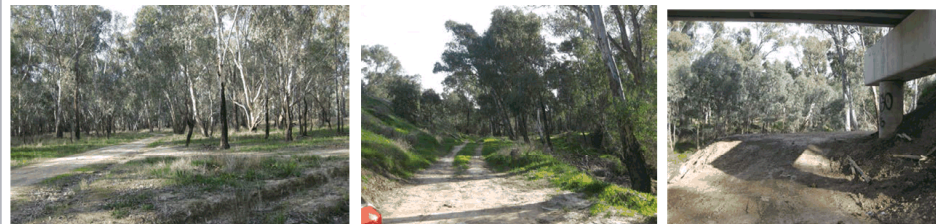
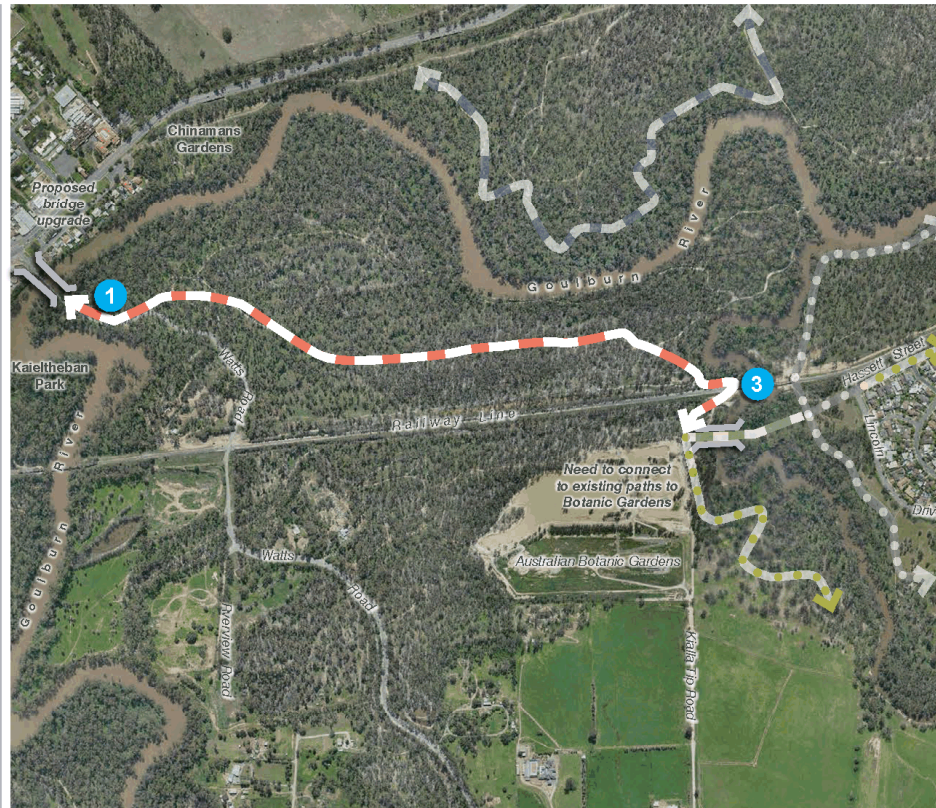
- 3** Passing under the existing Rail Bridge over the Goulburn River is potentially a safety concern that will need to be addressed. The bridge abutments and worked bank below the existing track is scouring, slumping and prone to mass failure if corrective works are not undertaken in the near future.

Planning

- Zones - Urban Floodway + Public Use Zone 4
- Overlays - Bushfire Management
- Permit required for works within Public Use Zone

Management

- Non-designated roads to remain accessible by vehicles.
- Who will construct and maintain path in Parks Victoria managed land?



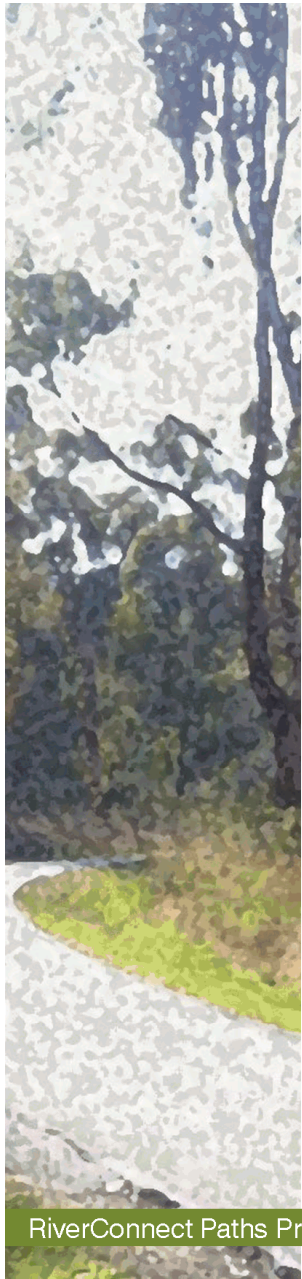
Heritage

- A section of the proposed route is off the existing track a complex assessment is required

Community Response

- Link Kialla to Mooroopna via Botanic Gardens
- Options for commuting by bike to work
- Enhance aesthetic values of Broken River
- Opportunity for educational materials to direct to Botanic Gardens
- Straight off road as soon as the bridge is crossed
- Can avoid bridge in first stage and go through to Melbourne Road from Botanic Gardens path
- Path goes past Chinese Gardens
- Retain Kialla Landfill to Melbourne Road path
- Prefer for path to be 'shared path' to make bike loop
- Crossing with cars may be issue at Bridge at Watts Road
- Track south of Broken may be unnecessary if already existing on north side of Broken River
- Flooding
- Lack of visual amenity - litter, dumped rubbish - no aesthetic value from Kialla landfill to Melbourne Road
- Big gullies on Kialla / Melbourne Road track near Botanic Gardens
- Vehicles use the tracks create ruts, hazards - might need basic vehicle track separated from shared path
- Potential for damage to environment / good quality vegetation along Broken River
- Hazards along McLennan St in front of hospital - needs to be on other side of road
- Needs to swing directly off road after crossing Mooroopna bridge
- Consider area west of Watt Rd in the future
- Should be a future shared path along Kialla Tip Road to connect to Forest Drive etc.





**Route 5: Australian Botanic Gardens
across the Broken River**

The issues and opportunities of Route 5 are summarised on the adjoining page.

The photos on this page illustrate the existing site conditions along the route.



Strategy + Policy



RiverConnect Strategic Plan

- Improving river access (including wheelchair suitable access) with tracks, parking and signage at Lincoln Drive.



Greater Shepparton Cycling Strategy

- Route 5 is an identified proposed route in the Greater Shepparton Cycling Strategy.



Ecology

- Further investigation required of precise bridge crossing.



Heritage

- A section of the proposed route is off the existing track, a complex assessment is required.



Engineering

- Height of the bridge/construction methods
- CMA approval required.



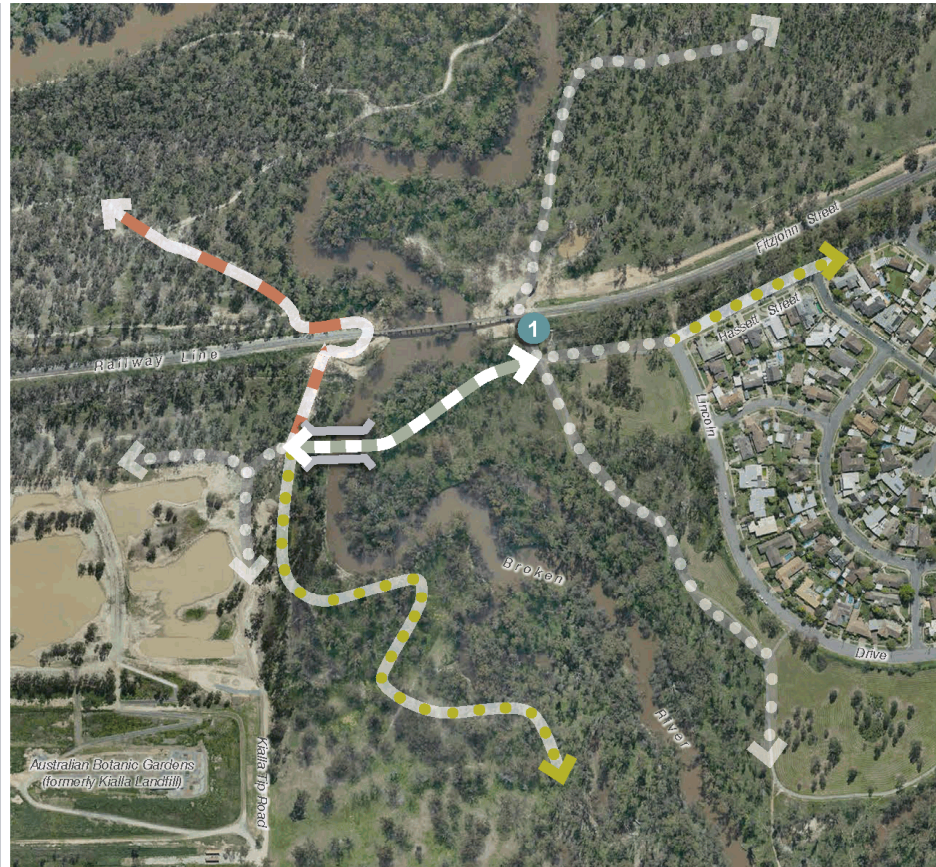
Management

- Who will construct and maintain path and bridge in Parks Victoria managed land?



Planning

- Zones - Urban Floodway
- Overlays - Bushfire Management
- Permit required, unless otherwise exempt under clause 62.02-2



Community Response

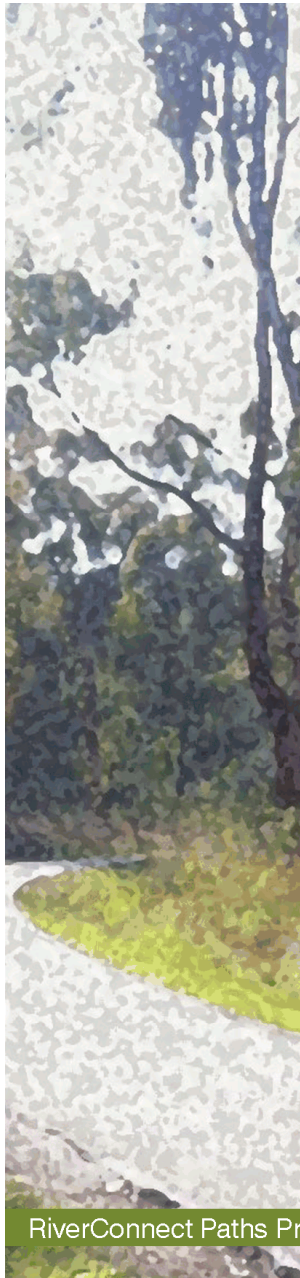


- Link between Shepparton and Mooroopna
- Loop or circuit from Mooroopna
- Australian Botanic Gardens
- Some value in viewing pristine Broken River from both sides



- Environmental issue of tree removal
- Cost of pedestrian bridge
- Doesn't service Shepparton and Mooroopna
- Kialla Tip Road – gate not always open
- Mooroopna Kiwanis wants to be part of the development of the path to Botanic Gardens
- Consider bike hire for people to do the loop
- Parking and signage at Lincoln Drive





Proposed Path Typologies

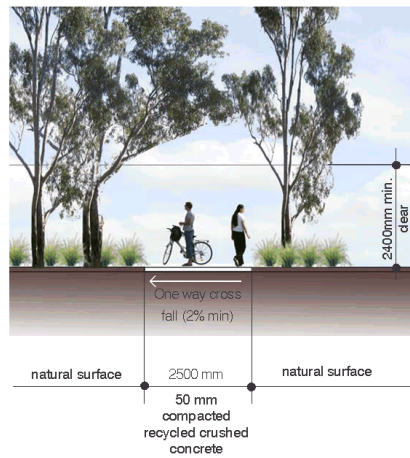
As a result of the RiverConnect Paths Focus Group consultation process, four different path types have been proposed for the shared path extensions. These are illustrated and described in the following illustrative cross sections.

Recreational Path

A 2.5 m wide unsealed path in accordance with the City of Greater Shepparton's 'Typical Recreational Path Cross Section' (refer Appendix 4).



legend symbol on master plans

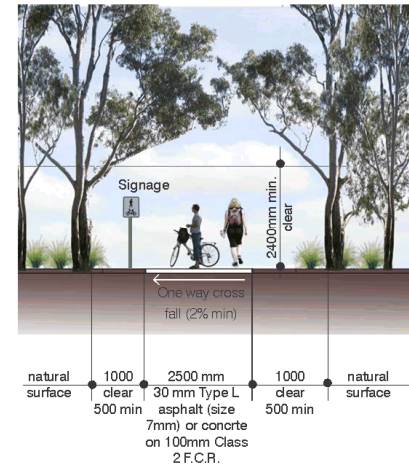


Shared Path

A 2.5 m wide sealed shared path in accordance with the City of Greater Shepparton's 'Typical Shared Path Cross Section' (refer Appendix 4).

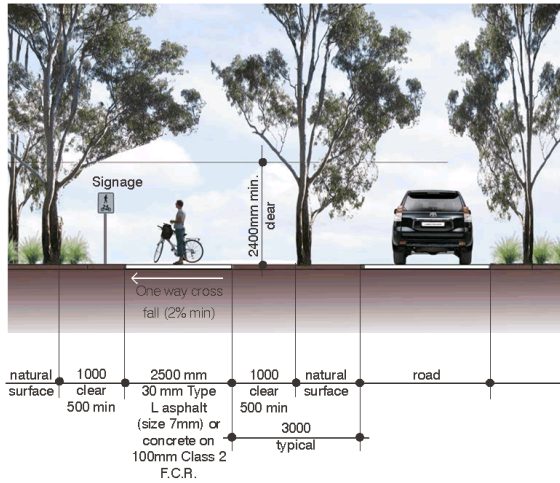


legend symbol on master plans



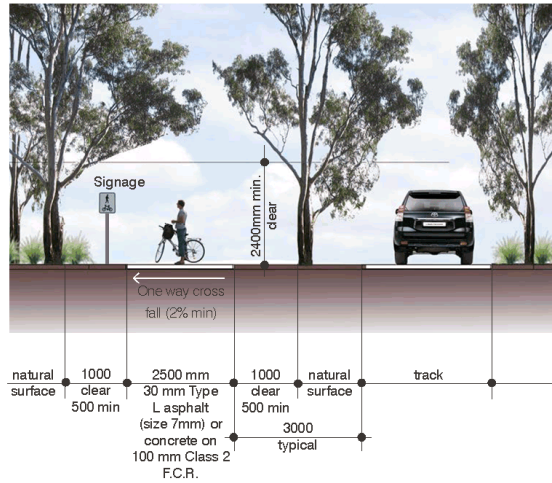
Shared Path adjacent to existing road

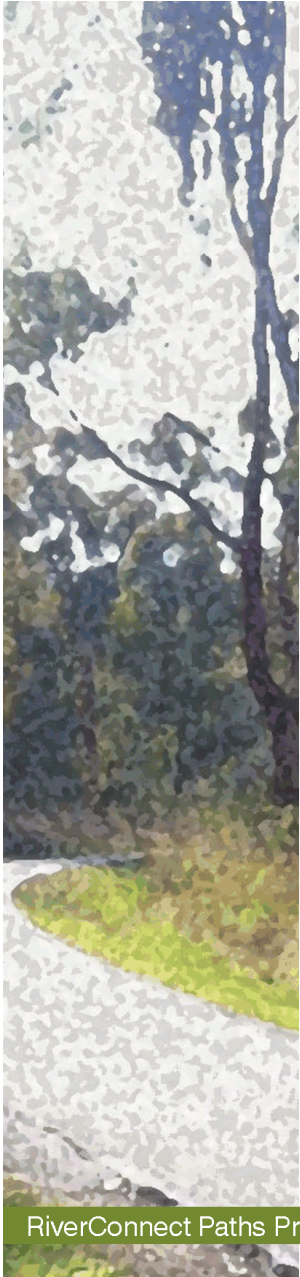
A 2.5 m wide sealed shared path in accordance with the City of Greater Shepparton's 'Typical Shared Path Cross Section' (refer Appendix 4) located adjacent to designated roads.



Shared Path adjacent to existing 'track'

A 2.5 m wide sealed shared path in accordance with the City of Greater Shepparton's 'Typical Shared Path Cross Section' (refer Appendix 4) located adjacent to access tracks.





Proposed Signage Strategy

Signage is an important part of shared path experience, as it will assist users with way-finding and interpretive information.

The 'Goulburn Valley Wayfinding Strategy - Style Guidelines' details a suite of signs to be used across the City of Greater Shepparton. It is recommended that the RiverConnect Paths Project utilise this suite of signage, but incorporating the RiverConnect logo, to provide consistency and to differentiate the Council managed paths and assets as different to the Parks Victoria or Catchment Management Authority signage.

Road safety signage should also be considered during detailed design of any paths, particularly where vehicles, pedestrian and cyclists interface with one another.

Actions for Implementation:

- > Confirm the use of the 'Goulburn Valley Way-Finding Strategy' suite of signs.
- > Rationalise or remove any existing signage which creates visual clutter and does not fit with the adopted signage for RiverConnect.
- > Co-ordinate with Parks Victoria with regard to signage upgrades and locations within Shepparton Regional Park.



Images of existing signage within Shepparton Regional Park and surrounds



Signage Types and Purpose



Wayfinding plinth

- > Located at key entries to and exits from the shared path network.
- > Includes a map of the route and connections, "you are here" reference, walking and/or cycling distances (in minutes) to key destinations and iconography (e.g no bardi grubbing, no dumping of rubbish, carry out rubbish, etc).



Directional signage

- > Located where shared paths and other designated shared and recreational paths intersect.
- > Provides directional information and minutes to destination at key nodal decision points.



Trail Marker

- > Located at key locations for reassurance along the shared path network.
- > Provides walking and/or cycling minutes to destination along route.
- > Must be clear and comprehensible from both approaches.

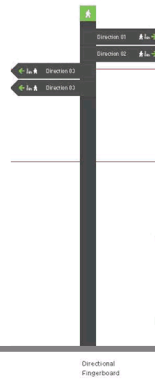


Interpretive signage

- > Located at key points of interest along the shared path network where appropriate, such as Aboriginal or European heritage and natural heritage or processes.
- > Materials and form could match other wayfinding signage types, where appropriate, to visually unify the RiverConnect stories and also assist with way-finding.



Wayfinding Plinth Front Side Back



Directional Fingerboard

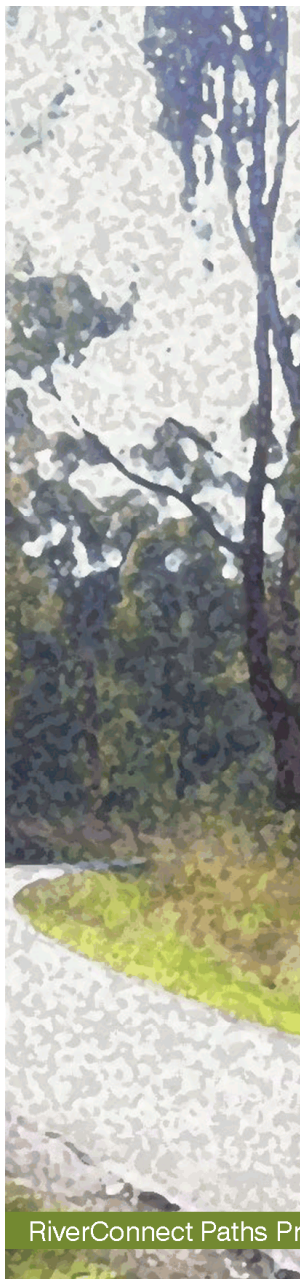


Trail Marker Front Side Back



Images of existing interpretive signage at 'The Flats' path.

Graphic images taken from the City of Greater Shepparton 'Goulburn Valley Wayfinding Strategy - Style Guidelines', 2013



Strategies for Implementation

The following section of this master plan details each route plan and the next steps required to implement each of the preferred routes and the anticipated order of cost associated with this implementation. Where relevant, the possible staging of these paths is also discussed.

Across all routes the following actions should be taken, prior to proceeding with the implementation of any one route.

- > Undertake community consultation to determine community support for the preferred routes and their preferred priorities for implementation.
- > Consult with Parks Victoria to determine how to manage the construction and maintenance of Council assets (paths, signs and seating) within the Shepparton Regional Park.
- > Confirm the use of the 'Goulburn Valley Way-Finding Strategy' suite of signs.

Note that the anticipated order of costs do not include the cost of native vegetation removal offsets or any internal Council costs.

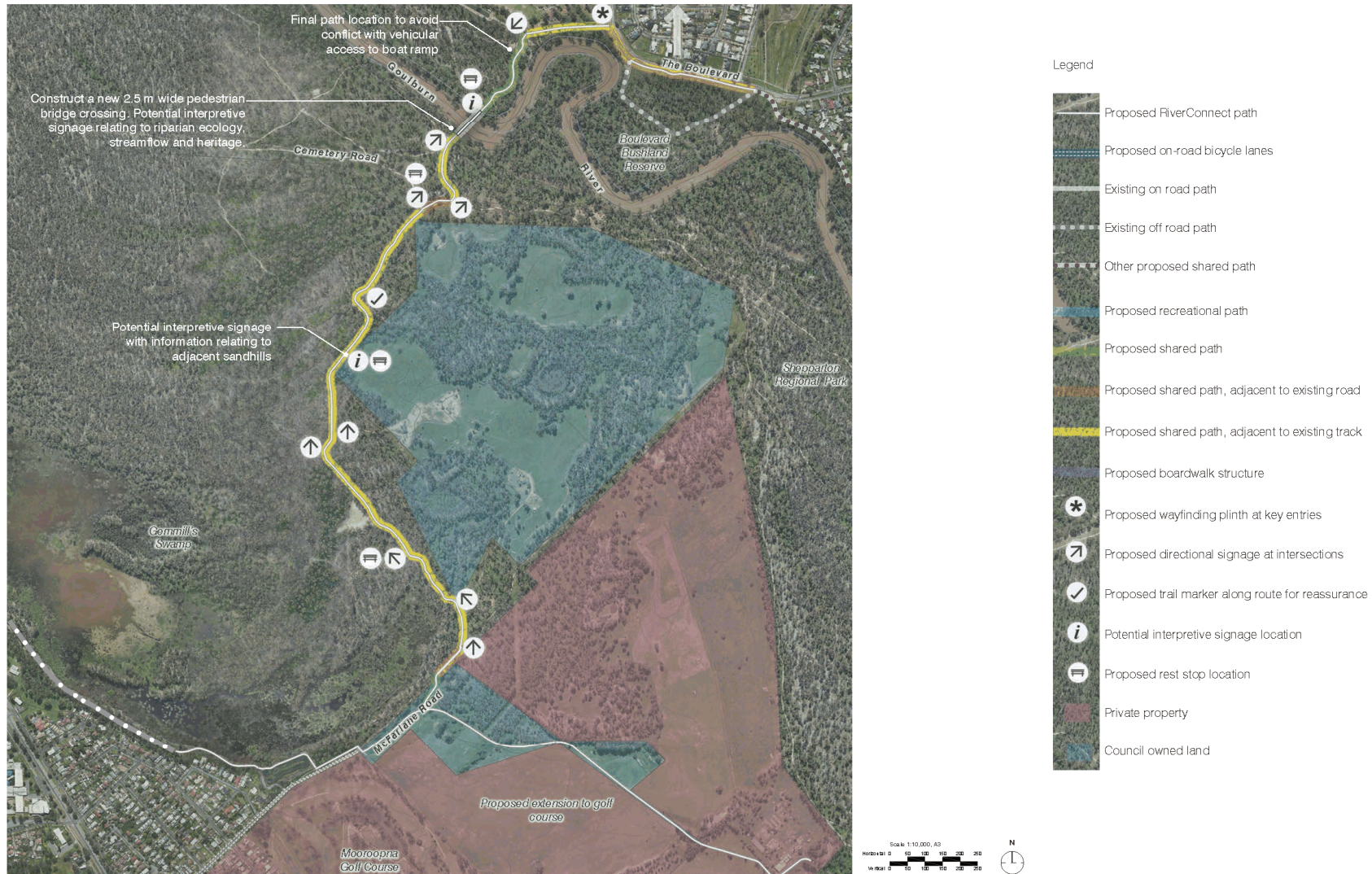
Route 1 Gemmill's Swamp to North Shepparton

The adjoining plan illustrates the proposed works associated with preferred route 1 and the table below details the actions required to implement these works.

