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Figure 12: Proposed vegetation communities

5.1.2 Weed management

Weed infestation is the main environmental problem in the corridor because much of the riparian corridor is densely weed-affected and has low resilience. This section and the actions tabulated in **Figure 11** provide more detail about how to control weeds and gradually rehabilitate native vegetation within the corridor.

The recommended approach is to maintain and enhance the better quality areas first, and involve the community where possible. Weed control must be achieved without detriment to other environmental qualities such as soil stability and fauna habitat. Effective rehabilitation will require a sustained effort over the long term, in conjunction with control of potential further degrading influences such as urban stormwater or garden dumping.

Where relevant, the site should be prepared by removing burnt timber, pine wildlings and stock grazing. The first weeding of a site is called primary weeding. Follow-up or secondary weeding needs to be timed to prevent:

- Any weeds seeding
- Vigorous growth of weeds from weed fragments
- Native plants being out-competed or smothered by weeds

A site is considered to have reached the maintenance stage when a follow-up is only needed once or twice per year. The amount of time and resources required should decrease each time a site is treated.

Selection of a suitable weed control technique will depend on:

- The weed species to be controlled
- The size of the weeds (e.g. mature or seedling)
- The ratio of weeds to native species
- The density of weeds (i.e. high or low resilience)
- The size of the area affected
- Topography
- Soil type
- Weather
- Presence of threatened species

Variability of conditions across the study area means that a variety of weed control techniques will be needed. The main techniques are expected to include management of seed movement, seed set and seed germination; weed control mats; mulch; cut and paint; scrape and paint/stem scrape; herbicide spraying; and slashing and mowing. Further information about weed control, bush regeneration and revegetation is provided by Buchanan (2009).

Monitoring will be needed to determine if native plants are regenerating following weed control.

5.1.3 Revegetation and regeneration

Revegetation and soil erosion control will be needed where resilience is low and there has been extensive weed cover removed. A preliminary list of flora species suited to the proposed vegetation communities is given in **Section 5.1.4**. Additional species suitable for revegetation will be determined by available nursery stock and revegetation objectives.

Local provenance species should be used where possible for public landscaping in the urban area and revegetation in the riparian corridor. It is recommended that a plant nursery be established to provide a

reliable, cost-effective supply of suitable plant stock (no weed species). In the longer term the nursery could sell native plants to residents as well as continue to supply replacement plants for public landscaping.

Consideration should be given to an annual native plant give-away to interested local residents. This is an effective way to revegetate gardens in the area with suitable species. This offer could be supported by other community engagement activities such as education about weed species and native fauna habitat.

Regeneration within the Pink-tailed Worm Lizard habitat areas will need to be carefully monitored and controlled to ensure that Grassland is not lost at the expense of invading Tableland Shrubland vegetation (see below).

5.1.4 Vegetation communities

It is proposed that vegetation communities be rehabilitated in accordance with location within the landscape, as shown in **Figure 12**. The following table summarises the types of vegetation communities that would occur within the study area, including their characteristic species and typical location.

Table 3: Vegetation communities for rehabilitation

ACT VEGETATION COMMUNITY	CLASS (KEITH 2004)	CHARACTERISTIC SPECIES	TYPICAL LOCATION
<i>Casuarina cunninghamiana</i> Tableland Riparian Woodland	Eastern Riverine Forests	<i>Casuarina cunninghamiana</i> <i>Acacia mearnsii</i> <i>Acacia dealbata</i> <i>Acacia rubida</i> <i>Callistemon sieberi</i> <i>Kunzea ericoides</i> <i>Microlaena stipoides</i>	River fringes
<i>Eucalyptus pauciflora</i> – <i>Eucalyptus rubida</i> Tableland Woodland	Southern Tableland Grassy Woodlands	<i>E. pauciflora</i> <i>E. rubida</i> <i>E. dives</i> <i>Poa sieberiana</i> <i>Austrodanthonia caespitosa</i> <i>Themeda triandra</i>	Open lowland valleys on plains and frost-hollows
Tableland Shrubland	Not identified	<i>Kunzea ericoides</i> <i>Bursaria lasiophylla</i> <i>B. spinosa</i> <i>Callitris endlicheri</i> <i>Leptospermum obovatum</i> <i>C. endlicheri</i> <i>Callistemon sieberi</i> <i>Acacia dealbata</i>	Dry hillslopes, river fringes

ACT VEGETATION COMMUNITY	CLASS (KEITH 2004)	CHARACTERISTIC SPECIES	TYPICAL LOCATION
Tableland Dry Tussock Grassland	Temperate Montane Grasslands	<i>Themeda triandra</i> <i>Poa sieberiana</i> <i>Austrostipa scabra</i> ssp. <i>falcata</i> <i>Austrostipa bigeniculata</i> <i>Austrodanthonia</i> spp. <i>Bothriochloa macra</i> <i>Chrysocephalum apiculatum</i> <i>Convolvulus erubescens</i> <i>Vittadinia muelleri</i> <i>Desmodium varians</i> <i>Carex inversa</i>	Lowland plains, valleys

Adapted from ACT Government 2007

Casuarina cunninghamiana Tableland Riparian Woodland

Casuarina cunninghamiana Tableland Riparian Woodland grows on streambanks between normal water levels and maximum flood levels, in particular, on sandy and shingle terraces. Characteristically, it forms almost pure stands (unless subject to weed infestation) in narrow belts along the watercourses. Riparian She-oak Woodlands and associated mistletoe species are important faunal habitat.