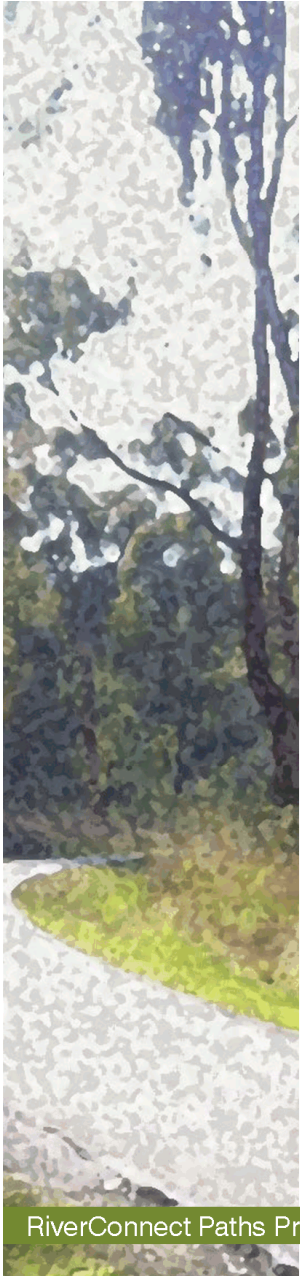
Action	Anticipated order of cost
PRE-CONSTRUCTION ACTIVITIES	
1 Seek permits and approvals from the relevant authorities, such as Parks Victoria and the CMA to undertake the path and Goulburn River pedestrian bridge works.	\$5,000
2 Undertake feature and level survey for route corridor.	\$25,000
3 Complete Complex Cultural Heritage Master Plan for all works proposed through undisturbed areas.	\$20,000
4 Undertake detailed flora and fauna investigation.	\$10,000
5 Undertake geotechnical investigations to enable pavement and structure design.	\$15,000
6 Design and document the works.	\$60,000
7 Obtain planning permit.	\$5,000
CONSTRUCTION ACTIVITIES	
8 Construct path and pedestrian bridge.	\$1,200,000
9 Construct signage and seating.	\$35,000
	\$1,375,000

Route 1 could be constructed in the following stages:

- > Proposed shared path adjacent to The Boulevard.
- > Proposed shared path adjacent to golf course access track extended to location of river crossing.
- > Proposed river crossing.
- > Proposed shared path adjacent to Shepparton Regional Park access track and McFarlane Road extending to intersection with Route 2.



Route 1 Gemmill's Swamp to North Shepparton Master Plan 25



RiverConnect Paths Project Master Plan

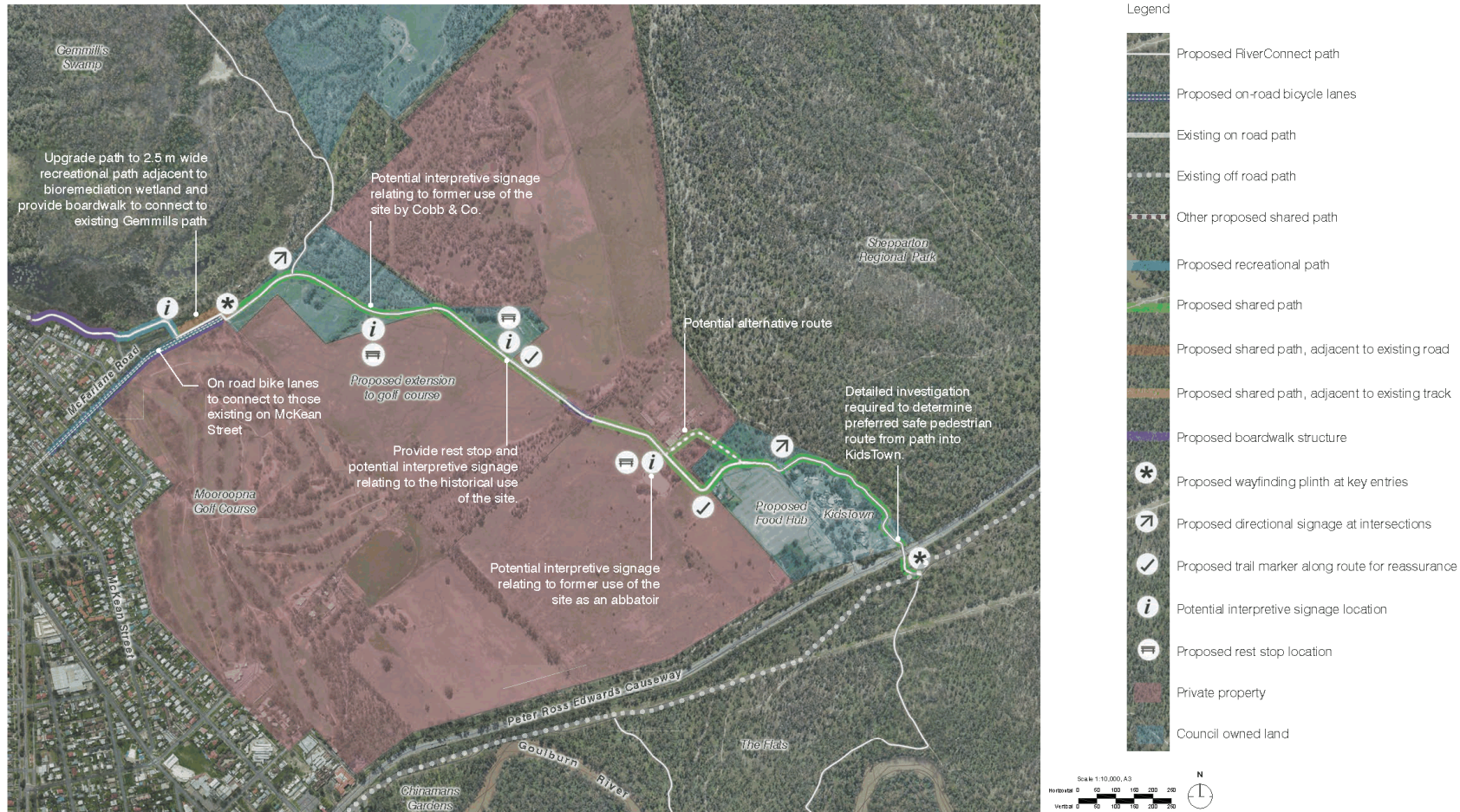
Route 2 Gemmill’s Swamp to KidsTown

The adjoining plan illustrates the proposed works associated with preferred route 2 and the table below details the actions required to implement these works.

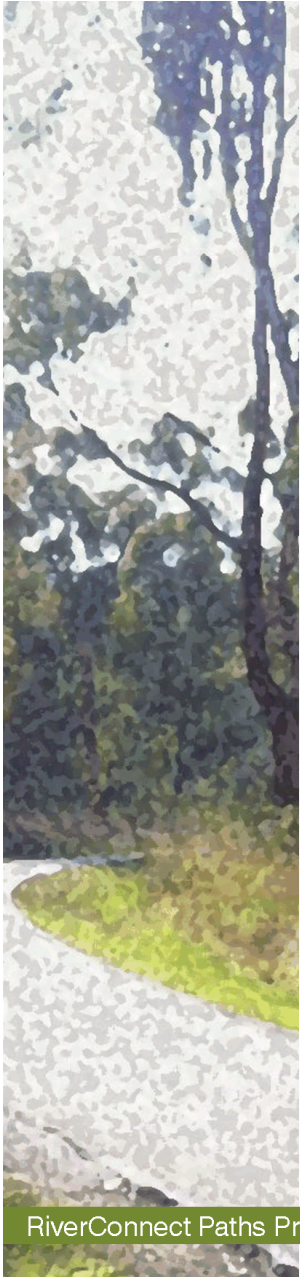
Actions	<i>Anticipated order of cost</i>
PRE-CONSTRUCTION ACTIVITIES	
1 Seek permits and approvals from the relevant authorities, such as Parks Victoria to undertake the path works adjacent to Gemmill’s Swamp.	\$5,000
2 Determine extent of private land required for acquisition/transfer to Council.	TBD
3 Undertake further soil testing to determine extent of contaminated land.	\$10,000
4 Undertake feature and level survey for route corridor.	\$20,000
5 Complete Complex Cultural Heritage Master Plan for all works proposed through undisturbed areas.	\$10,000
6 Undertake detailed flora and fauna investigation.	\$5,000
7 Undertake geotechnical investigations to enable pavement and structure design.	\$10,000
8 Design and document the works.	\$25,000
9 Obtain planning permit.	\$5,000
CONSTRUCTION ACTIVITIES	
10 Undertake site remediation works.	TBD
11 Construct path and structures.	\$350,000
12 Construct signage and seating.	\$35,000
	\$475,000

Route 2 could be constructed in the following stages:

- > Proposed shared path adjacent to Kidstown.
- > Proposed boardwalk adjacent to Gemmill’s Swamp.
- > Upgrade of path adjacent to Gemmill’s Swamp bioremediation wetland.
- > Installation of on-road bicycle lanes.
- > Proposed shared path from McFarlane Road to KidsTown.



Route 2 Gemmill's Swamp to KidsTown Master Plan 27



RiverConnect Paths Project Master Plan

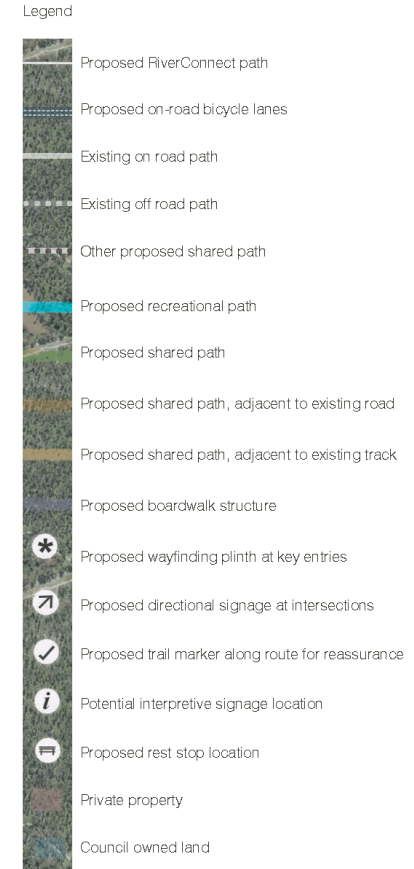
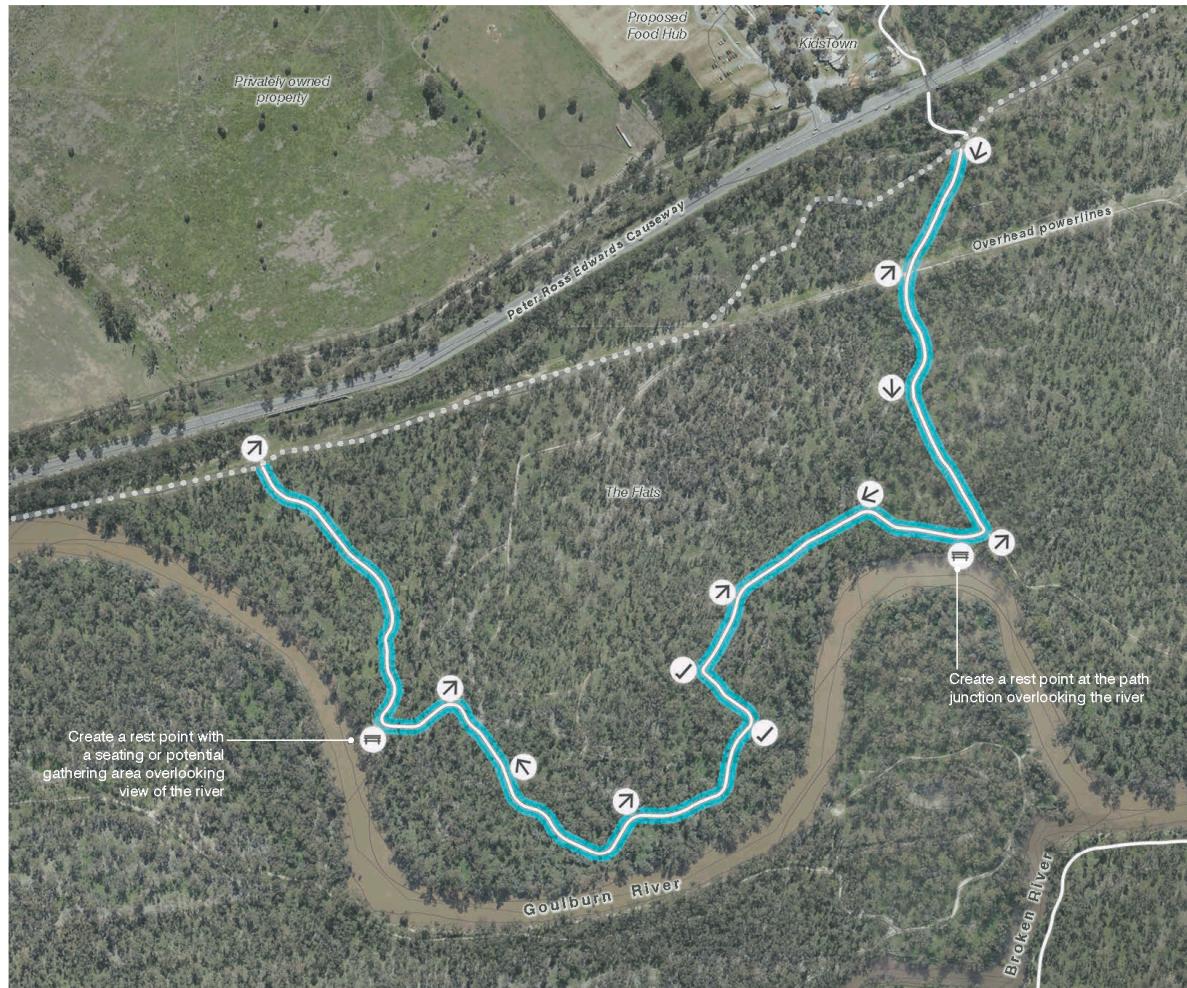
Route 3 The Flats

The adjoining plan illustrates the proposed works associated with preferred route 3 and the table below details the actions required to implement these works.

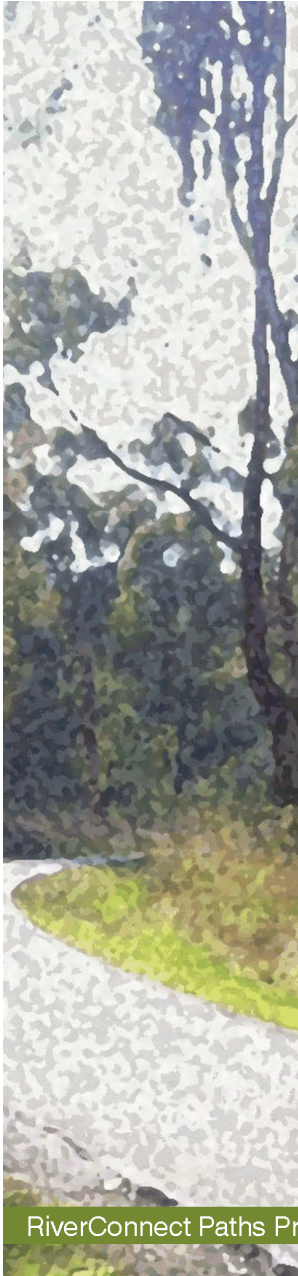
Actions	<i>Anticipated order of cost</i>
PRE-CONSTRUCTION ACTIVITIES	
1 Seek permits and approvals from the relevant authorities, such as Parks Victoria to undertake the path works.	\$2,500
2 Design and document the works.	\$20,000
CONSTRUCTION ACTIVITIES	
8 Construct path and drainage structures.	\$60,000
9 Construct signage and seating.	\$25,000
	\$107,500

Route 3 could be constructed in the following stages:

- > Proposed path upgrade works.
- > Proposed seating areas.
- > Proposed directional signage



Route 3 The Flats Master Plan 29



RiverConnect Paths Project Master Plan

Route 4 Mooroopna to Australian Botanic Gardens

The adjoining plan illustrates the proposed works associated with preferred route 4 and the table below details the actions required to implement these works.


















<i>Action</i>	<i>Anticipated order of cost</i>
PRE-CONSTRUCTION ACTIVITIES	
1 Seek permits and approvals from the relevant authorities, such as Parks Victoria, VicTrack and the CMA to undertake the path works.	\$5,000
2 Undertake feature and level survey for route corridor.	\$15,000
3 Complete Complex Cultural Heritage Master Plan for all works proposed through undisturbed areas.	\$10,000
4 Undertake detailed flora and fauna investigation.	\$5,000
5 Undertake geotechnical investigations to enable pavement and structure design.	\$5,000
6 Design and document the works.	\$25,000
7 Obtain planning permit for works across Public Use Zone	\$5,000
CONSTRUCTION ACTIVITIES	
8 Construct path.	\$170,000
9 Construct signage and seating.	\$25,000
	\$265,000

Route 4 could be constructed in the following stages:

- > Proposed shared path adjacent to Watts Road.
- > Proposed shared path from Watts Road to the Australian Botanic Gardens.



Legend

-  Proposed RiverConnect path
-  Proposed on-road bicycle lanes
-  Existing on road path
-  Existing off road path
-  Other proposed shared path
-  Proposed recreational path
-  Proposed shared path
-  Proposed shared path, adjacent to existing road
-  Proposed shared path, adjacent to existing track
-  Proposed boardwalk structure
-  Proposed wayfinding plinth at key entries
-  Proposed directional signage at intersections
-  Proposed trail marker along route for reassurance
-  Potential interpretive signage location
-  Proposed rest stop location
-  Private property
-  Council owned land

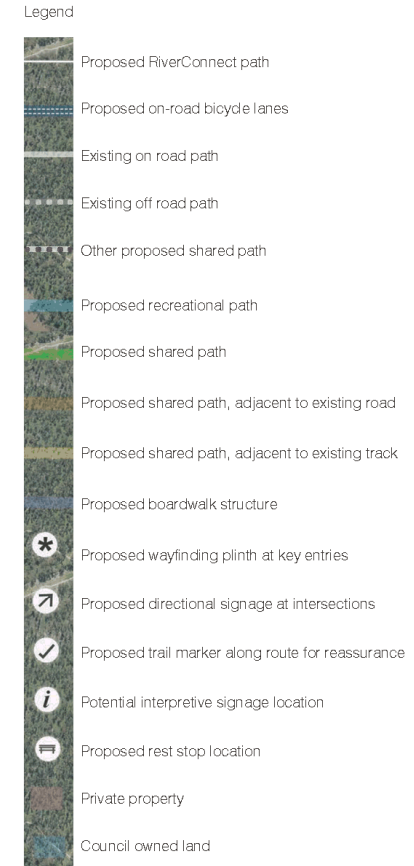


RiverConnect Paths Project Master Plan

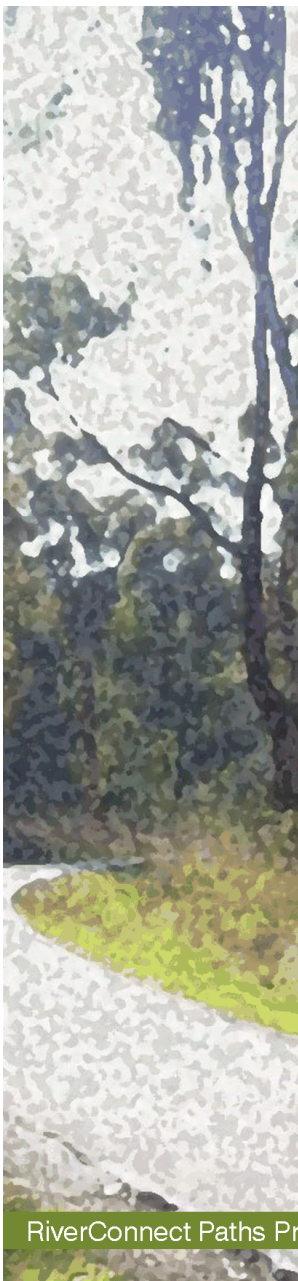
Route 5 Australian Botanic Gardens across the Broken River

The adjoining plan illustrates the proposed works associated with preferred route 5 and the table below details the actions required to implement these works.

<i>Action</i>	<i>Anticipated order of cost</i>
PRE-CONSTRUCTION ACTIVITIES	
1 Seek permits and approvals from the relevant authorities, such as Parks Victoria and the CMA to undertake the path and Broken River pedestrian bridge works.	\$5,000
2 Undertake feature and level survey for route corridor.	\$7,000
4 Undertake detailed flora and fauna investigation.	\$7,500
5 Undertake geotechnical investigations to enable pavement and structure design.	\$10,000
6 Design and document the works.	\$30,000
7 Obtain planning permit.	\$5,000
CONSTRUCTION ACTIVITIES	
8 Construct path and pedestrian bridge.	\$800,000
9 Construct signage and seating.	\$15,000
	\$879,500



Route 5 Australian Botanic Gardens across the Broken River Master Plan 33



Priorities and Quick Wins

Priorities

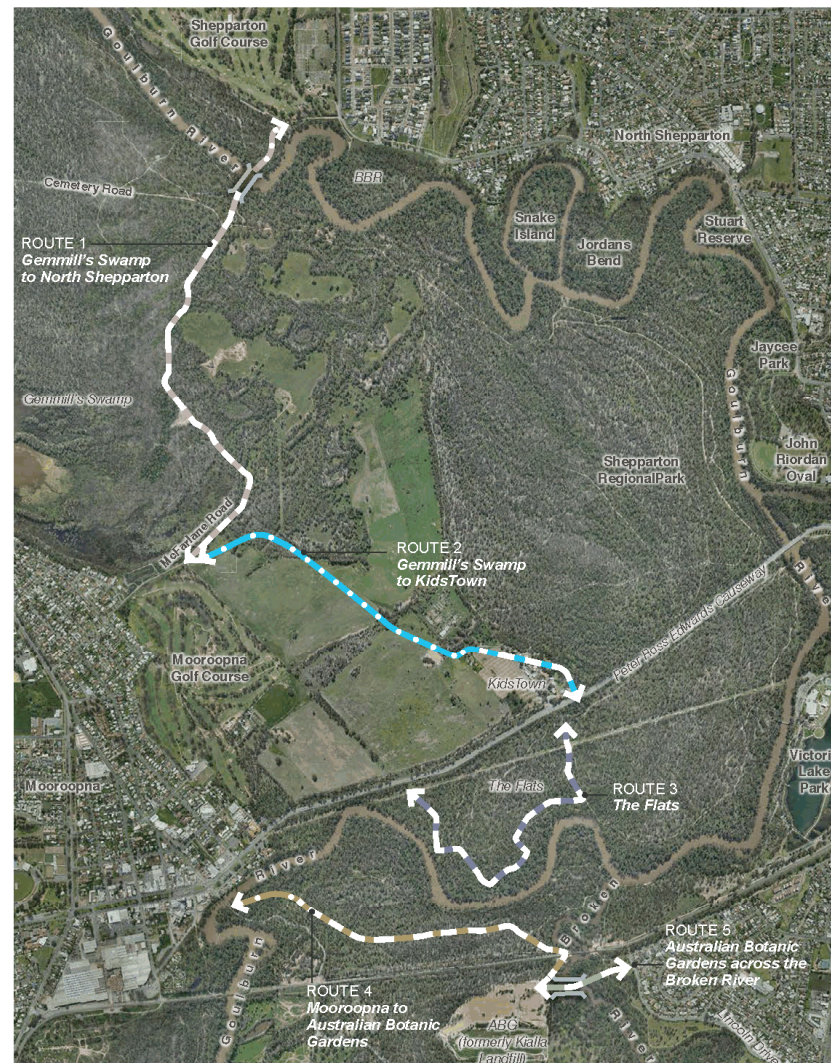
The following order of priority for implementation has been proposed based on the results of the initial stakeholder and Focus Group consultation:

- 1 Route 2 Gemmill's Swamp to Kidstown
- 2 Route 1 Gemmill's Swamp to North Shepparton
- 3 Route 5 Australian Botanic Gardens across the Broken River
- 4 Route 4 Mooroopna to Australian Botanic Gardens
- 5 Route 3 The Flats

Quick Wins

The following potential minor works are relatively cost effective and simple to implement:

- > Route 4 - Ensure an off-road shared use path is incorporated into the design and construction of the Watts Road bridge upgrade.
- > Route 2 - line marking of bicycle lanes along McFarlane Road
- > Route 2 - Upgrade the existing walking track behind the Gemmill's Swamp bioremediation wetland to a 2.5 m wide recreational path
- > Route 3 - install seating areas



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- Coomes Consulting, 2006, *Greater Shepparton 2030 Strategy Plan*
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- Sutherland, G, 2011, *Broken River – Kialla Landfill Rehabilitation Site – shared path, Shepparton Cultural Heritage Management Plan Number: 11372*
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GREATER SHEPPARTON
GREATER FUTURE



Community Engagement Plan RiverConnect Paths Master Plan

Project Name: RiverConnect Paths Master Plan
Reason for engagement: Plan development
Level of engagement: various depending on stakeholder
Project Organising Officer/s: Renee Ashmore
Branch: Sustainability and Environment
Branch Manager: Greg McKenzie

Engagement and consultation during the life of the project must incorporate targeted stakeholders and community groups. The following are identified target groups who will be consulted during the life of the project:

- **RiverConnect Paths Project Focus Group.** (Direct Advisory Group) Braydon Aitken – Planning GSCC, Darren Buchanan – Project Design GSCC, Graeme Pollard – Major Projects GSCC, Travis Turner – Sustainability and Environment GSCC, Neville Wells – Ranger Parks Vic, Neil Morris – Yorta Yorta Nation Aboriginal Corporation, Dennis Patterson – Gemmills Wetland Working Group and RiverConnect IAC (community and Councillor) and Renee Ashmore – RiverConnect GSCC.
- **RiverConnect Paths Project Stakeholder Group.** Includes representatives and members from: Parks Victoria, Greater Shepparton City Council, Goulburn Broken Catchment Management Authority, Yorta Yorta Nation Aboriginal Corporation, Rotary of Mooroopna, Kiwanis of Mooroopna, Australian Botanic Gardens Shepparton and Gemmills Wetland Working Group.
- **RiverConnect Implementation Advisory Committee.** Includes: Greater Shepparton City Council, Goulburn Broken Catchment Management Authority, Parks Victoria, Goulburn Murray Landcare Network, Goulburn Valley Environment Group, Yorta Yorta Nation Aboriginal Corporation, Rumbalara Cooperative, Education Sector, community representatives.
- **Greater Shepparton City Council internal departments;** Engineering Projects, Parks and Recreation, Community Strengthening, Property, Planning, Grants, KidsTown, Governance, Risk and Environment and Sustainability. (Tom Zampaglione, Tony Ellis, Rohan Montgometry)
- Other RiverConnect Working Groups and partner groups.
- General Public

Date	Consultation Tool	Method	Stakeholder Details	Activity Plan	Stage of Consultation	Responsibility
<i>Date of consultation</i>	Type of consultation undertaken: <ul style="list-style-type: none"> • Inform • Consult • Involve/ Collaborate • Empower 	<i>Consultation strategy:</i> <ul style="list-style-type: none"> • Facilitated session • Focus Groups • Community Information Session • Small Meetings • Tele conference • Website • Letters • Working Groups 	<i>List all stakeholders and community groups involved in the engagement strategy/project.</i>	<i>Describe who is involved in the consultation process, how they will be consulted, where they will be consulted and why they are being consulted.</i>	<i>Identify what stage of consultation you are at – whether it is providing information or feedback etc.</i>	<i>List who is responsible for consultation responsibilities – Any meetings that need to be organised, potential quotes to be organised. All actions to be listed with action officer.</i>
June 2010 – Dec 2013	Collaborate	Facilitated sessions, small meetings, community information sessions, emails and website	Paths stakeholders	Discuss and develop concept map and project plan	Initial	GSCC - RA
Dec 2013	Inform	Direct email	RC Paths Project Focus Group, RC Paths Project Stakeholder Group, RC IAC.	Circulate update email to inform of progress.	Planning	GSCC - RA
Jan – March 2014	Collaborate	Group First regular meeting	RiverConnect Paths Project Focus group	Circulate papers prior to meeting. Draft Engagement Strategy, Draft Communication Strategy, Draft Timeline document, draft Project Brief and draft Statement of Intent	Planning - Providing draft planning documents for feedback, before progressing to next	GSCC – RA

				for Focus Group.	stage.	
May – August 2014	Collaborate	Small meetings, Stakeholder Workshop	GSCC internal departments, other agency and individual stakeholders	Meeting requests with background information sent to individuals. Collaboration during small meeting discussion	Draft – Providing expert advice for inclusion in the Draft plan	GSCC – RA, Consultant
Aug – Oct 2014	Empower	Council Meeting	GSCC Executive and Councillors	Complete appropriate InfoCouncil briefing papers to seek Draft Master Plan release for Community Consultation.	Draft – seeking draft plan release for Community Consultation	GSCC – RA, Consultant, Focus Group members
Oct - Nov 2014	Consult	Community Information Sessions, surveys at existing community events, presentations at targeted user group meetings.	Other stakeholders and general public	Direct email, general emails and public notice to advise of Draft RiverConnect Paths Project Plan, seeking input on priorities and other feedback.	Draft review – seeking community feedback	GSCC – RA RiverConnect Paths Focus Group
Nov - Dec 2014	Collaborate	Focus Group regular meeting	RC Paths Project Focus Group	Background documents will be circulated prior to meeting. Community Feedback compiled for review	Draft review – community feedback review	GSCC – RA, Consultant, Focus Group
Jan - Feb 2015	Collaborate	Focus Group regular meeting	RC Paths Project Focus Group	Background documents will be circulated prior to meeting. Final RiverConnect Paths Project Master	Final – endorsement	GSCC – RA, Consultant

				Plan compiled for review.		
Feb 2015	Inform	Regular meeting	RC Implementation Advisory Committee	Background documents will be circulated prior to meeting. Community Feedback and Final RiverConnect Paths Project Master Plan compiled for review.	Final - endorsement	GSCC – RA, Focus Group
Feb – April 2015	Empower	Council Meeting	GSCC Executive and Councillors	Appropriate InfoCouncil briefing papers will be completed to seek final plan endorsement.	Final - endorsement	GSCC – RA, Focus Group



Appendix 1





PRELIMINARY ASSESSMENT OF ABORIGINAL CULTURAL HERITAGE

RiverConnect Paths Project

28/7/2014

SPONSOR – Greater Shepparton Shire Council

RiverConnect Paths Project

Preliminary Assessment of Aboriginal Cultural Heritage



Sponsor: Greater Shepparton City Council

Cultural Heritage Advisors: Michael Dunn & Damian Wall

Author: Michael Dunn & Damian Wall

Date: 28th July 2014

Preliminary Assessment of Aboriginal Cultural Heritage

RiverConnect Paths Project

Preliminary Assessment of Aboriginal Cultural Heritage

Sponsor: Greater Shepparton City Council

Cultural Heritage Advisors: Michael Dunn & Damian Wall

Author: Michael Dunn & Damian Wall

Date: 28th July, 2014

Preliminary Assessment of Aboriginal Cultural Heritage

Executive Summary

The towns of Shepparton and Mooroopna are separated by a floodplain consisting of the Goulburn and Broken Rivers. This area has many social, cultural, environmental and economic values and the Greater Shepparton City Council (“the Sponsor”) have developed the RiverConnect Paths Project in order to utilise these values for the local economy and community.

This Preliminary Assessment of Aboriginal Cultural Heritage (AACH) provides valuable information relating to the Aboriginal cultural heritage previously recorded within the activity area and the inherent cultural heritage values of the area affected by the proposed RiverConnect Paths project. This document will eventually provide the basis for a Cultural Heritage Management Plan (CHMP) for the project after the project scope is finalised by the proponent in consultation with Yorta Yorta Nation Aboriginal Corporation (YYNAC) and the RiverConnect Path Focus Group.

An assessment was undertaken on the 5th June 2014 by Michael Dunn of Infield Impact and Travis Morgan, Wade Morgan and Braidon Joachim from YYNAC. No Aboriginal cultural heritage was located during the survey period and there is evidence to suggest that large areas have been subject to significant ground disturbance caused by sand extraction, logging, levy banks and recreational pursuits (e.g. Off-Road four-wheel driving).

However, potential areas of cultural sensitivity were identified including the Kidstown to Gemmills Swamp path, the northern section of the Mooroopna to Kialla Landfill path and the proposed Goulburn River crossing site. It is likely that a CHMP ‘Complex Assessment’ (Complex CHMP) will be required prior to the construction of these paths and the survey design is to consider all ground disturbing activities (which are yet to be determined).

Alignments of the proposed shared paths that followed existing tracks (i.e. already significantly disturbed areas) included the Gemmills Swamp to North Shepparton path, the southern section of the Mooroopna to Kialla Landfill path and The Flats Loop path. These alignments were surveyed both by vehicle and on foot (i.e. pedestrian survey).

Preliminary Assessment of Aboriginal Cultural Heritage

Recommendation 1 - Complex Assessment

A Complex CHMP be developed to account for the proposed development of shared paths (and ancillary facilities) where the proposed alignments are regarded as 'off existing tracks'. The Kidstown to Gemmills Swamp path (north), the Mooroopna to Kialla Landfill path (west) and the Gemmills Swamp to North Shepparton path (north) were considered to be proposed 'off existing tracks'.

Recommendation 2 – Interpretive Signage

The placement of the interpretive signage should be strategically located and in close proximity to the existing track footprint - in previously disturbed ground. In areas subject to a complex assessment, the locations chosen for the signage should be determined prior to the commencement of the complex assessment and sub-surface investigations be undertaken within these areas.

Recommendation 3 – Works on Previously Disturbed Ground

No further assessment is required on path alignments that are proposed to follow the alignment of existing tracks. If works are to commence before the finalisation of a Complex CHMP, the proponent should requested the lodgement of a Standard CHMP that considers these alignments before works commence.

Recommendation 4 - Cultural Heritage Awareness Induction

The construction team undertaking the works must have a cultural heritage induction prior to the commencement of works. Inductions will include discussion of the existing Aboriginal Places that have been identified by this AACH (and discussed in the Section 61 Matters of a complex CHMP) such that the nominated works supervisor has an understanding of the general location of these sites.

Recommendation 5 - Protection of Existing Aboriginal Places

Prior to the commencement of the path representatives from the YYNAC and the proponent will inspect the sites identified by this AACH (and discussed in the Section 61 Matters of a complex CHMP), accompanied by a suitably qualified CHA. If required, protective measures including the placement of bunting on the edge of the construction footprint should be used delineating these sites from the construction area.

Preliminary Assessment of Aboriginal Cultural Heritage

Acknowledgements

Red-Gum Environmental Consulting Pty Ltd and Infield Impact Pty Ltd would like to thank Wade Morgan, Travis Morgan, Braidon Joachim and Gaye Sutherland from YYNAC for their input and guidance during the development of the AACH.

Preliminary Assessment of Aboriginal Cultural Heritage

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Preliminary Assessment of Aboriginal Cultural Heritage

1. Background to the assessment

1.1 Introduction

The cities of Shepparton and Mooroopna are separated by the Goulburn River. The floodplains possess many social, cultural, environmental and economic values, which the Sponsor (via the Rivers Connect Paths Project) wishes to highlight. The Greater Shepparton City Council (“the Sponsor”) have a suite of plans that are strategically linked to the RiverConnect Paths Project enabling future social and economic benefits to the region. The plans include:

- The Greater Shepparton City Council Plan 2013 -2017,
- The Greater Shepparton 2030 Strategy Plan,
- River Connect Strategic Plan; and
- Mooroopna Community Plan.

The following AACH provides valuable information relating to the Aboriginal cultural heritage previously recorded within the activity area and the inherent cultural heritage values of the area affected by the proposed Rivers Connect Paths project. This document will eventually provide the basis for a Cultural Heritage Management Plan (CHMP) for the project, after the project scope is finalised by the proponent in consultation with Yorta Yorta Nation Aboriginal Corporation (YYNAC) and the RiverConnect Paths Project Focus Group.

1.2 Sponsor

The sponsor for this AACH is The Greater Shepparton City Council (ABN 59835329843). The contact for this project is:

Renee Ashmore

RiverConnect Project Officer

Greater Shepparton City Council

90 Welsford Street

Shepparton, Victoria 3630

Preliminary Assessment of Aboriginal Cultural Heritage

1.3 Cultural heritage advisors

The Cultural Heritage Advisors (CHA) for the project are Michael Dunn from Infield Impact Pty Ltd and Damian Wall of Red-Gum Environmental Consulting Pty Ltd. Michael has an Honours Degree in Arts Archaeology from Latrobe University. Damian has a Graduate Certificate in Cultural Heritage Management from Flinders University (SA) and both are suitably qualified under section 189 Act.

1.4 Location of Activity Area

The activity area is located on the floodplain of the Goulburn and Broken Rivers between the cities of Mooroopna and Shepparton. The boundaries of the activity area include the Australian Botanical Gardens to the South, the Goulburn River to the East, the Shepparton golf course to the North and the Mooroopna golf course to the west (**Map 1**).

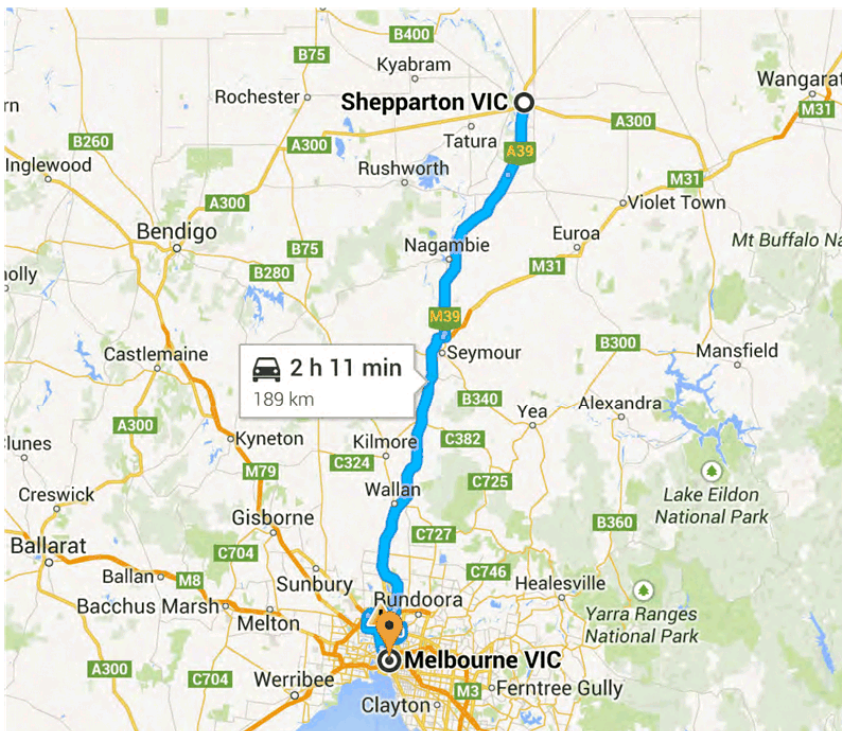
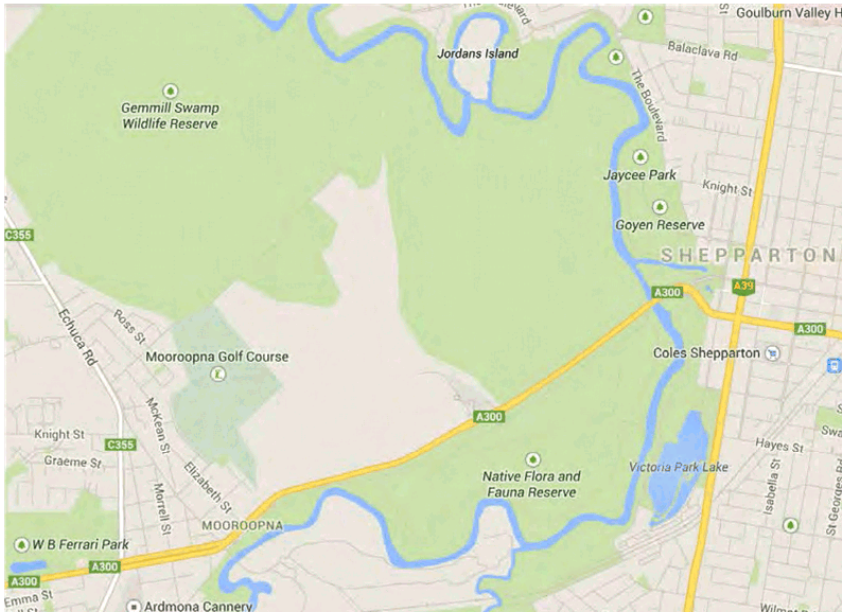
1.5 Owners & occupiers of the land

The owners and occupiers of the land encompassing the proposed individual paths (within the activity area) are summarised by **Table 1**.

Table 1: Land ownership by individual path

Name of Path	Land Description	Land Details
Gemmills Swamp to North Shepparton	Gemmills Swamp Wildlife Reserve	P160525
Kidstown to Gemmills Swamp	Kids town - 90 Macfarlane Rd Mooroopna Council Property	Kids Town (Lot 2 LP 24903), Lot 1 PS 716316, Lot Res 1 PS 716316
Mooroopna to Kialla Landfill	Shepparton Regional Park	P385259, P385264
The Flats Loop	Shepparton Regional Park	P162095, P385245
River Crossing Option 2 and associated path	Shepparton Regional Park	P164134, P385961

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Map 1: RiverConnect Paths Project location

1.6 Registered Aboriginal party

The registered aboriginal party for this activity area is the Yorta Yorta Nation Aboriginal Corporation located at 127 Welsford Street, Shepparton , Vic.

2. Activity Description

2.1 Extent of Activity covered by the AACH

The proposed activity consists of the development of 9 km of proposed interconnecting shared paths covering an area of 2.7 ha¹. The *Activity Area* covered by this AACH is shown in **Map 2** and consists of:

1. a 20m buffer of the centreline of paths that are proposed for development on already existing tracks, roads and paths (as provided by the proponent prior to field survey in June 2014);
2. a 50m wide transect of the approximate location of proposed paths through areas where an existing track, road or path does not exist at the time of the assessment; and
3. The approximate location of the new river crossing (north and south bank).

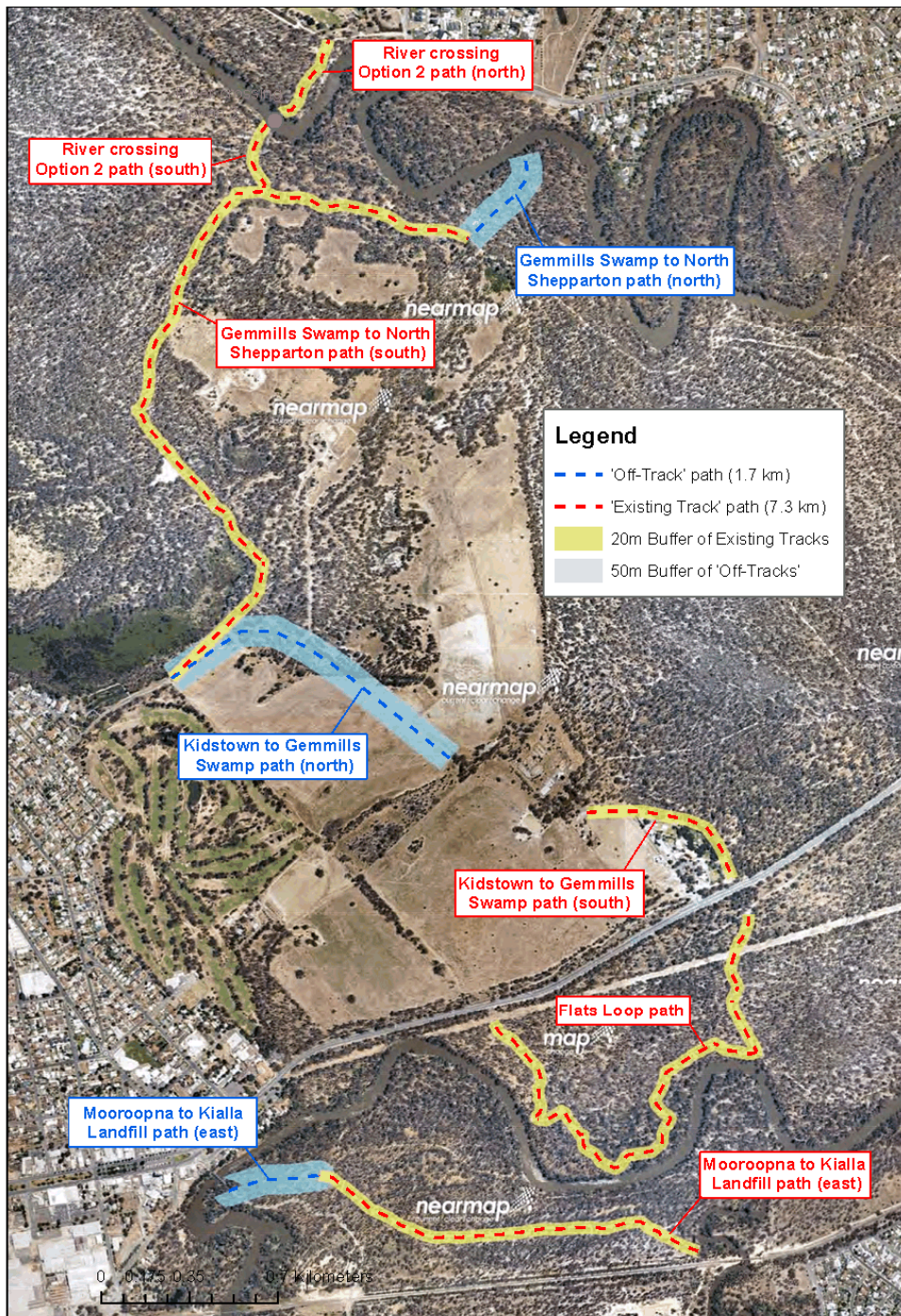
2.2 Description of Works

The proposed activity is the construction of shared (pedestrian and bike) paths within an area of public and connecting private land between Shepparton and Mooroopna, Vic. Tracks are planned to be built on existing paths/tracks (that are significantly disturbed) and 'off- track' sites. Parts of the proposed paths (as shown in **Map 2**) may require some re-survey once their alignments have been finalised. Paths include:

- Gemmills Swamp to North Shepparton path,
- Kidstown to Gemmills Swamp path,
- Mooroopna to Kialla Landfill path,
- The Flats Loop path; and
- River crossing option 2 and associated proposed path.

¹ Average width of proposed path (3m) multiplied by its total length (9 km).

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Map 2: RiverConnect Paths Project Activity Area (June 2014)

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2.2.1 Activity Description - Bridge Construction

At the time of assessment, one (1) site for a new crossing over the Goulburn River was proposed (Option 2, see **Map 2**) together with interconnecting paths. At the time of assessment the final design and chosen construction methodology had not been finalised, however indications from the sponsor were that a new bridge would be a suspension type structure anchored consisting of moored anchors and abutments in both banks. This AACH is to enable the RiverConnect Path Focus Group to make informed decisions on the preferred bridge location such that the chosen site avoids damage to existing and yet to be identified Aboriginal places.



Photo 1: Proposed bridge concept / ground disturbing activities

2.2.2 Path Construction

The proposed activity consists of the development of 9 km of proposed interconnecting shared (bicycle and pedestrian) paths. At the time of assessment the final design and chosen construction methodology had not been finalised, however indications from the sponsor were that a large proportion of the paths will be sealed with some left unsealed. This AACH is to enable the RiverConnect Path Focus Group to make informed decisions on the construction design of proposed paths in culturally sensitive areas within the activity area.

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Photo 2: Sealed and unsealed path examples

2.2.3 Signage

Directional and interpretive signage is likely to be installed at various sites throughout the activity area. The actual sites for signage had not been finalised at the time of the fieldwork. This AACH is to enable the RiverConnect Path Focus Group to make informed decisions on the number and location of such signage within the activity area (i.e. avoiding areas of cultural heritage sensitivity).



Photo 3: Example interpretive signage

2.2.4 Ancillary facilities including car parks

The location, type, design and capacity of ancillary facilities (e.g. rest areas, rubbish bin locations etc) and car parks had not been finalised at the time of the fieldwork. This AACH is to enable the RiverConnect Path Focus Group to make informed decisions on ancillary facilities within the activity area (i.e. avoiding areas of cultural heritage sensitivity).

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Photo 4: Example ancillary facilities

3. Documentation of consultation

3.1 Notification of Assessment and Inception Meeting

Damian Wall adhered to the consultation requirements of the Aboriginal Heritage Act 2006 ('the Act') when preparing to enter the field for the AACH. Michael Dunn (In-field Impact) contacted Gaye Sutherland (YYNAC) to discuss the upcoming project and to arrange an inception meeting and site visit. **Table 2** is record of communication with the YYNAC in relation to the development of the AACH.

Table 2: Consultation record

Type	Date	Time	Name	Party	Discussion/Details
Phone	21 May 2014	10:57	Gaye Sutherland	YYNAC	M Dunn left a message with Gaye regarding an assessment for the RiverConnect project
Phone	22 May 2014	11:53	Gaye Sutherland	YYNAC	G Sutherland called M Dunn returning his call. M Dunn introduced himself as the archaeologist undertaking the heritage works alongside Damian Wall. A number of dates were discussed and both parties required some time to determine a suitable date.
Email	26 May 2014	19:52	Gaye Sutherland	YYNAC	M Dunn received an email regarding the dates for the inception meeting.
Email	27 May 2014	15:01	Gaye Sutherland	YYNAC	M Dunn emailed notice of intention to undertake a heritage assessment to Gaye Sutherland.

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Type	Date	Time	Name	Party	Discussion/Details
Phone	27 May 2014	13:04	Gaye Sutherland	YYNAC	M Dunn spoke with Gaye regarding the availability for representatives from YYNAC to attend an inception meeting. Also discussed was the date of the 5 th and 6 th June to undertake the assessment.
Email	27 May 2014	13:14	Gaye Sutherland	YYNAC	M Dunn followed up consultation with an email confirming the dates for the inception meeting and date for standard assessment.
Phone	4 June 2014	10:00	Gaye Sutherland	YYNAC	M Dunn rang G Sutherland to confirm the meeting and assessment for the following day. Date confirmed and no concerns regarding the meeting and assessment.
Meeting	5 June 2014	09:00	Gaye Sutherland Travis Morgan Wade Morgan Braidon Joachim	YYNAC	M Dunn met with the representatives from the YYNAC to discuss the proposed assessment. The alignments were discussed prior to the commencement of the survey. G Sutherland commented that heritage planning for the Boulevard extension and the crossing from the Aust botanical garden across the Broken River had been undertaken in the past. Plans covering these areas include The Broken River-Kialla Land Fill Rehabilitation site Shared Path, Shepparton CHMP 11372 Sutherland 2010 and Extension of the Yarna Gurtji Shared Path Goulburn River, Shepparton, CHMP 11112 Sutherland 2010. Matters also discussed included the difficulty in locating the alignment on the A4 sheet. Gaye rang the council and requested another A3 sheet which was to be picked up that morning prior to the site inspection. MDunn and G Sutherland agreed that MDunn would pick up the map from the shire office, meet the reps back at the YYNAC office and head out to site.
Phone	13 June 2014	09:36	Gaye Sutherland	YYNAC	M Dunn spoke with G Sutherland and discussed the provision for YYNAC to provide a statement of significance for the existing aboriginal places within the activity area and for the YYNAC to look over the ethnography section of the report. There were no commitment made by YYNAC to provide this statement however MDunn agreed for YYNAC to look over the ethnography section.

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3.2 Assessment Survey Consultation

Prior to the commencement of the field survey for each individual path, Travis Morgan, Wade Morgan, Braidon Joachim and Michael Dunn discussed the proposed methodology and surrounding landscape. Periodically and immediately after the survey of each path, a discussion was held in which the following matters were discussed considering the section of surveyed path:

- Cultural heritage potential,
- Existing sites within close proximity,
- The level of existing ground disturbance,
- Future requirements (e.g. Complex assessment, monitoring etc); and
- Evidence of and the likely previous land use (e.g. Logging, sand extraction, grazing etc).

The intent of the discussion was not to obtain overall consensus regarding each of the discussion points – it was merely a collaborative method of recording the current condition of the path alignments whilst considering likely Aboriginal cultural heritage sensitivities and required future management recommendations.

4. Aboriginal Cultural Heritage Assessment

4.1 Desktop assessment

The desktop assessment was undertaken by Michael Dunn to determine the likelihood of the activity area containing Aboriginal cultural heritage and to assist in assessing the significance of any heritage that may be found. Desktop research provides information enabling predictions to be made to whether a place may contain Aboriginal cultural heritage. This research involves the following:

- Investigating the site registry,
- Reviewing other cultural heritage reports undertaken within the geographic area,
- Reviewing local ethnographic histories of the area,
- Research into past historic land use,
- Reviewing local histories of the area; and
- Researching the geomorphology and geology of the region encompassing the activity area.

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4.2 Search of the Victorian Aboriginal Heritage Register

The Victorian Aboriginal Heritage Register (VAHR) was initially searched on 28th May 2014 indicating a large number of heritage sites / places within the Shepparton Mooroopna region. The search indicated that ten (10) previously recorded Aboriginal Places are within 50m of the proposed works (Table 3). Table 4 is a record of additional sites within 200m of the proposed works – shown by Map 3.

Table 3: VAHR listed sites within 50m of the Activity Area

VAHR Number	GPS Location GDA94 Zone 55	Place Name	Type	Path Name
7925-0010	E 353440 N 5974497	Shepparton Golf Club 1	Scarred Tree	River Crossing Option 2 path (north)
7925-0369	E 353451 N 5974163	Youngs Bend State Forest 1	Artefact Scatter	Gemmills Swamp to North Shepparton path (south)
7925-0370	E 353361 N 5974185	Youngs Bend State Forest 2	Artefact Scatter	River Crossing Option 2 path (south) and Gemmills Swamp to North Shepparton path (south)
7925-0372	E 353955 N 5974061	Youngs Bend State Forest 4	Artefact Scatter	Gemmills Swamp to North Shepparton path (south) and Gemmills Swamp to North Shepparton path (north)
7925-0373	E 353825 N 5974070	Youngs Bend State Forest 5	Artefact Scatter	Gemmills Swamp to North Shepparton path (south)
7925-0576	E 353238 N 5974160	Gemmills Swamp East 1	Artefact Scatter	Gemmills Swamp to North Shepparton path (south)
7925-0207	E 353188 N 5972585	Gemmills Swamp 10	Artefact Scatter	Gemmills Swamp to North Shepparton path (south) and Kidstown to Gemmills Swamp path (north)
7925-0208	E 354113 N 5971485	Gemmills Swamp 11	Artefact Scatter	Gemmills Swamp to North Shepparton path (south) and Kidstown to Gemmills Swamp path (north)
7925-0375	E 355076 N 5971135	The Flat Toehold Tree	Scarred Tree	The Flats Loop path
7925-0374	E 354954 N 5971788	The Flat Powerline 1	Artefact Scatter	The Flats Loop path

Table 4: Additional VAHR listed sites within 200m of the Activity Area

VAHR Number	GPS Location GDA94 Zone 55	Place Name	Type	Path Name
7925-0358	354655.000 5970651.000	Tip Quarry Site 1	Artefact Scatter	Mooroopna to Kialla Landfill path (east)
7925-0368	354194.000 5974390.000	Goulburn River-Kittles Road 1	Artefact Scatter	Gemmills Swamp To North Shepparton Path (North)
7925-0368	354194.000 5974390.000	Goulburn River-Kittles Road 1	Earth Feature	Gemmills Swamp To North Shepparton Path (North)
7925-0371	353789.000 5974174.000	Youngs Bend State Forest 3	Scarred Tree	Gemmills Swamp To North Shepparton Path (South)
7925-0407	354143.000 5974385.000	The Boulevard 3	Artefact Scatter	Gemmills Swamp To North Shepparton Path (North)
7925-0580	352794.000 5973635.000	Gemmills Swamp East 5	Artefact Scatter	Gemmills Swamp To North Shepparton Path (South)

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In total, 204 sites are located within a 10 km radius of the activity area – over half (51%) of the sites are artefact scatters. Other places include scarred trees (32%), low density artefact scatters (8%), earth features (3%), object collections (3%), Aboriginal historical sites (1.5%), shell middens (0.5%) and burials (0.5%).

4.3 The Geographic region

The geographic region for this assessment consists of the riverine plain and floodplain system between Shepparton and Mooroopna, VIC (**Map 4**). Shepparton is located approximately 183 km north of Melbourne on the Midland Highway.

4.4 Geomorphology of the Region

The regional geomorphology of the activity area is known as the Shepparton formation and consists of a fluvial plain. This plain is believed to be Holocene in age (12 – 10000 years) and was formed by lake and swamp deposits (LCC cited in Lusty 1992). Topography within the area is relatively flat in nature and landscape features include low sand dunes, current and prior stream channels. According to Muhlen-Schulte (1995) the existing sand dunes within the region were formed during the last glacial deposited approximately 15,000 to 30,000 BP.

Bowler (1978) identified 3 sedimentary units including the present day active Goulburn sediments, followed by the Kotupna deposit between 15,000 and 10,000 BP and then the later up to 25,000BP (Lusty, 1992). The older formation (dated 25,000 BP) is also known as the Green Gully – Tallygaroopna formation (Tulloch, 2002 p 9) and resulted from sediment deposited by rivers and streams including wind blown Aeolian deposits (Sutherland, 2013 p 15).

According to Bowler (1978) the Goulburn River course has changed twice over the past 25,000 years. Firstly the river was located closer to the Murray River during a high energy phase. Tulloch (2002) suggests the high energy phase of the river terminated with the end of the last ice age when the glaciers of the Australian Alps disappeared and the amount of water from the watershed diminished. The lack of spring melt changed the flow of the river to low energy resulting in the river moving to the present location. The low energy phase resulted in the present day topography of the riverine plain consisting of billabongs, anabranches and sections of prior ancestral streams (Muhlen –Schulte 1995, p 3) accompanied by ridges characterised by sinuous depressions (Lusty 1992).

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Soils in the region average 2 metres in depth and consist of Sodic duplex soils covering prior stream, uniform calcareous sodic soil blanketing flat plains and variable grey soils covering the present day floodplains (Lusty 1992 p 5).



Map 4: Geographic region

4.5 Flora & Fauna

Prior to its more recent uses, the wider area would have been covered with eucalypt dominated woodlands with an open grassy understorey. Today, this original vegetation exists in scattered remnants, with forests and woodlands dominated by River Red Gum along watercourses and across flood-prone areas. Grey Box (*Eucalyptus microcarpa*), Yellow Box (*E. melliodora*) and Black Box (*E. largiflorens*) occur on the margins of the riverine forests and across the drier and better-drained plains to the south.

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The activity area is dominated by Open River Red Gum (*E. camaldulensis*) woodland with ground covers dominated by Moira Grass (*Pseudoraphis spinescens*), Wallaby Grass (*Danthonia spp.*), Summer Grass (*Paspalidium spp.*) and Spike Rush (*Eleocharis acta*) (Bonhomme 1990:13). Many of the trees are young (<50 years old) perhaps supporting the contention that the area has been subject to wide scale clearing in the past. In terms of likely use of vegetation by Aboriginal people, River Red Gum provided bark for shelters, canoes and shields and the tree sap (gum) was also used to shrink and seal burns (Zola and Gott 1992: 5). Species such as the Murnong Daisy Yam (*Microseris lanceolata*), Nardoo (*Marsilea*), various fungi and the stalks of water plants are also likely to have been important sources of food accessible on the riverine plain (Aboriginal Affairs Victoria 1996: 10-12).

The Murray Valley region provides a highly diverse native fauna, many species of which might have been used by Aboriginal people. The open woodland would have provided ample food resources in the form of kangaroos, emus, possums, wombats, snakes and lizards. Freshwater turtles were found in large numbers in rivers, creeks, lagoons and swamps, and were caught and roasted in the shell (Aboriginal Affairs Victoria 1996: 7). Large fish, yabbies, crayfish water rats, and abundant birdlife are known to have existed in the local wetlands which include the current study area, up until the 1960s (Weight 1993: 15). Trees may also have provided resources such as witchetty grubs and honey (Aboriginal Affairs Victoria 1996: 7).

A search of the Biodiversity Interactive Map V3.2 (DEPI, 2014) on 30th June 2014 revealed that in excess of thirty (30) species of mammal, including the threatened Squirrel Glider (*Petaurus norfolcensis*), Feathertail Glider (*Acrobates pygmaeus*), Sugar Glider (*Petaurus breviceps*) and Fat Tailed Dunnart (*Sminthopsis crassicaudata*) are known to occur within 5km of the activity area. More common species including the Brushtail Possum (*Trichosurus vulpecula*), Ringtail Possum (*Pseudocheirus peregrinus*) and over twenty (20) species of bat have also been previously recorded.

Threatened birds including the Barking Owl (*Ninox connivens*) and the Yellow-faced Honey-eater (*Lichenostomus chrysops*) have also been previously recorded using the riverine corridor and a total of seventeen (17) different species of reptile have been recorded in the area.

4.6 Previous archaeological work in the geographic region

A large number of archaeological investigations have been undertaken within the geographic region. Assessments include investigations for pipeline projects, subdivisions, drainage projects, shared paths, landfill sites, bypasses and water storage tanks. Table 5 provides a summary.

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Table 5: Literature Summary associated with activity area

Literature	Type	Date	Author	Summary
Marungi Street Drainage Outfall – Repair and Upgrade: Desktop, Standard and complex assessment	CHMP	2014	Matthew Barker	Barker undertook a desktop, standard and complex assessment and no aboriginal cultural heritage was found.
Proposed Masters Home Improvement Centre Florence Street and Midland Highway Shepparton CHMP	CHMP	2013	Jo Bell and Ashley Edwards	No aboriginal cultural heritage material found.
Proposed Water Reticulation Extension: Reedy Swamp Road, Shepparton, Desktop, Standard and Complex Assessment	CHMP	2013	Matthew Barker	Two new aboriginal sites were located during the complex assessment. They included 2 subsurface artefact scatters comprising of quartz, chert and silcrete material.
Greater Shepparton City Council – Upgrade of Watt road, Shepparton - Mooroopna	CHMP	2013	Gaye Sutherland	Study undertaken within close proximity to River Connect activity area. No cultural material found. Lack of mature trees and high degree of ground disturbance in the form of sand quarrying
Mooroopna West Growth Corridor – Proposed Flood Mitigation Works	CHMP	2012	Maya Barker	Standard assessment identified one scarred tree containing 2 cultural scars.
Shepparton South Growth Shared Pathway Kialla	CHMP	2012	Gaye Sutherland	Study did not locate any cultural material and suggested that previous ground disturbance has occurred in the past from track maintenance and grading for a subdivision.
Tom Collins Drive Landscape and parking Project Shepparton	CHMP	2011	Gaye Sutherland	No aboriginal cultural heritage material located and standard assessment indicated prior disturbance and the removal of the original topsoil layer.
Broken River – Kialla landfill rehabilitation site – Shared path, Shepparton	CHMP	2011	Gaye Sutherland	A complex assessment indicated no cultural heritage material and a lack of mature trees
Yarna Gurtji Shared Path Goulburn River , Shepparton	CHMP	2010	Gaye Sutherland	This standard assessment found no cultural heritage material
Goulburn Valley Freight Logistics Centre Drainage Outfall, Mooroopna, Victoria: CHMP	CHMP	2009	Andrew Orr	1 new archaeological site was found during the complex assessment consisting of a sandstone anvil
Gemmils Swamp Constructed Wetland Mooroopna, North East Victoria	CHMP	2009	Siobhan Paterson	Cultural heritage material was located during the complex assessment. The site includes 12 stone artefacts comprising of quartz, flint, trachyte, chalcedony and silcrete
East Shepparton Pressurised Pipeline Scheme, City of Greater Shepparton	CHMP	2009	Chris Kaskadanis, Robyn Jenkins and Monique Jacobs	No cultural heritage material found. Low potential for subsurface artefact scatters due to the prior disturbance due to the formation of the channels.
Katandra Gravity Pipeline Scheme, City of Greater Shepparton	CHMP	2008	Chris Kaskadanis	A standard assessment was carried out for a proposed pipeline route and no cultural heritage material was identified. The study found that the study area was subject to prior disturbance.

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Literature	Type	Date	Author	Summary
Goulburn Freight Logistics Centre, Mooroopna, Victoria: Cultural Heritage Management Plan	CHMP	2008	Darren Griffen, Jaclyn Ward and Jen Burch	The complex assessment located 4 new aboriginal places consisting of isolated artefacts and artefact scatters. 5 other existing sites were located. All these sites include artefacts manufactured from the raw materials silcrete and quartz.
An Archaeological Survey of the Kialla Landfill site, Shepparton, Victoria	Survey	2007	Andrew Orr	7 aboriginal heritage places were identified during the study including artefact scatters and isolated artefacts.
Housing Subdivision, Shepparton North : Cultural Heritage Management Plan	Survey	2007	Matthew Chamberlain and Sarah Myers	No aboriginal heritage material was identified during the study. The study found that the area was subject to prior ground disturbance due to orchard activities.
An Archaeological Survey, 520 and 530 Goulburn Valley Highway, Shepparton	Survey	2007	John Hyett	No aboriginal cultural heritage identified during the survey.
Archaeological Assessment of Three Properties in the Shepparton North Growth Corridor, Final Report prepared for Earthtech Pty Ltd on behalf of SS Urban Pty Ltd	Assessment	2006	Joanne Bell	No aboriginal cultural heritage identified. The study found that the area was heavily disturbed by agricultural activities and the building of dwellings.
An Archaeological Survey, 470-530 Goulburn Valley Highway Shepparton	Survey	2006	John Hyett	No aboriginal cultural heritage identified during survey
Report on an Archaeological Survey of a proposed Residential Development Site, Channel Road, Shepparton, Final Report to Earth Tech Pty Ltd 2005	Report	2005	David Rhodes and Natalie Paynter	No aboriginal cultural heritage identified during the survey. Evidence of ground disturbance up to 500mm deep due to orchard activities.
Cultural Heritage Assessment, Proposed Water Reuse site, North Shepparton, North East Victoria	Assessment	2004	Vanessa Edmonds	No aboriginal cultural heritage identified during the survey. Evidence of prior disturbance due to agricultural activities.
An Archaeological Survey of the Proposed Goulburn Freight Logistics Centre, Mooroopna, Victoria	Survey	2004	Taryn Debney	The survey located 4 aboriginal sites including 1 artefact scatter and 3 isolated artefact scatters. Raw material included red silcrete and quartz
Cultural Heritage Assessment, The Boulevard Rezoning Proposal, Shepparton, North East Victoria	Assessment	2004	Vanessa Edmonds	One aboriginal cultural heritage site was located consisting of a scarred tree.
Two Proposed Water Storages at Shepparton, North East Victoria	Assessment	2004	Vanessa Edmonds	No aboriginal cultural heritage material was located during survey
Proposed Residential Estate, Kalimna Drive and Dennison Street, Mooroopna, Cultural Heritage Assessment	Assessment	2003	Andrea Murphy and Lucy Amorosi	No aboriginal cultural heritage located during the survey.
Cultural Heritage Assessment, Welsford Street Alum Sludge Outfall Pipeline, Shepparton, North East Victoria	Assessment	2003	Vanessa Edmonds	No aboriginal cultural heritage material found during disturbance. Survey indicated previous ground disturbance from urban and rural activities.
An Archaeological Survey Along the Causeway between Mooroopna and Shepparton, Victoria	Survey	2002	Jenny Tulloch	2 aboriginal scarred trees were located during the survey.

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Literature	Type	Date	Author	Summary
An Archaeological Survey of Options N1 and N2, Shepparton Bypass, Shepparton, Victoria	Survey	2001	Jenny Tulloch and Gary Vines	During the survey 17 aboriginal heritage sites were located including scarred trees and isolated artefacts. Raw material includes quartz and hornfels
An Indigenous Heritage Assessment of the Shepparton Shared Paths, Mooroopna, North East Victoria	Assessment	2001	Vanessa Edmonds	No aboriginal cultural heritage was found during the survey
An Indigenous Archaeological Assessment of the Proposed Mooroopna – Shepparton Effluent Transfer Pipeline, North East Victoria	Assessment	2000	Vanessa Edmonds	No aboriginal cultural heritage found during the survey. Edmonds considered the floodplain low archaeological sensitivity.
Archaeological Background Report For the Shepparton Bypass EES Study Stage 1 Draft	Desk Top Assessment	1995	Roark Muhlen-Schulte	This assessment found 48 sites within the proposed bypass. Sites included scarred trees, artefact scatters, burials, earth features and shell middens.
Heritage Impact Study of the Proposed Community Surface Drain 17G, Shepparton Drainage Area	Heritage Impact Study	1992	Debra Lusty	This desktop study concluded that the proposed drain traversed through areas of high archaeological sensitivity. Potential material included scarred tree, mounds, burials and artefact scatters.
Heritage Impact Study of the Proposed Community Surface Drain 62G, Shepparton Drainage Area	Heritage Impact Study	1992	Debra Lusty	This desktop assessment found that the proposed 62G drain traversed areas of high archaeological sensitivity. Potential material included burials, middens, scarred trees and surface sites.
Aboriginal Associated with the Murray Valley Study area Report for The Victorian Land Conservation Council	Report	1983	Wayne Atkinson and Annette Berryman	This report provides a detailed summary of the aboriginal life ways within the study area. The study discusses the different clan groups who make up the Yorta Yorta clan and discussed how the aboriginal people have lived since the time of European arrival.

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4.7 Land Use History

The first Europeans arrived to the Shepparton region during the early 1840's were known as squatters and they established large rural properties including Tallygaroopna, Arcadia, Ardpatrick and Toolamba stations. These properties introduced agricultural pursuits to the region in the form of cattle and sheep grazing. Land selection laws were enacted in 1860 allowing for selectors to take up freehold land. The introduction of the selectors resulted in a growing agriculture industry including fruit production, dairy farming, cropping and pasture establishment.

Jones suggests that during the depression of the 1890's a system of levy banks were constructed along the Goulburn River as an unemployment relief project (1995 p 44). Man made canals and pontoons were cut into existing creeks along the flood plain enabling large felled trees to be placed on the edge of the river for transportation by riverboat (Jones 1995 p 44). Saw mills were established along the Goulburn and Broken Rivers, the very first of which was located south of Mooroopna in 1874 producing sawn sleepers and heavy construction timbers for the growing railway system and expanding colony (Jones, 1995 p.33).

Agricultural activity within the Murray Valley and the Goulburn region intensified after 1910 following the introduction of the State Rivers and Water Supply Commission (Jones 1995). The commission managed the growing irrigation channel system which was associated with the construction of the Goulburn Weir and Waranga Basin (Debney 2004 p 22). Extensive earthworks were undertaken within the region constructing earthen channel transporting the valuable irrigation water to the farmer's crops and pastures.

Other historic land use within the activity include accommodation for aboriginal people along the flats located on the flood plain between Shepparton and Mooroopna after the migration from Cummeragunga Mission Station in 1939 (Sutherland 2013 p 1). The Yorta Yorta Nation Aboriginal Corporation was set up by descendants of people involved in the walk off which came about as a result of dissatisfaction with the management of Cummeragunga Mission Station, and the desire of people to find work. By the early 1950s approximately 300 people were living on the river flats, moving to the higher ground of Daish's Paddock when the river flooded (Muhlen-Schulte 1995: 11).

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The activity area is within part of the States Crown reserve system - namely Shepparton Regional Park. The area is widely used for recreational pursuits including fishing, bushwalking, bike riding and four wheel driving activities. Weight (1993) suggests that sand mining took place in the wider region during the early 1980s, however, it is unclear whether mining extended into the activity area. Anecdotal evidence suggests large excavations occurred in the Shepparton Regional Park and Gemmills Swamp Wildlife Reserve during this period.

4.8 Historical and ethno-historical accounts in the geographic region

Jones cited in Tulloch (2002) suggests that the first non-aboriginal contact with Aboriginal people within the study area occurred in January 1838 when Joseph Hawdon and Charles Bonney passed through the Shepparton area.

In May 1838, the Government appointed George Augustus Robinson as Chief Protector of Aboriginal People for the Port Phillip District (Mulhen-Shulte 1995 p 6). An Aboriginal Protectorate station was operated at Murchison between 1840 and 1849 (Lomax 1991) that was replaced in 1850 by an official post of the Guardian of Aborigines, with Thomas appointed Honorary Protector (Muhlen-Schulte 1995 p 6). It is probable that Aboriginal people were extensively employed during this period as station hands (Morgan 1994 p 142) and domestic staff, particularly in the absence of non-Aboriginal labour during the gold rush years.

Another protectorate located in New South Wales called Cummeragunga was established in 1883 (Sutherland 2012 p 14). This protectorate was adjacent to the Maloga Mission which was established by David Mathews on his property in 1874 and many of the Maloga resident's resettled to the Cummeragunga protectorate in 1889 (Barker 2012 p 23).

According to Griffen, Ward and Burch (2008) many Aboriginal people worked the land living on farms and pastoral stations. Aboriginal people worked in local logging industry, gold mining and fishing in the nearby Goulburn and Murray Rivers. The population living on the missions declined during the 1920's with the Coranderrk mission station remaining open until 1924 when pressure from the government forced the closure. Cummeragunga remained open and in 1939 aboriginal people walked off the mission. The aboriginal people who walked off the Cummeragunga Mission belonged to the Yoda Yoda (Yorta Yorta) clan who according to Clarke cited in Muhlen-Schulte (1995) occupied the lower section of the Goulburn river to the junction of the Murray River.

Preliminary Assessment of Aboriginal Cultural Heritage

By the mid 1950's approximately 300 people lived on the river flats between Shepparton and Mooroopna. This area is known as "The flats" and the people living in this area moved to the higher ground of Daish's paddock during times of flood (Muhlen-Schulte 1995 p 11). The aboriginal historical site "The Blue Moon" was selected by the Mooroopna and District Housing for Aborigines in 1958 and 10 prefabricated houses were erected. This area was named Rumbalara and was occupied in 1958 (Orr 2009 p 17).

The Yorta Nation Aboriginal Corporation (YYNAC) is the custodian of Aboriginal cultural heritage in the study area and was incorporated on 27th November 1998 under the *Aboriginal Councils and Associations Act 1997* (Cth) and represents all Yorta clans and family groups (Baker 2012 p 26). These include Kailtheban, Wollithiga, Moira, Ulupna, Kwat, Yalaba, Nguaria-illaum-wurrung and Bangerang clans (Seidel & Heteyey cited in Barker 2012 p 26).

4.9 Registered Aboriginal Party information about the Aboriginal cultural heritage

Yet to be inserted.

Preliminary Assessment of Aboriginal Cultural Heritage

4.10 Conclusions from the Desktop Assessment

It is evident from the number and range of Aboriginal places that have been recorded within 5 km of the activity area that the Goulburn River, Broken River and Seven Creeks region has been well used by Aboriginal people. Abundant food resources were available in the numerous species of birds, animals and fish as well as a range of plant foods. Bark was available from the red gums along the rivers, providing shelter and materials for containers, canoes and shields. Wood was also readily available for fuel, and of course permanent water was present. The number of scarred trees and artefact scatter sites that have been recorded are evidence of Aboriginal occupation and a range of activities being undertaken by people living in the area.

However, the literature review indicates that over half of the thirty three (33) archaeological assessments undertaken within the region found no cultural heritage material. In these cases, it was suggested that forestry practices, agricultural pursuits and development on the floodplain had resulted in extensive significant disturbance.

Nonetheless, previous ethnography and archaeological surveys suggest that there is a high likelihood that Aboriginal cultural heritage is present within the activity area, particularly in those areas where shared paths are proposed in areas not already impacted by the *existing path network* (where the inherent likelihood of locating Aboriginal cultural material is very low due to the level of past disturbance).

5. Field Assessment

Field assessment was undertaken on 5th June 2014 by Michael Dunn with Travis Morgan, Wade Morgan and Braidon Joachim from YYNAC. The assessment areas included:

1. a 20m buffer of the centreline of paths that are proposed for development on already existing tracks, roads and paths (as provided by the proponent prior to field survey in June 2014);
2. a 50m wide transect of the approximate location of proposed paths through areas where an existing track, road or path does not exist at the time of the assessment; and
3. The approximate location of the new river crossing (north and south bank).

All areas were inspected by a combination of vehicle and pedestrian survey. Weather conditions were patchy rain periods and constraints to the survey include 100% vegetation cover, boggy wet ground and lack of access through private property along the Kidstown to Gemmills Swamp path.

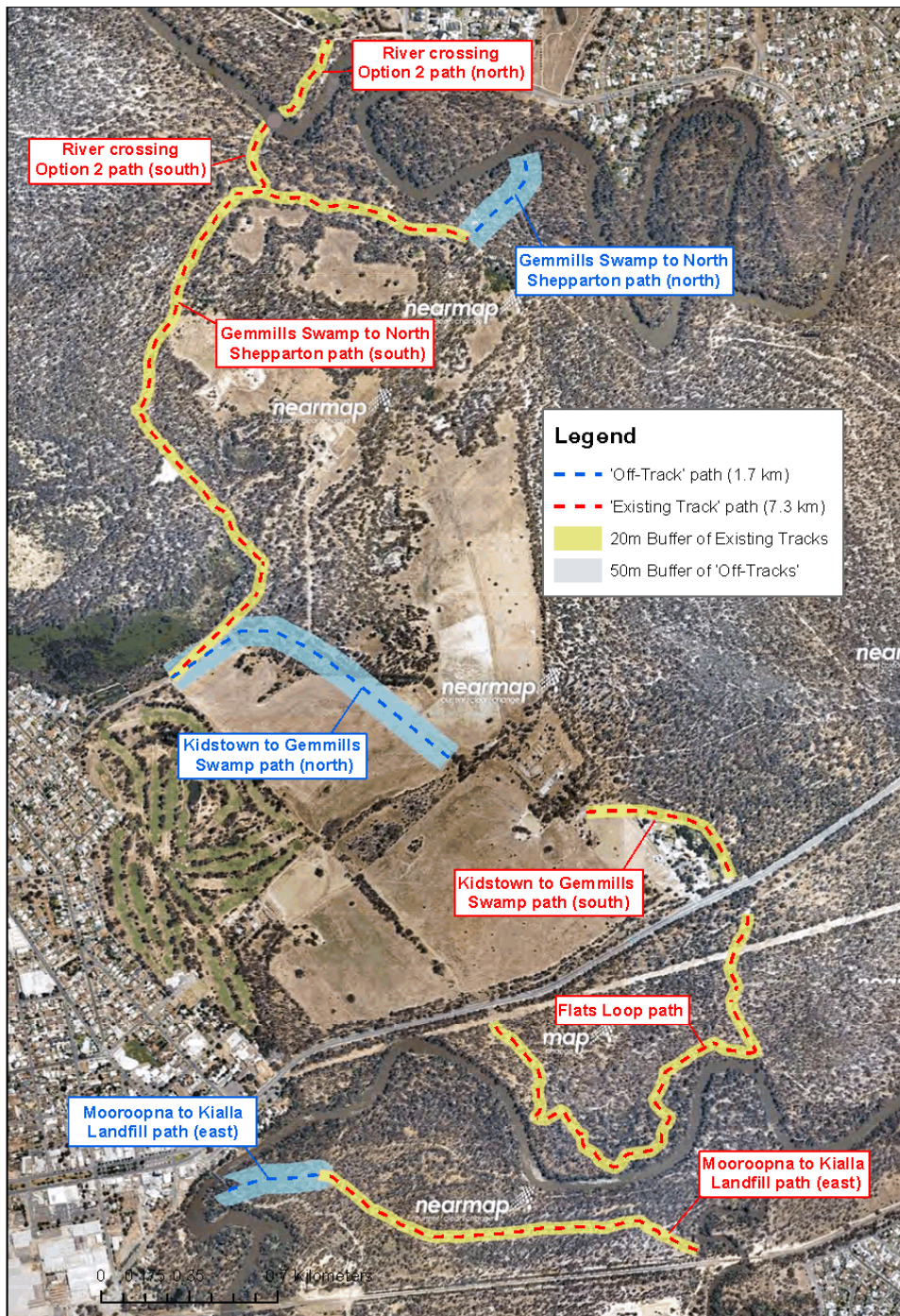
5.1 Methodology

The methodology chosen for the survey was determined in consultation with the YYNAC representatives prior to the commencement of each path. **Map 5** is a representation of the two path types discussed below.

5.1.1 *Off existing tracks*

The Kidstown to Gemmills Swamp path (north), the Mooroopna to Kialla Landfill path (west) and the Gemmills Swamp to North Shepparton path (north) were considered to be proposed 'off existing tracks' for the purpose of deciding on an appropriate survey method. In these areas a pedestrian survey was undertaken throughout the area where the approximate alignment is proposed. Individuals walked 10m apart traversing the proposed alignment. Any mature trees and areas of bare earth including billabong banks were inspected for cultural material.

Preliminary Assessment of Aboriginal Cultural Heritage



Map 5: Off track vs Existing track path alignments

Preliminary Assessment of Aboriginal Cultural Heritage

5.1.2 On existing tracks – Pre-existing formed tracks (previously disturbed)

Gemmills swamp to North Shepparton path (south), the Mooroopna to Kialla Landfill path (east), the Flats Loop path, Kidstown to Gemmills Swamp path (south), River Crossing Option 2 path (north) and River Crossing Option 2 path (south) were all considered to have been extensively used for vehicle access and previously disturbed. These alignments were inspected by slow moving vehicle (walking pace) with participants inspecting mature trees immediately alongside the track for any cultural scars.

The Flats Loop path (although regarded as disturbed) was inspected by foot due to the condition of the existing track. The alignment through the Kidstown to Gemmills Swamp path (south) has been subject to previous ground disturbance with the formation of a mini railway track and walking existing walking track. This area was inspected by foot and any large mature trees inspected for cultural modification.



Photo 5: Mooroopna to Kialla Landfill path (west) – Off Track & undisturbed



Photo 6: Gemmills Swamp to North Shepparton path (sth) – Existing track

Preliminary Assessment of Aboriginal Cultural Heritage



Photo 7: Kidstown to Gemmills Swamp path (north)



Photo 8: Kidstown to Gemmills Swamp path (north)



Photo 9: Bridge crossing Option 2 (north) – South orientation

Preliminary Assessment of Aboriginal Cultural Heritage



Photo 10: Hats Loop path

5.2 Results

5.2.1 Aboriginal Cultural Heritage

During the survey no new Aboriginal places were located, however potential areas of cultural sensitivity were identified. They included Kidstown to Gemmills Swamp path (north), Mooroopna to Kialla Landfill path (west) and River Crossing Option 2 path (north and south). All other paths were regarded as previously disturbed.

5.2.2 Ground Disturbance

During the survey, evidence to suggest that large areas within the activity area have been subject to prior ground disturbance was observed. The remnants of sand extraction sites and logging together with levee bank networks exist throughout as well as an established track network that is used regularly for various high impact recreational pursuits (Four wheel driving and motor cross bike riding). These activities are likely to have significantly reduced the possibility of encountering intact Aboriginal places within large areas of the activity area. The level of disturbance by each of these activities is shown in **Photos 11-14**.

Preliminary Assessment of Aboriginal Cultural Heritage



Photo 11: Levee bank construction and traffic - Gemmills Swamp to North Shep (north)



Photo 12: Sand extraction site adjacent to Gemmills Swamp to North Shepparton path (north)

Preliminary Assessment of Aboriginal Cultural Heritage



Photo 13: Historical logging - Gemmills Swamp to North Shepparton path (north)



Photo 14: Existing track, retaining wall on Kidstown to Gemmills Swamp path (south)

Preliminary Assessment of Aboriginal Cultural Heritage

5.2 Protection of existing sites

The desktop assessment indicated that there are many sites within the region, however there are ten (10) previously recorded Aboriginal Places that are within 50m of the defined activity area. In order to avoid harm to these sites the following matters should be considered.

5.2.1 VAHR 7925-0010 - Shepparton Golf Club 1 (Scarred Tree)

VAHR 7925-0010 is located within the specified search distance from River Crossing Option 2 path (north). Prior to the commencement of the construction of the path representatives from YYNAC and the Greater Shepparton City Council (GSCC) will inspect the site accompanied by a suitably qualified Cultural Heritage Advisor (CHA). During the inspection the parties will discuss the location of the Aboriginal Place in relation to the final track alignment, location of the bridge approaches, abutments and anchor points which will be identified by GSC and chosen such that they do not encroach on VAHR 7925-0010. Ancillary facilities including lay down yards, stockpile sites and truck access used to construct the new bridge are also to be discussed on site and located outside the mapped site extent.

5.2.1 VAHR 7925-0369 - Young's Bend State Forest 1 (Artefact Scatter)

VAHR 7925-0369 is located within the specified search distance from the Gemmills Swamp to North Shepparton path (south). Prior to the commencement of the construction of the path representatives from the YYNAC and the GSCC will inspect the site accompanied by a suitably qualified CHA to discuss required measures required to protect the site. The construction of this path will be undertaken on an existing road and the construction will not extend into the mapped site extent of VAHR 7925-0369.

5.2.3 VAHR 7925-0370 - Young's Bend State Forest 2 (Artefact Scatter)

VAHR 7925-0370 is located within the specified search distance from the River Crossing Option 2 path (south) and Gemmills Swamp to North Shepparton path (south). Prior to the commencement of the paths representatives from the YYNAC and the GSCC will inspect the sites accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of these paths will be undertaken on an existing roads and the construction will not extend into the mapped site extent of VAHR 7925-0370.

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5.2.4 VAHR 7925-0372 - Young's Bend State Forest 4 (Artefact Scatter)

VAHR 7925-0372 is located within the specified search distance from the Gemmills Swamp to North Shepparton path (south) and Gemmills Swamp to North Shepparton path (north). Prior to the commencement of the paths representatives from the YYNAC and the GSCC will inspect the sites accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of these paths will be undertaken on existing roads and the construction will not extend into the mapped site extent of VAHR 7925-0372.

5.2.5 VAHR 7925-0373 - Young's Bend State Forest 5 (Artefact Scatter)

VAHR 7925- 0373 is located within the specified search distance from the Gemmills Swamp to North Shepparton path (south). Prior to the commencement of the path representatives from the YYNAC and the GSCC will inspect the site accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of the path will be undertaken on an existing road and the construction will not extend into the mapped site extent of VAHR 7925-0373.

5.2.6 VAHR 7925-0576 - Gemmills Swamp East 1 (Artefact Scatter)

VAHR 7925- 0576 is located within the specified search distance from Gemmills Swamp to North Shepparton path (south). Prior to the commencement of the path representatives from the YYNAC and GSCC will inspect the site accompanied by a suitably qualified CHA. The construction of this path will be undertaken on an existing road and the construction will not extend into the mapped site extent of VAHR 7925-0576. GSCC will ensure that construction personnel attend a site induction to prevent inadvertent damage by construction traffic.

5.2.7 VAHR 7925-0207 - Gemmills Swamp 10 (Artefact Scatter)

VAHR 7925- 0207 is located within the specified search distance from the Kidstown to Gemmills Swamp path (north). Prior to the commencement of the path representatives from the YYNAC and GSCC will inspect the site accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of this path will be undertaken on an existing road and the construction will not extend into the mapped site extent of VAHR 7925-0207. GSCC will ensure that construction personnel attend a site induction to prevent inadvertent damage by construction traffic.

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5.2.8 VAHR 7925-0208 - Gemmills Swamp 11 (Artefact Scatter)

VAHR 7925- 0208 is located within the specified search distance from the Kidstown to Gemmills Swamp path (north). Prior to the commencement of the path representatives from the YYNAC and GSCC will inspect the site accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of this path will be undertaken on an existing road and the construction will not extend into the mapped site extent of VAHR 7925-0208. GSCC will ensure that construction personnel attend a site induction to prevent inadvertent damage by construction traffic.

5.2.9 VAHR 7925-0375 - The Flat Toehold Tree (Scarred Tree)

VAHR 7925- 0375 is located within the specified search distance from The Flats Loop path. Prior to the commencement of the path representatives from the YYNAC and GSCC will inspect the site accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of this path will be undertaken on an existing earthen road and the construction will not extend within 20m of VAHR 7925- 0375. GSCC will ensure that construction personnel attend a site induction to prevent inadvertent damage by construction traffic.

5.2.10 VAHR 7925-0374 - The Flat Powerline 1 (Artefact Scatter)

VAHR 7925- 0374 is located within the specified search distance from The Flats Loop path. Prior to the commencement of the path representatives from the YYNAC and GSCC will inspect the site accompanied by a suitably qualified CHA to discuss measures required to protect the site. The construction of this path will be undertaken on an existing earthen track and the construction will not extend into the mapped site extent of VAHR 7925-0374. GSCC will ensure that construction personnel attend a site induction to prevent inadvertent damage by construction traffic.

6. Cultural Heritage Management Recommendations

6.1 Recommendation 1 - Complex Assessment

A Complex CHMP be developed to account for the proposed development of shared paths (and ancillary facilities) where the proposed alignments are regarded as 'off existing tracks'. The Kidstown to Gemmills Swamp path (north), the Mooroopna to Kialla Landfill path (west) and the Gemmills Swamp to North Shepparton path (north) were considered to be proposed 'off existing tracks'.

6.2 Recommendation 2 – Interpretive Signage

The placement of the interpretive signage should be strategically located and in close proximity to the existing track footprint - in previously disturbed ground. In areas subject to a complex assessment, the locations chosen for the signage should be determined prior to the commencement of the complex assessment and sub-surface investigations be undertaken within these areas.

6.3 Recommendation 3 – Works on Previously Disturbed Ground

No further assessment is required on path alignments that are proposed to follow the alignment of existing tracks. If works are to commence before the finalisation of a Complex CHMP, the proponent should requested the lodgement of a Standard CHMP that considers these alignments before works commence.

6.4 Recommendation 4 - Cultural Heritage Awareness Induction

The construction team undertaking the works must have a cultural heritage induction prior to the commencement of works. Inductions will include discussion of the existing Aboriginal Places that have been identified by this AACH (and discussed in the Section 61 Matters of a complex CHMP) such that the nominated works supervisor has an understanding of the general location of these sites.

6.5 Recommendation 5 - Protection of Existing Aboriginal Places

Prior to the commencement of the path representatives from the YYNAC and the proponent will inspect the sites identified by this AACH (and discussed in the Section 61 Matters of a complex CHMP), accompanied by a suitably qualified CHA. If required, protective measures including the placement of bunting on the edge of the construction footprint should be used delineating these sites from the construction area.

Preliminary Assessment of Aboriginal Cultural Heritage

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Legislation

Aboriginal Heritage Regulations 2007 (Vic)

Victorian Civil and Administrative Tribunal Act 1998 (Vic)

8. Appendices

Appendix 1: Michael Dunn Resume

Michael Dunn Resume

B. Bus (Ag Commerce), B. Arts (Archaeology)

Weebo Park Bungowannah, NSW 2640

Phone: 0419 688215 0260 2661233

Email: michaeldunn74@bigpond.com

Professional Profile

An experienced and exceptionally well skilled project construction team member with specialised experience in land access, environmental compliance, cultural heritage management, construction supervision and client representation. An excellent communicator who understands the risks associated with pipeline construction and provides leadership and sensible solutions when challenges arise.

Key Competencies

Communications

Experienced in consultation with a range of stakeholders including aboriginal communities, land owners, contractors, statutory bodies, proponents, design engineers and all levels of management. Ability to communicate with the construction team at all levels undertaking the job in a safe manner avoiding harm to people, third party assets, the environment and cultural resources.

Technical Writing

Strong skills associated with report writing including construction procedures, cultural heritage plans, quality plans and dilapidation reports.

Leadership / Management

Ability to lead and manage people within a construction context. Effective in management of construction personnel striving to produce an excellent product in the safest manner.

Innovation

Constantly investigating how to undertake construction works more efficiently and safely during the design, implementation and close out stage of a project.

Industry Awareness

Understanding the operational aspects and commercial drivers of multiple industries including agriculture, cultural heritage and gas pipeline construction. This knowledge base facilitates effective communication with the different stakeholders, rapid mobilisation into projects and ready alignment with the project team's goals.

Preliminary Assessment of Aboriginal Cultural Heritage

Risk and Strategic Management

Experienced in undertaking risk assessments for plant, pre starts, job safety analysis and contributing to 2885 pipeline design risk assessment. A comprehensive understanding of the inherent risks associated with pipeline construction provides a benchmark to make decisions improving the productivity of the delivery team and safety of the work force. This knowledge enables the mentoring of less experienced project team members resulting in a better understanding of the overall risks associated with pipeline construction.

The knowledge associated with project risk enables a platform for effective strategic management. Based on this experience potential opportunities can be exploited and any foreseen potential risks managed appropriately.

Career Summary**Cultural Heritage advisor / Archaeologist**

Project Archaeologist

Project Archaeologist

Cultural Heritage Advisor

Cultural Heritage Advisor

General Pipeline Civil Works Inspector

Project Archaeologist

Property Liaison officer

Senior Site Construction Supervisor

Land Access Coordinator

Construction Services Manager

Land Liaison and Environmental Manager

Site representative and land liaison manager

Parklands Albury Wodonga Walking trails

Rivcott Gin Site and Bridge Project

Baxters Quarry Project

Vic Roads Projects North East Victoria

Murray Goulburn Trading, Vic Roads

AJ Lucas

Mark Dugay-Grist (GLNG Project)

APA Group

Transfield Services

Maloney Field Services

John Holland Group

AJ Lucas

Alinta

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Appendix 2: Damian Wall Resume

Damian Wall

BApp Sc, MEnv Mgt, MEIANZ, CENVP, GradCert CHM

Managing Director

I completed my Bachelor of Applied Science in 1996, graduating with a Distinction average, a Masters Degree in Environmental Management and Restoration in 2005 and I gained accreditation as a Certified Environmental Practitioner (CENVP) by the Environment Institute of Australia & New Zealand in 2008. I have recently completed a Graduate Certificate in Cultural Heritage Management (CHM) through Flinders University on my way to completing a CHM Masters Degree (December 2014).

My work experience has included coordinating the consultation and strategic planning components of several catchment scale projects, including the Murrumbidgee Catchment Action Plan (1998) and a regional strategy for the Border Rivers in northern NSW.

I am an experienced Project Manager and Environmental Compliance Auditor and I am a registered Principle Auditor through RABQSA. I work regularly with the NSW Roads & Traffic Authority in various capacities, predominantly site management and Compliance Auditing, development and implementation of Environmental Management Plans (CEMP) and Erosion & Sediment Control Plans (ESCP).

I have 15 years experience in the use and management of Geographic Information Systems (GIS), and have many examples of excellent products and services provided through extension of this skill set.

I have been engaged by CSIRO, numerous Universities and the NSW Nature Conservation Trust to conduct remote area field work over the last 10 years. I specialise in remote area first aid, vehicle recovery, arid zone survival and training in all of the above.

Most recently, I have used all these skill sets to position myself as a Senior Consultant with a junior minerals and petroleum exploration company, Pangaea Resources. In this retained engagement I manage all aspects of environmental approvals, cultural and threatened species clearance and native title negotiations (Lead Negotiator) in WA, NSW & NT. My involvement at the company level extends into all aspects of the exploration field from low impact preliminary surveys to seismic and drilling operations.

Professional Affiliations

- Ecological Consultants Association of NSW Inc.
- Certified Environmental Practitioner (CENVP).
- Full Member Environment Institute of Australia and New Zealand (EIANZ).
- Member of the Australian Water Association.
- Member of the Australian Network for Plant Conservation.

**Fields of Competence**

- Environmental Compliance Auditing
- Sediment and Erosion Control (Design & Construct)
- Stakeholder liaison and facilitation
- Social and community planning
- Environmental Impact Assessment
- GIS mapping, data collection and analysis
- Remote area field work
- Cultural site clearance
- Cultural Heritage Management Plans (Vic)

Education

- Graduate Certificate in Cultural Heritage Management, Flinders University (2012)
- Certificate in Forest Growing & Management, Ahvenbloem Academy of Education (2008)
- Master Environmental Management and Restoration, Charles Sturt University (2005)
- The Environmental Auditor Certification Workshop (2005)
- Managing Urban Stormwater Capacity Building Capacity Building Workshop, Morse McVey & Associates (2004)
- Landscape Rehabilitation Approaches & Techniques, ANPC (2003)
- ArcGIS 8.3 Advanced User Workshop, Environment ACT (2003)
- Bachelor of Applied Science (Parks, Recreation & Heritage), Charles Sturt University, (1996)

Key Clientele

- Infrastructure, Development & Construction
- Minerals & Petroleum Exploration
- Catchment Management & Landcare
- Spatial Technology
- State, Federal and Local Government
- Agricultural Sector
- Not for Profit Organisations
- Research Organisations (CSIRO)

Referees

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Mr Sunil Salhotra – CEO Pangaea Resources
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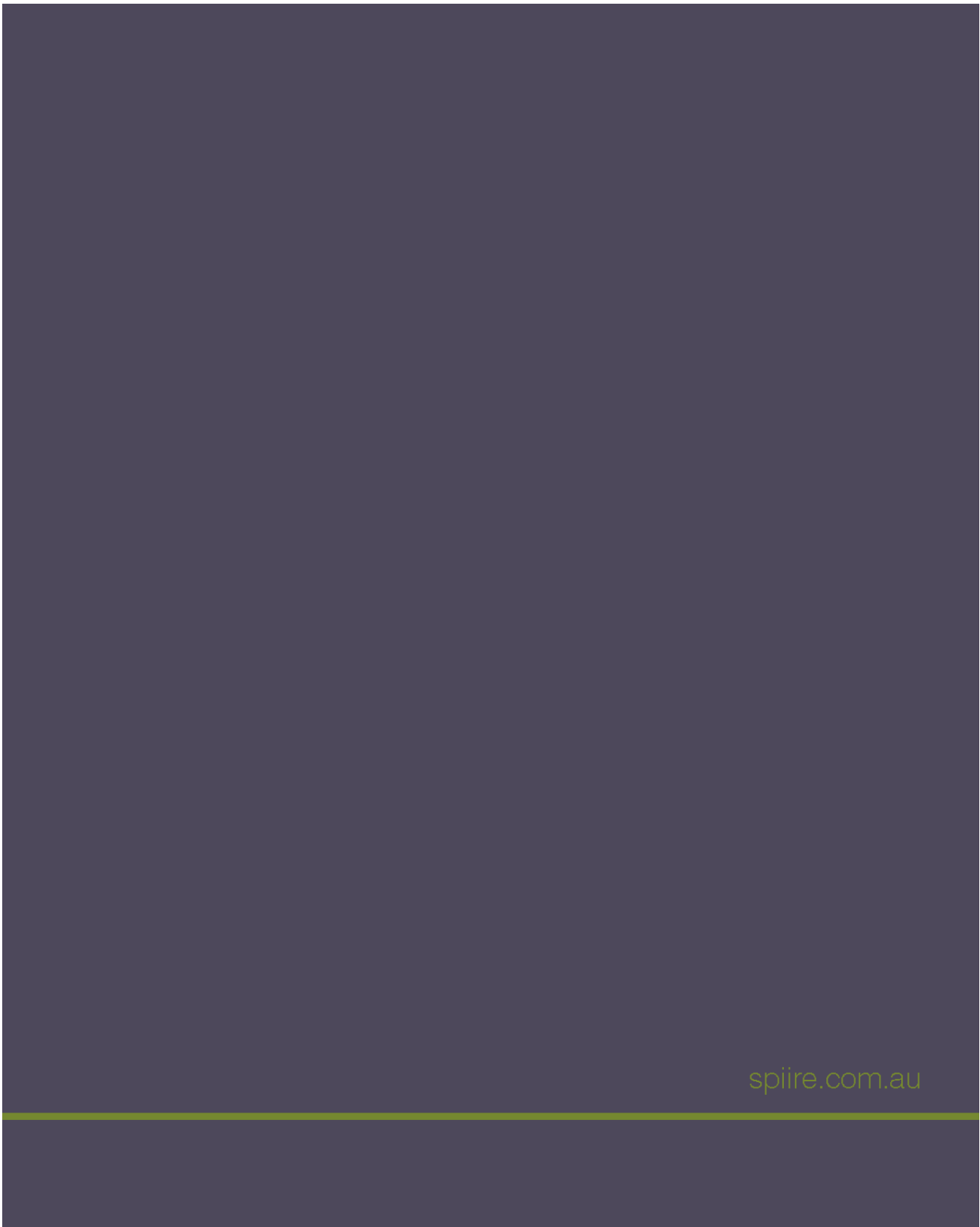
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Appendix 3: Glossary of Terms

Glossary	Definition
Artefact	An object made by a human being, typically one of cultural or historical interest.
Artefact Scatter	A surface scatter of cultural material.
Archaeology	The study of man's past by scientific analysis of the material remains of his cultures.
Angular Fragment	A piece of stone that is angular non flake like.
Core	A piece of stone or flint from which flakes or blades have been removed.
Cortex	Original or natural weathered surface of a stone.
Ethnography	The branch of anthropology that deals with the scientific description of individual human societies.
Holocene	The time from the end of the Pleistocene Ice Age (c. 10,300 BP) to the present day.
Whole flake	A sharp edged sliver of stone
Split Flake	Whole flake that has
Distal Flake	any flake on which the breakage removes the platform but retains the termination
Proximal Flake	Any flake on which the breakage removes the termination but retains the platform
Formal tool	Lithics that has undergone a sequence of production through the process of retouch to alter their shape into a specific tool type.
Ground surface visibility	The visibility of the bare ground with respect to vegetation cover.
Retouch	The modification of the knapping material by the removal of a series of small flakes.
Scar Tree	A tree containing a visual surface scar as a result of human activity i.e. the manufacture of shields and canoes.
Thumb nail scraper	A small flake with a convex scraper edge, shaped like a thumbnail and located opposite the flake's platform.
Transect	A sample strip of land used to monitor distribution within a given area.



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Appendix 2





PRELIMINARY ECOLOGICAL ASSESSMENT

RiverConnect Paths Project

2nd July, 2014

PROPONENT – City of Greater Shepparton

Preliminary Ecological Assessment Report

for

RiverConnect Shared Paths Project

at

Goulburn & Broken River Floodplain, Maroopna & Shepparton, VIC

Prepared for and on behalf of

City of Greater Shepparton Council

by



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Version 1, 2 July 2014

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Executive Summary

Red-Gum Environmental Consulting Pty Ltd has been engaged to prepare a Preliminary Ecological Assessment report assessing proposed new alignments for the existing shared path (bicycle and pedestrian) network throughout the Shepparton Regional Park, on the Goulburn & Broken River floodplain between Shepparton and Maroopna. This area has many social, cultural, environmental and economic values and the Greater Shepparton City Council ("the Proponent") have developed the RiversConnect Paths Project in order to utilise these values for the local economy and community.

The site is located within an area of River Red Gum (*Eucllyptus camaldulensis*) dominated riparian forest bordering Grey box (*E. microcarpa*) open areas along the Broken River to the south. The northern and central parts of the Shepparton Regional Park also contain areas that can be classified as Sand Ridge Woodland that is sparsely influenced by White Cypress Pine (*Callitris glaucophylla*) and Buloke (*Allocasuarina luehmannii*).

The first Europeans arrived to the Shepparton region during the early 1840's and agricultural pursuits were introduced to the region in the form of cattle and sheep grazing, forestry and irrigation. These landuses have left an impression on the landscape as seen today in the form of a distinct lack of structural variability (forestry) and levees (flood protection and irrigation). More recently the study area has widely used for recreational pursuits including fishing, bushwalking, bike riding and four-wheel driving activities. There is also evidence to suggest that sand mining took place in the area during the early 1980s.

The proposal in its current form, will see the development of 9 km of proposed interconnecting shared paths covering an area of 2.7 ha of the site which includes standing native remnant vegetation, modified sandy rises and riparian habitat.

Over 16 hours of survey time was conducted between 15th June and 2nd July 2014. Survey design was guided by the NSW Threatened Species Survey and Assessment Guidelines (DECCW, 2004). Online tools including the Commonwealth Protected Matters Online Search Tool and the Biodiversity Interactive Map, Version 3.2 were also consulted.

During field survey, thirty-six (36) species of fauna were recorded within the study area – two (2) of which (Brown Tree-creeper & Azure Kingfisher) are listed as *Near Threatened* in the Flora & Fauna Guarantee Act (FFG Act). In addition, eighty-two (82) flora species were recorded – thirty four (34) native - of which none are regarded as threatened. No fauna or flora (including Endangered Ecological Communities) listed under the Environment Protection Biodiversity Conservation Act (EPBC Act) were identified throughout.

By way of a caveat to the results - no fauna trapping or specialist survey techniques (e.g. harp netting, deployment of an ANABAT or targeted reptile searches) were employed given the preliminary nature of the project scope. Likewise, no detailed vegetation transects were performed.

Preliminary findings/recommendations:

1. Consideration be given to eliminating the proposed track marked as *Gemmills Swamp to North Shepparton (north)* through the undisturbed area towards the Goulburn River. The track alignment crosses several secondary 'runners' that drain the floodplain post flood and will result in unnecessary disturbance to an otherwise stable riparian environment (given that River Crossing Option 2 site is met by existing track on both sides of the river).

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2. Soils in the northern section of the works (along Cemetery Road) are highly erodible and dominated by sandy loam. Consideration be given to development of an Erosion & Sediment Control Plan from any works in these areas that will result in the intensification of overland flow (i.e. off a sealed track). The probability of intensified flow resulting in erosion in these environments is very high.
3. In areas where the proposed paths are to be constructed 'off-track', an Ecologist or suitably qualified personnel be engaged to flag tape the final alignment. Areas such as small *Gilgai type wetland formations* (repeated mounds and depressions formed on shrink-swell and cracking clay soils) are important 'retreat points' for amphibians utilizing the forest floor. Likewise, areas where native shrubs persist, areas of large log stacks and sandy ecotones are to be avoided as each of these aspects of the environment are important habitat features.
4. A large variety of introduced grasses and groundcovers occur along some of the proposed path alignments. Some of the species present are significant weeds within the catchment - Paterson's Curse (*Echium plantagineum*), African Lovegrass (*Eragrostis curvula*), Cape Broom (*Genista monspessulana*) and Soursob (*Oxalis pes-caprae*). Of note, is the establishment of isolated pockets of the Restricted Weed, Bridal Creeper (*Asparagus asparagoides*) and several Undeclared Weeds (which have the potential to be widespread) including Jerusalem Cherry (*Solanum pseudocapsicum*), Fleabane (*Conyza sumatrensis*) and Phalaris.
5. Weed infested areas should be identified, mapped and highlighted in the field, ahead of the construction program by a suitably qualified contractor. Chemcert accredited contractors are to be invited to the field to inspect the mapped sites and 'sign-off' on the agreed method of control. Works to control weeds are to focus on the fringe of existing tracks and care should be taken to ensure that any herbicide application does not impact on off-target species (desirable native plants).
6. Slashing is not recommended along the new paths. Whilst desirable from a management and health and safety consideration, slashing substantially increases the risk of spreading existing weeds and introducing new weeds to the regional park.
7. If revegetation activities are proposed along any of the alignments, Red-Gum recommends using cardboard tree guards only. Plastic guards are being used in several parts of the Shepparton Regional Park, however when dislodged from their stakes, they become a mobile form of rubbish.
8. There seems to be a trend with lodging rubbish amongst trees along the existing tracks and several illegal rubbish dumping sites were recorded. Consideration is to be given to managing waste (i.e. bins) along the proposed alignments. Cans, tins and bottles can be a hazard to small native marsupials and incidents resulting in death (from being stuck in open tin cans and bottles) are not uncommon in high use areas like the regional park.
9. Several areas that have been subject to 'Bardi Grubbing' were identified along the existing tracks within the regional park. Bardi Grubbing involves the removal of the soil surface to locate grubs for fishing and causes substantial damage to the understory. Signage should consider highlighting that this activity is NOT permitted without a permit.
10. Siting of ancillary facilities (e.g. toilets) are to be located away from areas of Sand Ridge Woodland which are fragile, currently recovering and have highly porous/leachable soils.

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11. The Mooroopna to Kialla Landfill path (east) seems unnecessary and passes through very difficult terrain that includes several secondary 'runners' that drain the floodplain post flood. Consideration be given to relocating this alignment to the roadside verge of Watts Road which may need to be widened to accommodate the path. Other options to connect Kialla Landfill to Mooroopna include an new pedestrian bridge that connects existing paths south of the Goulburn River with the Flats Loop path. This option would negate the need to rebuild the Watts Road bridge completely or add a pedestrian walkway (which is likely to be required to facilitate safe passage).
12. The Mooroopna to Kialla Landfill path is currently much lower than its surrounds and crosses heavy black to grey cracking clays that will need to be built up such that it is higher than the surrounding floodplain. Path design will require consideration of flood flows and should be designed with a definite 'crown' to facilitate movement of overland flow away from the alignment (otherwise these areas will become impassable when wet and ultimately the subsurface will fail resulting in slumping).
13. Passing under the existing Rail Corridor Bridge over the Goulburn River is potentially a safety concern that will need to be addressed. The bridge abutments and worked bank below the existing track is scouring, slumping and prone to mass failure if corrective works are not undertaken in the near future.
14. The proposal as it is currently designed is not likely to have a significant effect on threatened biodiversity – in particular, those threatened species identified in this report. However, further consideration of the environment is recommended when a final location of any river crossings are discussed by the proponent. An assessment of the chosen locations should be undertaken considering the riparian environment (including threatened fish, crustaceans and amphibians). Involvement of suitably qualified personnel is also encouraged during placement of the final alignment through 'off-track' areas to avoid sensitive parts of the landscape mentioned in this report.

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Preliminary Ecological Assessment

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Preliminary Ecological Assessment

1 Background

Red-Gum Environmental Consulting Pty Ltd has been engaged to prepare a Preliminary Ecological Assessment report assessing proposed new alignments for the existing shared path (bicycle and pedestrian) network throughout the Shepparton Regional Park, on the Goulburn & Broken River floodplain between Shepparton and Maroopna (Figure 1). This area has many social, cultural, environmental and economic values and the Greater Shepparton City Council ("the Proponent") have developed the RiversConnect Paths Project in order to utilise these values for the local economy and community.

The site is located within an area of River Red Gum (*Euclyptus camaldulensis*) dominated riparian forest bordering Grey box (*E. microcarpa*) open areas along the Broken River to the south. The northern and central parts of the Shepparton Regional Park also contain areas that can be classified as Sand Ridge Woodland that is sparsely influenced by White Cypress Pine (*Callitris glaucophylla*) and Buloke (*Allocasuarina luehmannii*).

The first Europeans arrived to the Shepparton region during the early 1840's and agricultural pursuits were introduced to the region in the form of cattle and sheep grazing, forestry and irrigation. These landuses have left an impression on the landscape as seen today in the form of a distinct lack of structural variability (forestry) and levees (flood protection and irrigation). More recently the study area has widely used for recreational pursuits including fishing, bushwalking, bike riding and four-wheel driving activities. There is also evidence to suggest that sand mining took place in the area during the early 1980s.

The proposal in its current form, will see the development of 9 km of proposed interconnecting shared paths covering an area of 2.7 ha of the site which includes standing native remnant vegetation, modified sandy rises and riparian habitat (Figure 2)

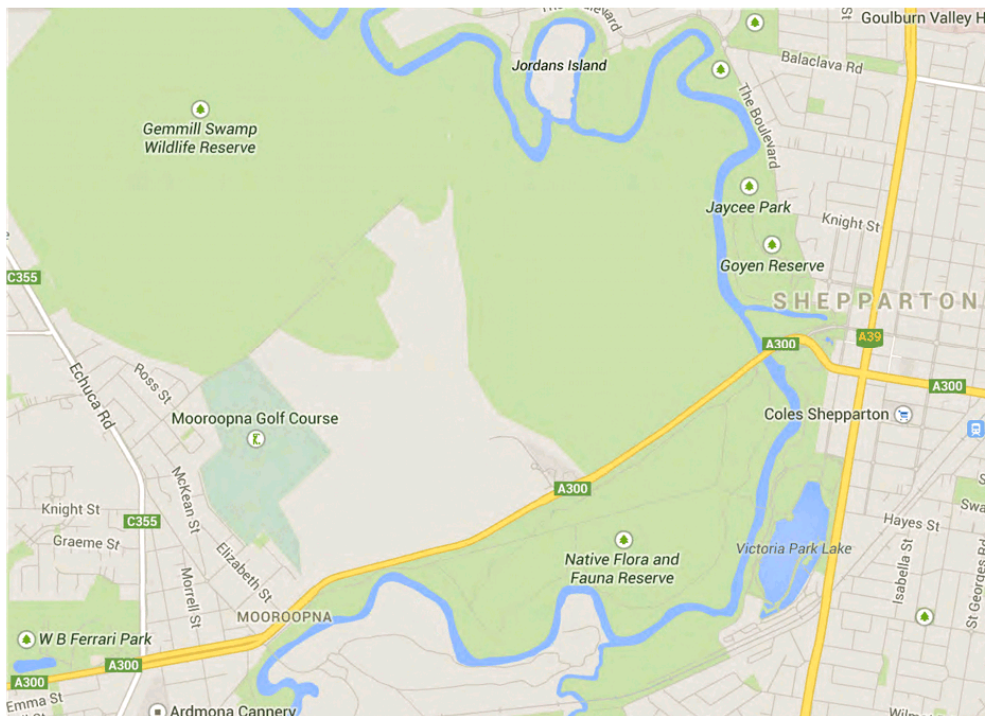


Figure 1: Site Location

Preliminary Ecological Assessment



Figure 2: RiverConnect Proposed paths, June 2014

2 Objectives of the Consultancy

The objectives of the consultancy are:

1. To obtain ecology information affecting the 'Site investigation area' to ensure the *RiverConnect Path Focus Group* make informed decisions on the construction design, alignment and placement of proposed paths in environmentally sensitive areas; and
2. To advise of further information reasonably required, if any, to guide implementation stage of the project once the design phase of the project is complete and the preferred alignment of paths, bridges and associate infrastructure becomes known.

3 Construction Method

The construction method in either of the alternate locations will involve:

- **Clearing and Grubbing:** The path alignment and any chosen bridge site(s) will require clearing and stripping such that the sub-soil is exposed for path construction. This process will likely see the complete loss of native vegetation (at the ground level, avoiding large trees) along the entire length of the path (where it is regarded as 'off-track') using excavators, tip trucks, bobcat, grader and various light vehicles.
- **Stockpiling of Native Vegetation:** Cleared native vegetation will be stockpiled on site, most likely as mulch. Larger logs that cannot be avoided, may be re-introduced to the adjacent forest environment upon approval by the appropriate authority.
- **Construction on the Floodplain:** Any pedestrian bridge construction will see excavation of the riverbank to facilitate safe access for machinery and the establishment of a semi-permanent compound site for materials and equipment on or near the chosen bridge site(s). Bridge design will also most likely see the removal/realignment of some woody debris and trees on each bank and installation of concrete bridge anchor points. Some path alignments may require installation of box-culverts on the floodplain.
- **Path construction:** The alignment will see the elevation (above the surrounding floodplain) of some proposed paths to ensure accessibility is maintained during periods of wet weather. Indications at present are that new path heights will not be such that it creates any impediment to flood flows. Path construction will see the importation of fill, road base, bitumen and concrete to the floodplain as well as possibly the establishment of temporary works staging areas and depots at strategic sites.

4 Assessment Scope

The fieldwork was conducted to assess whether or not threatened species, populations and ecological communities are likely to occur in the proposed subject site AND study area.

Subject site means the area directly affected by the proposal as defined on [Figure 2](#). **Study area** means the subject site and any additional areas, which are likely to be affected by the proposal, either directly or indirectly (i.e. the Shepparton Regional Park). In particular, the assessment considered:

1. The extent of native vegetation and ground disturbance works required; and
2. The extent of likely impact(s) that intensified use of the land on the vegetation within the area proposed for development. This factor requires some assumptions about what the 'likely impact(s)' might be on the site. For the purpose of the assessment, this document has been developed considering impacts typically associated with an increased 'land use' (e.g. establishment of invasive species, high pedestrian traffic through the site, permanent structure in the river etc).

5 The Existing Environment

5.1 Geomorphology

The regional geomorphology of the activity area is known as the Shepparton formation and consists of a fluvial plain. This plain is believed to be Holocene in age (12 – 10000 years) and was formed by lake and swamp deposits (LCC cited in Lusty 1992). Topography within the area is relatively flat in nature and landscape features include low sand dunes, current and prior stream channels. According to Muhlen-Schulte (1995) the existing sand dunes within the region were formed during the last glacial deposited approximately 15,000 to 30,000 BP.

Bowler (1978) identified 3 sedimentary units including the present day active Goulburn sediments, followed by the Kotupna deposit between 15,000 and 10,000 BP and then the later up to 25,000BP (Lusty, 1992). The older formation (dated 25,000 BP) is also known as the Green Gully – Tallygaroopna formation (Tulloch, 2002 p 9) and resulted from sediment deposited by rivers and streams including wind blown Aeolian deposits (Sutherland, 2013 p 15).

According to Bowler (1978) the Goulburn River course has changed twice over the past 25,000 years. Firstly the river was located closer to the Murray River during a high energy phase. Tulloch (2002) suggests the high energy phase of the river terminated with the end of the last ice age when the glaciers of the Australian Alps disappeared and the amount of water from the watershed diminished. The lack of spring melt changed the flow of the river to low energy resulting in the river moving to the present location. The low energy phase resulted in the present day topography of the riverine plain consisting of billabongs, anabranches and sections of prior ancestral streams (Muhlen –Schulte 1995, p 3) accompanied by ridges characterised by sinuous depressions (Lusty 1992).

Soils in the region average 2 metres in depth and consist of Sodic duplex soils covering prior stream, uniform calcareous sodic soil blanketing flat plains and variable grey soils covering the present day floodplains (Lusty 1992 p 5).



Photo 1: Sand ridge environs – Gemmills Swamp to North Shepparton path (south)

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5.2 Vegetation Pattern and Bioregion

The vegetation across the site is relatively homogenous comprising of River Red Gum (*Euclyptus camaldulensis*) dominated riparian forest bordering Grey box (*E. microcarpa*) associations in the south on the Broken River floodplain.

The study area has a good representation of native understorey plants but is largely one-dimensional in that very few large old trees remain within the park (history of selective logging). These trees support a large number of hollows, which are essential to supporting many bird and mammal species. There are some areas along the banks of the Goulburn River where Kangaroo Grass (*Themeda australis*) dominates whilst other low-lying depressions maintain a high cover of Tall Sedge (*Carex tereticaulis*), Pale Rush (*Juncus pallidus*), Leafy Flat-sedge (*Cyperus lucidus*) and Common Club-rush (*Eleocharis acuta*), all typical species.

The majority of the area within the Shepparton Regional Park can be described as belonging to Ecological Vegetation Class (EVC) No. 814: Riverine Swamp Forest with small areas of EVC 264: Sand Ridge Woodland in the north (Figure 3). EVC 814 is described as open eucalypt forest to 25 m tall with understorey dominated by wetland species (or opportunistic annuals during sustained dry periods) and can range from closed sedgeland or herbland to grassy-herbaceous or extremely sparse and with cover primarily leaf-litter, black water or exposed alluvium. This EVC occupies low-lying areas subject to reasonably regular flooding, typically flood-prone lower river terraces and low-lying areas adjacent to floodways through or within riverine forest (DSE, 2004).



Photo 2: Sparse but important – Grey Parrot-pea (*Dillwynia cinerescens*)

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EVC 264 is described as open pine-box woodland to 15 m tall with a small or medium shrub layer of variable density and including a range of annual herbs, grasses and geophytes, in the dense ground layer. Occupies distinctive sandy rises (or sand mounts) adjacent to major rivers and wetlands. Very sandy, deep, free draining, moderately fertile soil, developed on sand blown up by wind action from a prior stream bed (DSE,2004).

Field inspection confirmed that the mapping and description of these two EVCs is accurate as it relates to the study area.

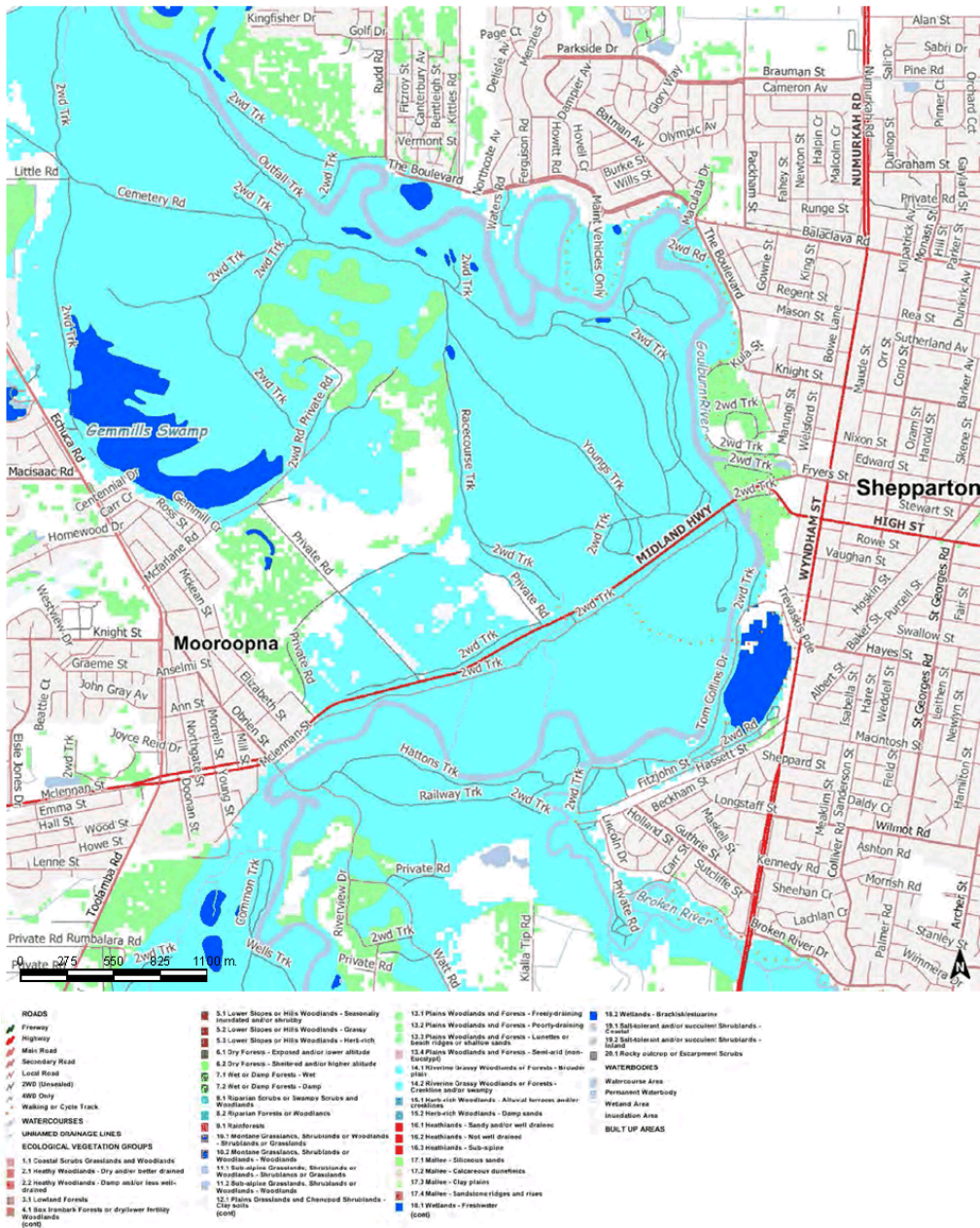


Figure 3: EVCs of the Study Area, Source: Biodiversity Interactive Map (V3.2)

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5.3 Surrounding land uses

The Goulburn River is essentially a continuous corridor of vegetation (River Red Gum forest), with ecologically important remnant creek lines intermittently adjoining the Goulburn and Broken River extending from the wider plains environs to the east and west (Figure 4).

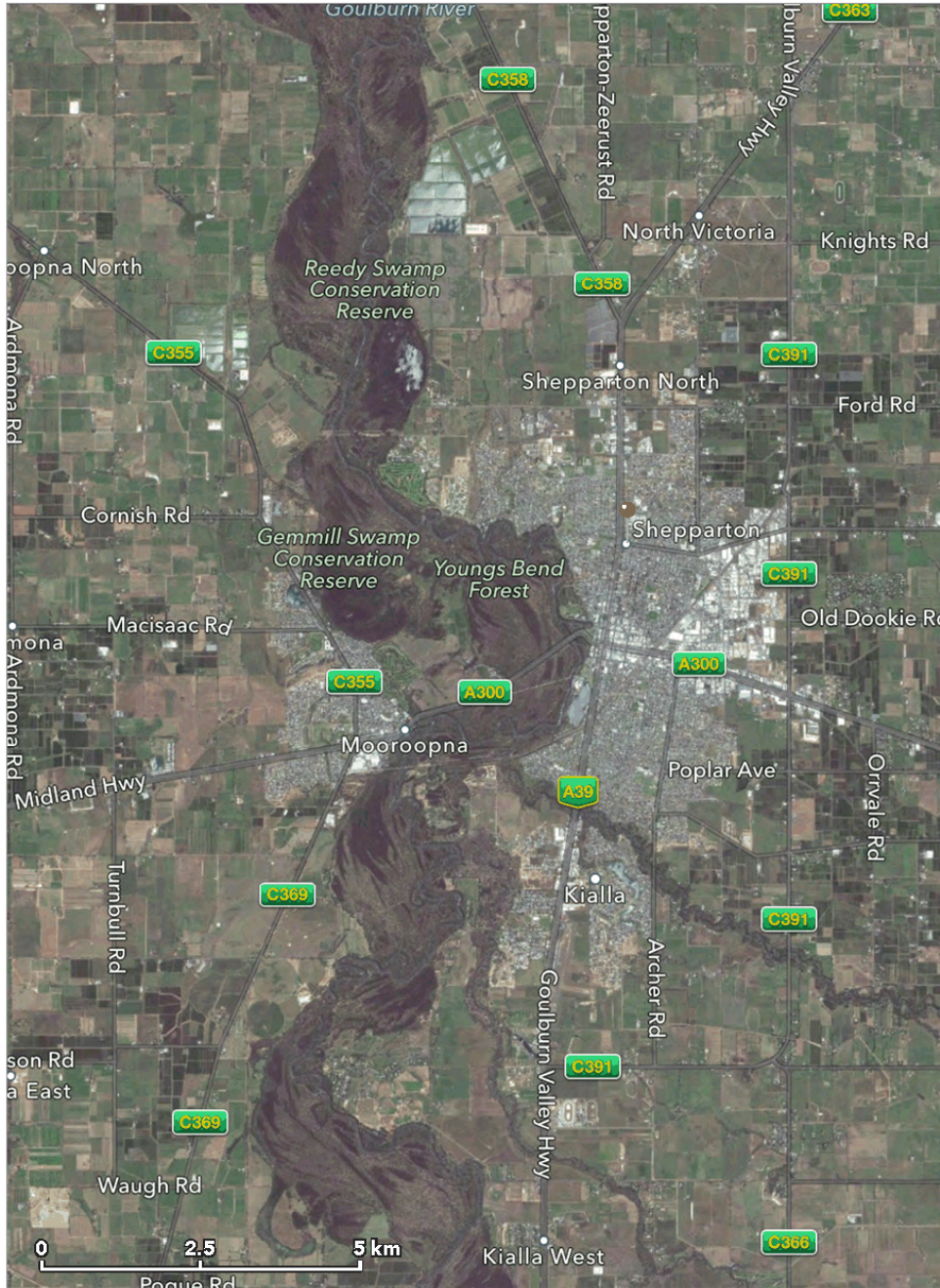


Figure 4: Land use – Continuous vegetation (Imagery: NearMap, 2014)

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6 Threatened Species, Populations & Ecological Communities

6.1 Environment Protection Biodiversity Conservation Act 1999 Threatened Species

FLORA

Consultation with the EPBC Protected Matters Online Search Tool within a 10 km radius of the site returned three (3) Critically Endangered vegetation communities, two (2) Endangered communities and three (3) Vulnerable species whose habitat may occur within that specified geographic range. Table 1 considers their likelihood of occurring at the site.

Table 1: EPBC Protected Matters Database results - Flora

Species	Preferred Habitat	EPBC Act Status	Likelihood ¹
White Box-Yellow Box Blakely's Red-Gum Grassy Woodland and Derived Native Grassland	Characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum.	Critically Endangered	No
Natural Grasslands of the Murray Valley Plains	This ecological community is naturally treeless, or almost so, and not derived from other vegetation types.	Critically Endangered	No
Seasonal Herbaceous Wetlands (Freshwater) of the Temperate Lowland Plains	These are isolated, freshwater wetlands that are usually inundated on a seasonal basis through rainfall, then dry out, so surface water is not permanently present. They have a vegetation structure that is open, i.e. woody cover is absent to sparse.	Critically Endangered	No
Grey Box (<i>Eucalyptus microcarpa</i>) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia.	Predominantly occurs on the drier edge of the temperate grassy eucalypt woodland belt. Generally occurs in landscapes of low-relief such as flat to undulating plains, low slopes and rises and, to a lesser extent, drainage depressions and flats.	Endangered	No
Buloke Woodlands of the Riverina and Murray- Darling Depression Bioregions	Characterised as woodland or open woodland with a well developed ground stratum that is usually grassy, but also includes many subshrubs and herbs.	Endangered	No
<i>Amphibromus fluitans</i> River Swamp Wallaby- grass	Moderately fertile wetlands, some bare ground and seasonally-fluctuating water levels.	Vulnerable	Potential
<i>Brachyscome muelleroides</i> Mueller Daisy	Occurs in seasonally damp situations such as shallow depressions and around the margins of swamps, lagoons and claypans.	Vulnerable	Potential
<i>Myriophyllum porcatum</i> Ridged Water-milfoil	Occurs in shallow, ephemeral wetlands including lakes, swamps, rock pools in granite outcrops, waterholes in claypans, and highly modified habitats including farm dams and drainage lines on private land.	Vulnerable	Unlikely

¹ Five categories for the 'likelihood of occurrence' of species has been used. The categories are based on recorded sightings listed in credible databases,

'Yes'	The species/community was or has been observed on the site.
'Likely'	A 'medium' to 'high' probability that a species uses the site
'Potential'	A suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as 'likely' or 'unlikely' to occur.
'Unlikely'	A 'very Low' to 'low' probability that a species uses the site.
'No'	Habitat on the site and in the vicinity in unsuitable for the species.

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FAUNA

Consultation with the EPBC Protected Matters Online Search Tool within a 10 km radius of the site returned one (1) Critically Endangered, four (4) Endangered and eight (8) Vulnerable species whose habitat may occur within that specified geographic range. Table 2 considers their likelihood of occurring at the site.

Table 2: EPBC Protected Matters Database results - Fauna

Species	Preferred Habitat	EPBC Act Status	Likelihood
<i>Bidyanus bidyanus</i> - Silver Perch	Show a general preference for faster-flowing water	Critically Endangered	Unlikely
<i>Anthochaera phrygia</i> - Regent Honeyeater	Dry open forest and woodlands on inland slopes and valleys	Endangered	Unlikely
<i>Lathamus discolor</i> - Swift Parrot	Forests and woodlands dominated by winter flowering eucalypts	Endangered	Potential
<i>Botaurus poeciloptilus</i> - Australasian Bittern	Found in wetlands with tall, dense vegetation, favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes	Endangered	Unlikely
<i>Macquaria australasica</i> - Macquarie Perch	Clear water and deep, rocky holes with lots of cover	Endangered	No
<i>Rostratula australis</i> - Australian Painted Snipe	Margins of densely vegetated swamps and wetlands	Vulnerable	Unlikely
<i>Polytelis swainsonii</i> - Superb Parrot	The Superb Parrot mainly inhabits forests and woodlands dominated by eucalypts.	Vulnerable	Potential
<i>Pedionomus torquatus</i> - Plains-wanderer	Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground.	Vulnerable	No
<i>Maccullochella peelii peelii</i> - Murray Cod	Slow flowing turbid rivers and billabongs.	Vulnerable	Likely
<i>Litoria raniformis</i> - Growling Grass Frog	Still or slow-flowing water bodies such as lagoons, amongst emergent vegetation.	Vulnerable	Potential
<i>Pteropus poliocephalus</i> - Grey-headed Flying-fox	Primary food source is blossom from Eucalyptus and roost sites are typically located near water, such as lakes, rivers or the coast.	Vulnerable	Unlikely
<i>Aprasia parapulchella</i> - Pink-tailed Worm-lizard	Occurs in primary and secondary grassland, grassy woodland and woodland communities including mallee, and box-ironbark forest with rocky attributes.	Vulnerable	No
<i>Delma impar</i> - Striped Legless Lizard	Requires relatively undisturbed native grasslands with site characteristics such as soil cracks, rocks and tussock grasses.	Vulnerable	No

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6.2 Flora and Fauna Guarantee Act 1998 Threatened Species

FLORA

Consultation with *the Biodiversity Interactive Map (V3.2)* for a 2.5km radius from the site returned three (3) three (3) Threatened species previously recorded within 5km of the site. **Table 3** considers their likelihood of occurring at the site.

Table 3: Biodiversity Interactive Map (2.5 km site buffer) - Flora

Species	Preferred Habitat	FFG Act Status	Likelihood
<i>m. montanum</i> - Waterbush	Found in sclerophyll forest, prefers full sun but will grow in partial shade.		No
<i>Allocasuarina luehmannii</i> - Buloke	It occurs primarily on gentle to moderate slopes on sandy soils and light loams, but it does grow on a wide range of soils.	Threatened	Yes
<i>Brachyscome chrysoglossa</i> – Yellow-tongue Daisy	Found on clays subject to flooding.	Threatened	Potential
<i>Cullen parvum</i> – Small Scurf-pea	Generally associated with alluvial plains, creeks, ephemeral pools and river channels.	Threatened	Potential
<i>Anthosachne multiflora</i> subsp. <i>Multiflora</i> – Short-awned Wheat-grass	Little Known		Unknown
<i>Amphibromus fluitans</i> - River Swamp Wallaby-grass	Grows mostly in permanent swamps and also lagoons, billabongs, dams and roadside ditches.		Potential

FAUNA

Consultation with *the Biodiversity Interactive Map (V3.2)* for a 2.5km radius from the site returned three (3) three (3) Threatened species previously recorded within 5km of the site. **Table 4** considers their likelihood of occurring at the site.

Table 4: Biodiversity Interactive Map (2.5 km site buffer) - Fauna

Species	Preferred Habitat	FFG Act Status	Likelihood
<i>Chelodina expansa</i> - Broad-shelled Turtle	They utilise large, slow-moving or still bodies of water. During winter they hibernate by burrowing into the mud on the river bottom.	Threatened	Likely
<i>Varanus varius</i> – Lace Monitor	Australian forests and coastal tablelands. Much of its time is spent up fairly large trees.		Likely
<i>Pteropus poliocephalus</i> - Grey-headed Flying-fox	Found in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps	Threatened	Unlikely
<i>Petaurus norfolcensis</i> - Squirrel Glider	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest, Prefers mixed species stands with a shrub or Acacia midstorey.	Threatened	Potential
<i>Macquaria ambigua</i> - Golden Perch	Most commonly in slow-moving stretches of streams, lakes and backwaters.		Likely
<i>Tandanus tandanus</i> - Freshwater Catfish	Prefers lakes and sluggish turbid streams with fringing vegetation.	Threatened	Likely
<i>Galaxias rostratus</i> - Flat-headed Galaxias	Found in still or slow moving water bodies such as wetlands and lowland streams.		Likely

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Species	Preferred Habitat	FFG Act Status	Likelihood
<i>Melanotaenia fluviatilis</i> - Murray-Darling Rainbowfish	Inhabit rivers, streams, billabongs, drainage ditches, reservoirs, overflows, swamps, and ponds with dense aquatic vegetation.	Threatened	Unlikely
<i>Macquaria australasica</i> - Macquarie Perch	Typically found in the cooler, upper reaches.	Threatened	Unlikely
<i>Maccullochella peelii</i> - Murray Cod	Reliant on habitat features such as snags, holes, rocks and overhanging vegetation.	Threatened	Likely
<i>Bidyanus bidyanus</i> - Silver Perch	Potentially prefers faster, open water, but the general scarcity of information on the habitat preferences of the species makes generalisation difficult.	Threatened	Unlikely
<i>Pseudophryne bibronii</i> - Brown Toadlet	Frequent dry forest, woodland, shrubland and grassland, ponds, flooded grassland and roadside ditches.		Potential
<i>Litoria raniformis</i> - Growling Grass Frog	Still or slow flowing water bodies	Threatened	Potential
<i>Climacteris picumnus victoriae</i> - Brown Treecreeper (south-eastern ssp.)	Occupies eucalypt woodlands, particularly open woodland lacking a dense understorey. It is sedentary and nests in tree hollows.		Yes
<i>Chthonicola sagittatus</i> - Speckled Warbler	Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	Threatened	Unlikely
<i>Grantiella picta</i> - Painted Honeyeater	They inhabit (Acacia- or Eucalyptus-dominated) woodlands and open forest and prefer habitats with more mature trees since these host more mistletoes.	Threatened	Unlikely
<i>Pomatostomus temporalis temporalis</i> - Grey-crowned Babbler	They occupy open woodlands dominated by mature eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs.	Threatened	Potential
<i>Alcedo azurea</i> - Azure Kingfisher	Habitat includes the banks of vegetated creeks, lakes, swamps, tidal estuaries and mangroves.		Likely
<i>Burhinus grallarius</i> - Bush Stone-curlew	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber.	Threatened	Unlikely
<i>Biziura lobata</i> - Musk Duck	Deep freshwater lagoons, with dense reed beds.		Potential
<i>Gallinago hardwickii</i> - Latham's Snipe	They usually inhabit open, freshwater wetlands with low, dense vegetation.		Potential
<i>Phalacrocorax varius</i> - Pied Cormorant	Marine habitats, including estuaries, mangroves and on large inland wetlands.		Potential
<i>Ninox connivens</i> - Barking Owl	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas.	Threatened	Likely
<i>Anas rhynchotis</i> - Australasian Shoveler	All kinds of wetlands, preferring large undisturbed heavily vegetated freshwater swamps.		Potential
<i>Lathamus discolor</i> - Swift Parrot	Found in dry sclerophyll eucalypt forests and woodlands. It occasionally occurs in wet sclerophyll forests.	Threatened	Potential
<i>Platalea regia</i> - Royal Spoonbill	Found in shallow freshwater and saltwater wetlands, intertidal mud flats and wet grasslands.		Potential
<i>Ardea modesta</i> - Eastern Great Egret	Wide range of wetland habitats including swamps and marshes; margins of rivers and lakes.	Threatened	Potential

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Species	Preferred Habitat	FFG Act Status	Likelihood
<i>Ardea intermedia</i> - Intermediate Egret	Frequent terrestrial wetlands, wet grasslands and occasionally in sheltered coastal habitats, preferably among emergent vegetation of grasses, herbs, sedges, reeds or rushes.	Threatened	Potential
<i>Plegadis falcinellus</i> - Glossy Ibis	Preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation.		Potential
<i>Neophema pulchella</i> - Turquoise Parrot	Inhabits eucalypt and cypress-pine open forests and woodlands (commonly box or box-ironbark) with native grasses, sometimes with a low shrubby understory.	Threatened	Unlikely
<i>Ninox strenua</i> - Powerful Owl	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Threatened	Likely
<i>Nycticorax caledonicus hillii</i> - Nankeen Night Heron	Frequents well-vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens.		Likely
<i>Aythya australis</i> - Hardhead	Found in freshwater swamps and wetlands and occasionally in sheltered estuaries. They are rarely seen on land and tend to roost on low branches and stumps near the water.		Potential
<i>Ixobrychus minutus dubius</i> - Little Bittern	Inhabits terrestrial wetlands, in dense emergent vegetation in freshwater swamps, lakes and watercourses.	Threatened	Potential
<i>Oxyura australis</i> - Blue-billed Duck	Terrestrial freshwater and brackish wetlands, preferring deep permanent, well vegetated water bodies. Secretive birds, usually feeding in open water or beside tall dense vegetation.	Threatened	Potential
<i>Egretta garzetta nigripes</i> - Little Egret	It occurs in a range of coastal and terrestrial wetlands, including freshwater wetlands with vegetation such as Typha and requires trees for roosting and nesting.	Threatened	Potential



Photo 3: Gilgai type wetland feature – Important ‘retreat points’ for frog species

7 Field Assessment

The survey methodology consisted of two parts, a database search and then field searches. A database search of the Biodiversity Interact Map (V3.2) was undertaken and provides a list of threatened fauna and flora recorded within 2.5 km the site. A broader search was undertaken of species known or predicted to occur within 10 km of the site using the *EPBC Protected Matters Search tool*. Once a list of species and habitat preferences were determined from databases, fieldwork was initiated. The fieldwork included:

1. An initial inspection of the site to determine the extent of various microhabitats within the Study Area.
2. Secondary inspections to obtain an appreciation of the dominant flora species and conditional variations within the habitat whilst targeting specific habitat requirements for threatened species.
3. A pedestrian survey of the site as part of a targeted search for threatened species.
4. Targeted spotlighting for nocturnal threatened species.

7.1 Vegetation

A variety of methods were employed during the field assessment stage. The field assessment was designed to collect as much information on the vegetation present on site (overstorey, shrub layer and groundcovers) whilst gaining an understanding of the use (or potential use) of the site and surrounding area by threatened species.

7.2 Terrestrial fauna

Species whose likelihood of using the study area was determined to be 'Yes', 'Likely' or 'Potential' were targeted during the searches. These species have either been identified previously in the Study Area or their respective habitat requirements best fit those found in the Study Site. Amphibians were listened for at every opportunity, however no call back methods were employed. No targeted assessment of mammals or reptiles were employed due to the preliminary nature of the assessment.

7.3 Aquatic fauna

No targeted assessment or survey was employed for native fish.

7.4 Limitations of Design

Red-Gum acknowledges that the field work was not conducted in Spring, when many terrestrial species are perhaps most active (Faragher et al. 1993; Douglas et al. 1994), however survey effort was increased to account for this and was extended to dawn, dusk and at night when many species are more active. **Table 5** provides a summary of field methodologies/ targets and field notes.

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Table 5: Field assessment methods employed

Intended Target	Methodology	Survey Period Notes
Diurnal Birds	Area search, where the observer walked transects	Conditions on 15 th June, 16°C, overcast to sunny breaks, no wind. 2 nd July, 10°C, light breeze, overcast. Active calling on both days.
	Point Count method, where observations were made from 4 points for 20 minutes each.	See above.
Nocturnal Birds	Day habitat search. Search habitat for pellets, and likely hollows plus spotlighting.	Spotlighting and call back employed for Bush-Stone Curlew with 10 min listening period post each call. None recorded. Fox and Kangaroo scats located throughout.
Non-Flying Mammals	Spotlighting on foot – 2hrs hour walking the site on 1 night.	No arboreal native mammals observed during night-time searches. Possibly due to full moon on the 15 th .
Non-Flying Mammals	Search for scats and signs – 30 minutes searching relevant habitat, including trees for scratch marks.	Fox scats located throughout. None collected for further analysis. Some scratching on several trees. Likely to be goanna.
Bats	Spotlighting on foot – 2hrs hour walking the site on 1 night.	Night of the 15 th . Bat calling recorded. None seen or identified during spotlighting.
Reptiles	Day habitat search.	Bark stripping of some trees employed. None recorded. No rocks on site, some concrete/brick/debris on the southern side of the river but no reptiles recorded in these areas.



Photo 4: Cape Broome – An aggressive weed on floodplains

Preliminary Ecological Assessment

7.5 Terrestrial fauna

Table 6 is a record of all fauna observed during targeted searches of available habitats (Figure 7). Over the two day survey period, 27 native species of bird were recorded which included two *Near Threatened* FFG Act listed species - Brown Tree creeper (*Climacteris picumnus victoria*) and Azure Kingfisher (*Alcedo azurea*). Of note, no nocturnal birds or mammals were recorded on the night of the 15th. The White-throated Tree creeper (*Cormobates leucophaea*) was also recorded along with several other insectivorous bird species perhaps reflecting the value of the area to these forest dwellers.



Photo 5: Brown Tree creeper (left) & White-throated Tree creeper (right). Source: Birds in Backyards

Table 6: Fauna recorded during the field assessment

Common name	Scientific name	Common name	Scientific name
Australian Raven	<i>Corvus coronoides</i>	Australian Magpie	<i>Gymnorhina tibicen</i>
Australian Wood Duck	<i>Chenonetta jubata</i>	Magpie-lark	<i>Grallina cyanoleuca</i>
Azure Kingfisher	<i>Alcedo azurea</i>	Mallee Ringneck	<i>Barnardius barnardi</i>
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	Musk Lorikeet	<i>Glossopsitta concinna</i>
Brown Thornbill	<i>Acanthiza pusilla</i>	Noisy Miner	<i>Manorina melanocephala</i> *
Brown Tree creeper	<i>Climacteris picumnus</i>	Pied Currawong	<i>Strepera graculina</i>
Dusky Woodswallow	<i>Artamus cyanopterus</i>	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
Eastern Rosella	<i>Platycercus eximius</i>	Red-rumped Parrot s	<i>Psephotus haematonotu</i>
Eastern Yellow Robin	<i>Eop altria australis</i>	Silvereye	<i>Zosterops lateralis</i>
Galah	<i>Eolophus roseicapillus</i>	Spotted Pardalote	<i>Pardalotus punctatus</i>
Grey Shrike-thrush	<i>Colluricincla harmonica</i>	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Jacky Winter	<i>Microeca fascinans</i>	Superb Fairy-wren	<i>Malurus cyaneus</i>
Laughing Kookaburra	<i>acelo novaeguineae</i>	Welcome Swallow	<i>Hirundo neoxen</i>
Little Corella	<i>Cacatua sanguinea</i>	White Winged Chough	<i>Corcorax melanorhamphos</i>
Little Friarbird	<i>Philemon citreogularis</i>	Little Corrella	<i>Cacatua sanguinea</i>
Little Lorikeet	<i>Glossopsitta pusilla</i>	European Rabbit	<i>Oryctolagus cuniculus</i> *
White-throated Tree creeper	<i>Cormobates leucophaea</i>	Swamp wallaby	<i>Wallabia bicolor</i>

*Introduced species

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Figure 7: Terrestrial fauna survey

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7.6 Flora

A total of thirty-four (34) native species were recorded on site during the fieldwork stage (Table 7). No threatened flora or endangered ecological communities were identified or are likely to exist within the area of the proposed alignments. Of particular importance are any large Hollow Bearing Trees (HBT) throughout the study area – although very few remain on the floodplain. As it is currently proposed – and not considering the establishment of a new bridge site (which hasn't been finalized) – the development would not see the loss of any hollow bearing trees.



Photo 6: Lack of hollow bearing trees and uniform young Eucalypts



Photo 7: Log stacks are important habitat features to be avoided

Preliminary Ecological Assessment

Table 7: Observed Flora on site

Common Name	Scientific Name	Common Name	Scientific Name
Paterson's Curse	<i>Echium plantagineum</i> *	Desert Ash	<i>Fraxinus angustifolia</i> *
Annual Veldtgrass	<i>Ehrharta longiflora</i> *	Cleavers	<i>Galium aparine</i> *
Common Club-rush	<i>Eleocharis acuta</i>	Austral Cranesbill	<i>Geranium solanderi</i> var. <i>solanderi</i>
Smooth Willow-herb	<i>Epilobium billardierianum</i>	Rough Raspwort	<i>Haloragis heterophylla</i>
Common Storksbill	<i>Erodium cicutarium</i> *	Yorkshire Fog-grass	<i>Holcus lanatus</i> *
River Red Gum	<i>Eucalyptus camaldulensis</i>	Barley Grass	<i>Hordeum leporinum</i> *
Common Eutaxia	<i>Eutaxia microphylla</i>	Cat's Ear	<i>Hypochoeris radicata</i> *
Silver Wattle	<i>Acacia dealbata</i>	Pale Rush	<i>Juncus pallidus</i>
Hedge Wattle	<i>Acacia paradoxa</i>	Blown Grass	<i>Lachnagrostis filiformis</i>
Golden Wattle	<i>Acacia pycnantha</i> (planted)	Prickly Lettuce	<i>Lactuca serriola</i> *
Varnish Wattle	<i>Acacia verniciflua</i>	River Tea-tree	<i>Leptospermum obovatum</i>
Sheep Sorrel	<i>Acetosella vulgaris</i> *	Perennial Ryegrass	<i>Lolium perenne</i> *
Lesser Joyweed	<i>Alternanthera denticulata</i>	Wimmera Ryegrass	<i>Lolium rigidum</i> *
Box Mistletoe	<i>Amyema miquelli</i>	False Loosestrife	<i>Lythrum hyssopifolia</i>
Capeweed	<i>Arctotheca calendula</i> *	Small-flowered Mallow	<i>Malva parviflora</i> *
Wild Oat	<i>Avena fatua</i> *	Barrel Medic	<i>Medicago truncatula</i> *
Quaking Grass	<i>Briza maxima</i> *	Red-flowered Mallow	<i>Modiola caroliniana</i> *
Prairie Grass	<i>Bromus catharticus</i> *	Wood Sorrel	<i>Oxalis perennans</i>
Great Brome	<i>Bromus diandrus</i> *	Sour Sob	<i>Oxalis pes-caprae</i> *
River Bottlebrush	<i>Callistemon sieberi</i>	Red Bartsia	<i>Parentucellia latifolia</i> *
Rounded Water Starwort	<i>Callitriche muelleri</i>	Warrego Summer Grass	<i>Paspalidium jubiflorum</i>
White Cypress-pine	<i>Callitris glaucophylla</i>	Paspalum	<i>Paspalum dilatatum</i> *
Tall Sedge	<i>Carex tereticaulis</i>	Water Couch	<i>Paspalum distichum</i>
Chinese Scrub	<i>Cassinia arcuata</i>	Creeping Knotweed	<i>Persicaria prostrata</i>
Spear Thistle	<i>Cirsium vulgare</i> *	Ox's Tongue	<i>Picris echio des</i> *
Flaxleaf Fleabane	<i>Conyza bonariensis</i> *	Plantain	<i>Plantago lanceolata</i> *
Drain Sedge	<i>Cyperus eragrostis</i> *	Winter-grass	<i>Poa annua</i> *
Leafy Flat-sedge	<i>Cyperus lucidus</i>	Tussock Grass	<i>Poa labillardiera</i>
Cocksfoot	<i>Dactylis glomeratus</i> *	Poison Pratia	<i>Pratia concolor</i>
Grey Parrot-pea	<i>Dillwynia cinerescens</i>	Jersey Cudweed	<i>Pseudognaphalium luteoalbum</i>
Sand Rocket	<i>Diplotaxis tenuifolius</i> *	River Buttercup	<i>Ranunculus inundatus</i>
Jerusalem Cherry	<i>Solanum pseudocapsicum</i> *	Creeping Buttercup	<i>Ranunculus repens</i> *
Rough Sowthistle	<i>Sonchus asper</i> *	Onion-grass	<i>Romulea rosea</i> *
Milk Thistle	<i>Sonchus oleraceus</i> *	Swamp Dock	<i>Rumex brownii</i>
Kangaroo Grass	<i>Themeda australis</i>	A Groundsel	<i>Senecio linearifolius</i>
Strawberry Clover	<i>Trifolium fragiferum</i> *	Cotton Fireweed	<i>Senecio quadridentatus</i>
White Clover	<i>Trifolium repens</i> *	Variiegated Thistle	<i>Silybum marianum</i> *
African Lovegrass	<i>Eragrostis curvula</i> *	Subterranean Clover	<i>Trifolium subterraneum</i> *
Cape Broom	<i>Genista monspessulana</i> *	Vetch	<i>Vicia sativa</i> ssp. <i>sativa</i> *
Bridal Creeper	<i>Asparagus asparagoides</i> *	Squirrel-tail	<i>Fescue Vulpia bromoides</i> *
Grey box	<i>Eucalyptus microcarpa</i>	Buloke	<i>Allocasuarina luehmannii</i>

*Introduced species

8 Conclusion

Over 16 hours of survey time was conducted between 15th June and 2nd July 2014. During field survey, thirty-six (36) species of fauna were recorded within the study area – two (2) of which (Brown Tree-creeper & Azure Kingfisher) are listed as *Near Threatened* in the Flora & Fauna Guarantee Act (FFG Act).

In addition, eighty-two (82) flora species were recorded – thirty four (34) native - of which none are regarded as threatened. No fauna or flora (including Endangered Ecological Communities) listed under the Environment Protection Biodiversity Conservation Act (EPBC Act) were identified throughout.

By way of a caveat to the results - no fauna trapping or specialist survey techniques (e.g. harp netting, deployment of an ANABAT or targeted reptile searches) were employed given the preliminary nature of the project scope. Likewise, no detailed vegetation transects were performed.

9 Preliminary Findings & Recommendations

Preliminary findings & recommendations:

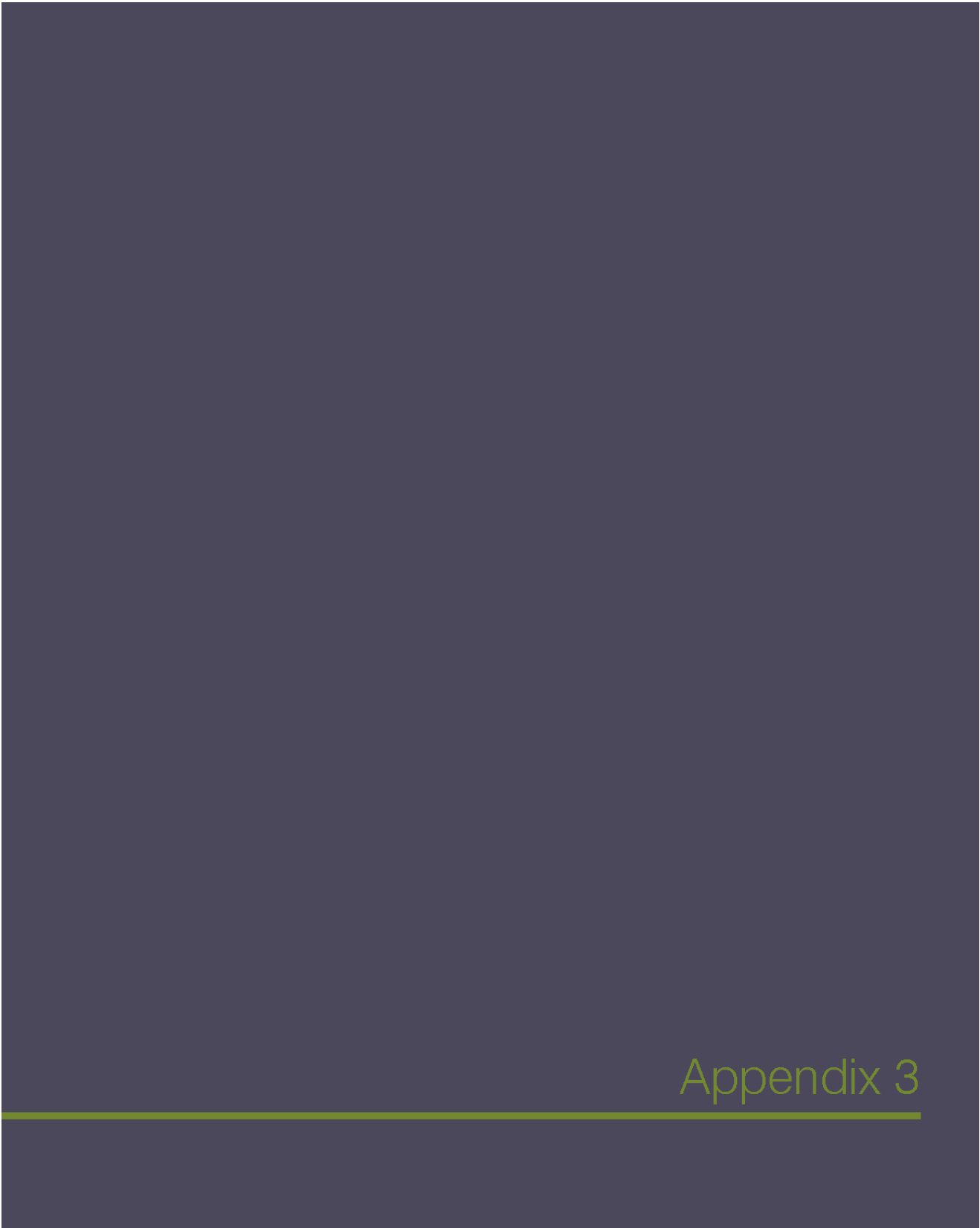
1. Consideration be given to eliminating the proposed track marked as *Gemmills Swamp to North Shepparton (north)* through the undisturbed area towards the Goulburn River. The track alignment crosses several secondary 'runners' that drain the floodplain post flood and will result in unnecessary disturbance to an otherwise stable riparian environment (given that River Crossing Option 2 site is met by existing track on both sides of the river).
2. Soils in the northern section of the works (along Cemetery Road) are highly erodible and dominated by sandy loam. Consideration be given to development of an Erosion & Sediment Control Plan from any works in these areas that will result in the intensification of overland flow (i.e. off a sealed track). The probability of intensified flow resulting in erosion in these environments is very high.
3. In areas where the proposed paths are to be constructed 'off-track', an Ecologist or suitably qualified personnel be engaged to flag tape the final alignment. Areas such as small *Gilgai type wetland formations* (repeated mounds and depressions formed on shrink-swell and cracking clay soils) are important 'retreat points' for amphibians utilizing the forest floor. Likewise, areas where native shrubs persist, areas of large log stacks and sandy ecotones are to be avoided as each of these aspects of the environment are important habitat features.
4. A large variety of introduced grasses and groundcovers occur along some of the proposed path alignments. Some of the species present are significant weeds within the catchment - Paterson's Curse (*Echium plantagineum*), African Lovegrass (*Eragrostis curvula*), Cape Broom (*Genista monspessulana*) and Soursob (*Oxalis pes-caprae*). Of note, is the establishment of isolated pockets of the Restricted Weed, Bridal Creeper (*Asparagus asparagoides*) and several Undeclared Weeds (which have the potential to be widespread) including Jerusalem Cherry (*Solanum pseudocapsicum*), Fleabane (*Conyza sumatrensis*) and Phalaris.
5. Weed infested areas should be identified, mapped and highlighted in the field, ahead of the construction program by a suitably qualified contractor. Chemcert accredited contractors are to be invited to the field to inspect the mapped sites and 'sign-off' on the agreed method of control. Works to control weeds are to focus on the fringe of existing tracks and care should be taken to ensure that any herbicide application does not impact on off-target species (desirable native plants).

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6. Slashing is not recommended along the new paths. Whilst desirable from a management and health and safety consideration, slashing substantially increases the risk of spreading existing weeds and introducing new weeds to the regional park.
7. If revegetation activities are proposed along any of the alignments, Red-Gum recommends using cardboard tree guards only. Plastic guards are being used in several parts of the Shepparton Regional Park, however when dislodged from their stakes, they become a mobile form of rubbish.
8. There seems to be a trend with lodging rubbish amongst trees along the existing tracks and several illegal rubbish dumping sites were recorded. Consideration is to be given to managing waste (i.e. bins) along the proposed alignments. Cans, tins and bottles can be a hazard to small native marsupials and incidents resulting in death (from being stuck in open tin cans and bottles) are not uncommon in high use areas like the regional park.
9. Several areas that have been subject to 'Bardi Grubbing' were identified along the existing tracks within the regional park. Bardi Grubbing involves the removal of the soil surface to locate grubs for fishing and causes substantial damage to the understory. Signage should consider highlighting that this activity is NOT permitted without a permit.
10. Siting of ancillary facilities (e.g. toilets) are to be located away from areas of Sand Ridge Woodland which are fragile, currently recovering and have highly porous/leachable soils.
11. The Mooroopna to Kialla Landfill path (east) seems unnecessary and passes through very difficult terrain that includes several secondary 'runners' that drain the floodplain post flood. Consideration be given to relocating this alignment to the roadside verge of Watts Road which may need to be widened to accommodate the path. Other options to connect Kialla Landfill to Mooroopna include a new pedestrian bridge that connects existing paths south of the Goulburn River with the Flats Loop path. This option would negate the need to rebuild the Watts Road bridge completely or add a pedestrian walkway (which is likely to be required to facilitate safe passage).
12. The Mooroopna to Kialla Landfill path is currently much lower than its surrounds and crosses heavy black to grey cracking clays that will need to be built up such that it is higher than the surrounding floodplain. Path design will require consideration of flood flows and should be designed with a definite 'crown' to facilitate movement of overland flow away from the alignment (otherwise these areas will become impassable when wet and ultimately the subsurface will fail resulting in slumping).
13. Passing under the existing Rail Corridor Bridge over the Goulburn River is potentially a safety concern that will need to be addressed. The bridge abutments and worked bank below the existing track is scouring, slumping and prone to mass failure if corrective works are not undertaken in the near future.
14. The proposal as it is currently designed is not likely to have a significant effect on threatened biodiversity – in particular, those threatened species identified in this report. However, further consideration of the environment is recommended when a final location of any river crossings are discussed by the proponent. An assessment of the chosen locations should be undertaken considering the riparian environment (including threatened fish, crustaceans and amphibians). Involvement of suitably qualified personnel is also encouraged during placement of the final alignment through 'off-track' areas to avoid sensitive parts of the landscape mentioned in this report.



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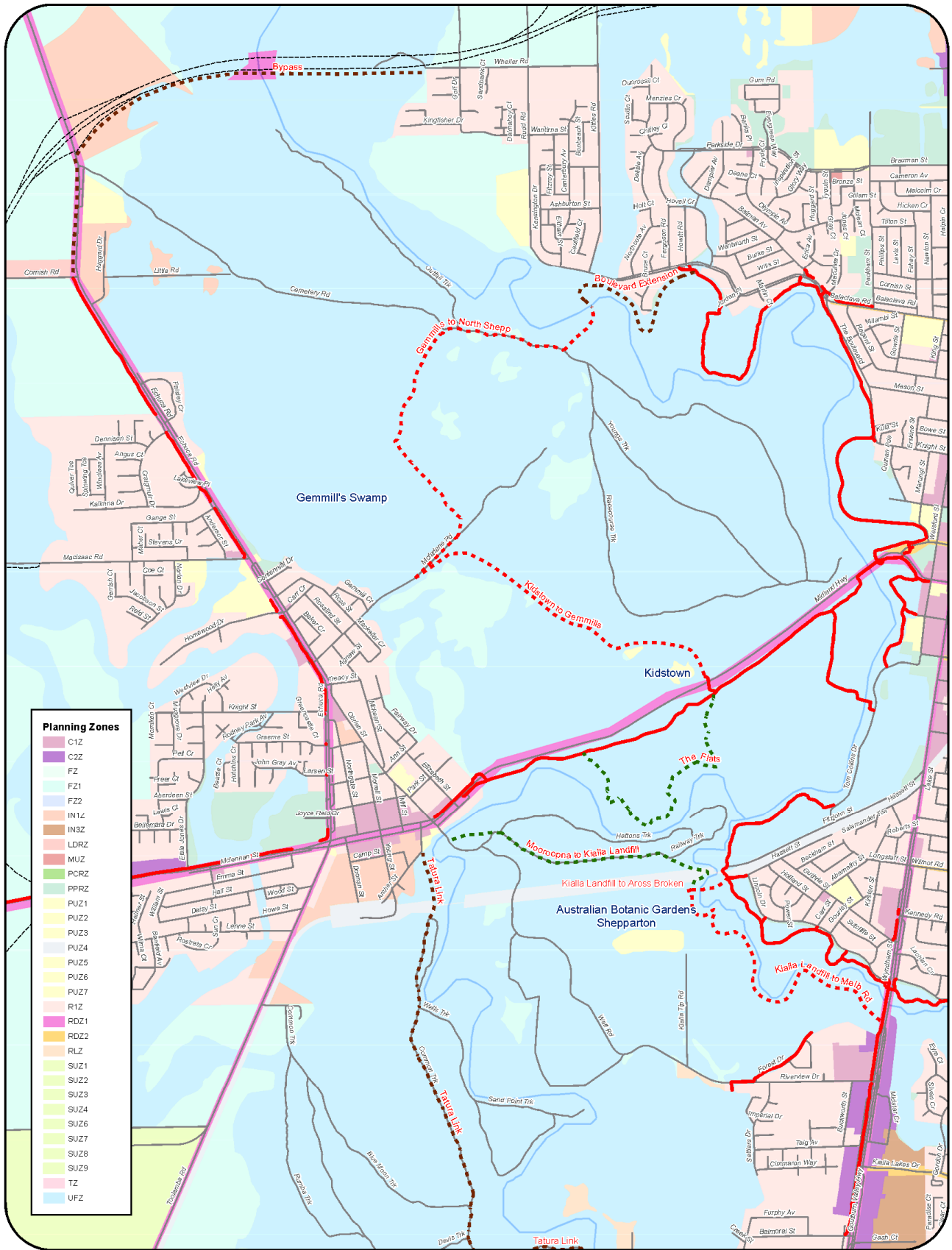
Appendix 3



Track Name	Zones	Overlays	Permit Required?
Boulevard Extension	Urban Floodway Zone Public Park Recreation Zone	Bushfire Management Overlay Land Subject to Inundation Overlay Floodway Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
Gemmills to North Shepp	Urban Floodway Zone Farming Zone	Bushfire Management Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
River Crossing Opt 2	Urban Floodway Zone Farming Zone	Bushfire Management Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
Gemmills Swamp missing links	Urban Floodway Zone General Residential Zone*	Bushfire Management Overlay Floodway Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
Kidstown to Gemmills	Urban Floodway Zone Farming Zone	Bushfire Management Overlay Land Subject to Inundation Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.

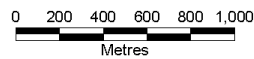
The Flats	Urban Floodway Zone	Bushfire Management Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
Mooroopna to Kialla Landfill	Urban Floodway Zone Public Use Zone 4	Bushfire Management Overlay	Permit required for the proposed use of informal outdoor recreation in the Public Use Zone 4. Buildings and works are exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.
Kialla Landfill Across Broken	Urban Floodway Zone	Bushfire Management Overlay	Exempt under Clause 62.02-2 of the Greater Shepparton Planning Scheme if the buildings and works are undertaken by or on behalf of the municipality and estimate cost is less \$1,000,000.

* It is not clear if the path traverses this zone.



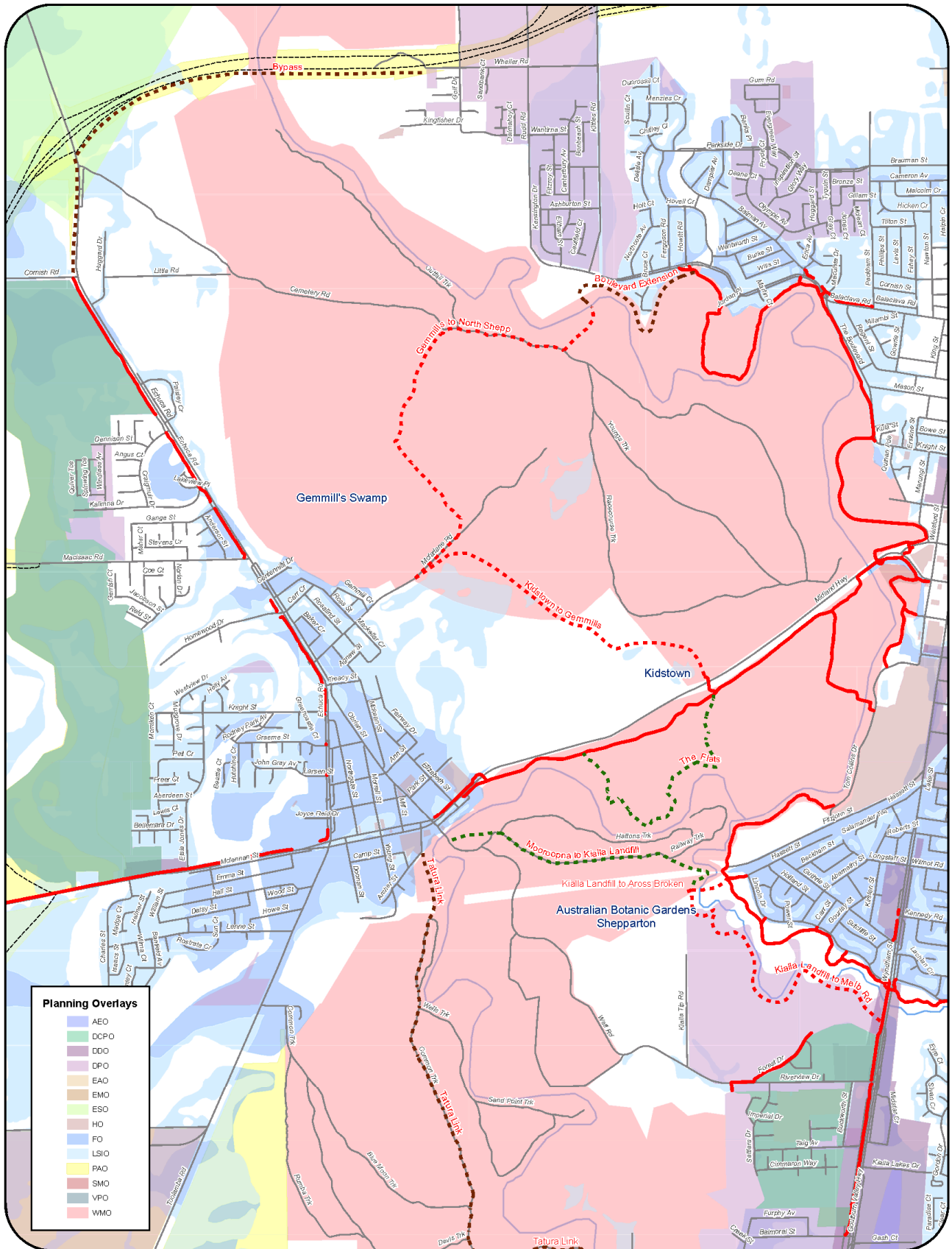
**RIVER CONNECT
PROPOSED NEW
SHARED PATHS**

- - - - Proposed River Connect Shared Path
- - - - Proposed River Connect Other Path
- - - - Other Proposed Shared Path
- Existing Shared Path
- - - - Proposed Bypass
- Roads



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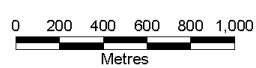


Planning Overlays

Blue	AEO
Green	DDPO
Purple	DDO
Light Purple	DPO
Orange	EAO
Light Green	EMO
Yellow	ESO
Light Blue	HO
Light Blue	FO
Light Blue	LSI
Light Green	PAO
Light Green	SMO
Light Green	VPO
Light Green	WMO

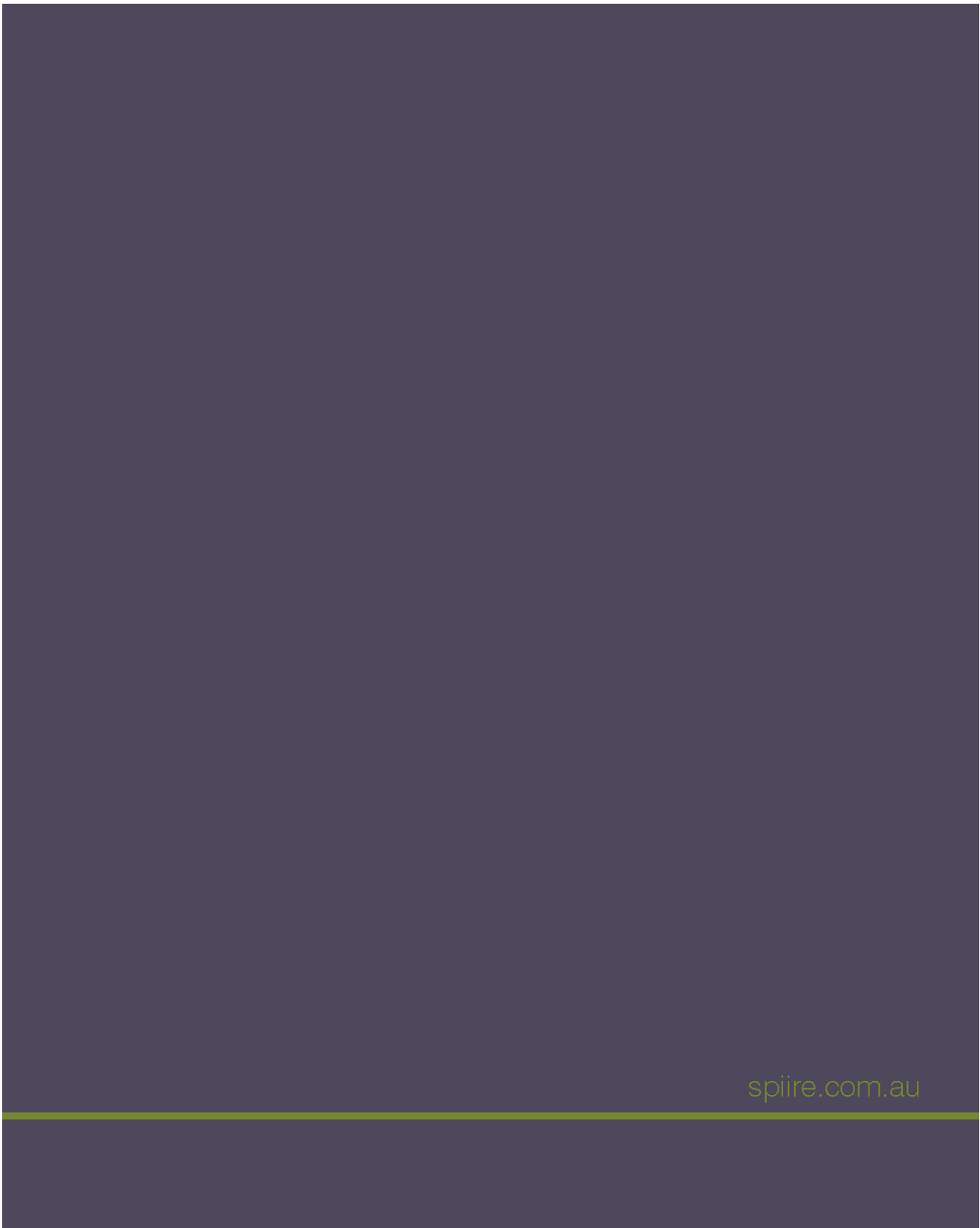
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Appendix 4





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