Casuarina cunninghamiana is a fire sensitive species and the majority of mature trees will die if burnt by high intensity fire. (Following the 2003 fires, monitoring has shown that *C. cunninghamiana* will regenerate by sprouting if burnt by lower intensity fires.) The understorey of this community typically contains limited biomass to carry fires. Monitoring after the bushfires of January 2003 showed seedling regrowth faces significant competition from weeds, especially Blackberry (*Rubus fruticosus* spp.).

The characteristic species of the community are *Casuarina cunninghamiana*, *Acacia mearnsii* (Black Wattle), *Acacia dealbata* (Silver Wattle), *Acacia rubida*, *Callistemon sieberi*, *Kunzea ericoides* and *Microlaena stipoides* (Weeping Grass). *Casuarina cunninghamiana* have a relatively short life, probably less than 100 years, appearing to give way to either *E. viminalis* or *E. bridgesiana* in the absence of disturbance. This vegetation cycle recommences following floods or changes in river course, as *Casuarina cunninghamiana* colonises the new banks.

Tableland Shrubland

The Tableland Shrubland community is dominated by *Kunzea ericoides* (formerly *Leptospermum phyllicoides*) and is associated particularly with river fringes, rocky riverbanks and gravel beds adjoining rapidly flowing water. It is frequently an early colonizer and stabilizer of riverbanks and on previously cleared hillslopes. It may form extensive thickets up to 3 m high and provides important habitat and movement corridors for birds.

Eucalypts are either sparse or absent but *Callitris endlicheri* commonly occurs within the shrub community and extends into adjacent open forest. *Kunzea ericoides* occurs with a range of other species, including *Leptospermum obovatum*, *C. endlicheri*, *Callistemon sieberi* (River Bottlebrush) and *Acacia dealbata*.

Other shrubland associations along the Molonglo River that do not contain *K. ericoides* include:

- *Bursaria lasiophylla* shrublands
- *Pomaderris angustifolia* shrublands
- *Cryptandra propinqua* (Silky Cryptandra) shrublands

- *Dodonaea viscosa* and *Acacia rubida* shrublands
- *Acacia rubida*, *A. mearnsii*, *Bursaria spinosa* shrublands

The density and extent of regrowth and revegetation of this community need to be monitored and managed carefully to ensure that bushfire risk is not significantly increased. Examples of benchmark conditions of this vegetation community from less disturbed areas along the Molonglo River suggest that more open areas can intersperse with denser patches of vegetation. This distribution pattern would be consistent with objectives to integrate 'pocket park' recreation areas in the riparian corridor.

Eucalyptus pauciflora–*Eucalyptus rubida* Tableland Woodland (Snow Gum–Candlebark)

Woodland containing *E. pauciflora* (Snow Gum) occurs in low-lying frost-prone areas and is only localised in extent. *E. rubida* (Candlebark) is found to a limited extent with this community or as pure stands. The characteristic tree species are *E. pauciflora* and *E. rubida*, with a grassy ground cover of *Poa sieberiana*, *Austrodanthonia caespitosa* and *Themeda triandra*. Trees in this community are sparsely distributed.

Tableland Dry Tussock Grassland

The community is naturally treeless or contains up to 10% projective foliage cover of trees, shrubs or sedges. The community is characterised by a diverse flora dominated by tussock grasses and containing many native forb species. The community is found in valleys influenced by cold air drainage and on open plains. This community merges into *Eucalyptus pauciflora*–*Eucalyptus rubida* Tableland Woodland.

The community has been greatly fragmented and disturbed since European settlement. Where it occurs within the riparian zone, it is frequently difficult to distinguish between naturally treeless grassland and cleared *Eucalyptus melliodora*–*Eucalyptus blakelyi* Tableland Grassy Woodland.

Characteristic species are *Themeda triandra*, *Poa sieberiana*, *Austrostipa scabra* spp. *falcata*, *Austrodanthonia* spp., *Bothriochloa macra* (Redleg Grass), *Chrysocephalum apiculatum* (Common Everlasting), *Convolvulus erubescens* (Pink Bindweed), *Vittadinia muelleri* (Narrow-leaved New Holland), *Desmodium varians* (Slender Tick-trefoil) and *Carex inversa* (Knob Sedge).

Three dry tussock associations have been identified in the ACT (Sharp 1997):

- *Austrostipa* grassland
- *Austrodanthonia* grassland
- Dry *Themeda* grassland

This vegetation community provides habitat for the Pink-tailed Worm Lizard. The rocky ground surface and lack of canopy cover means that it has a low bushfire fuel regime. Effective management of grassland areas (i.e. ensuring weeds, trees and shrubs are removed and rocks are in place) therefore has the dual benefit of protecting biodiversity while minimizing bushfire risk.

5.1.5 Ecologically-appropriate fire regimes

Fires in the ACT landscape have been caused by a combination of inherently inflammable vegetation, dry summers, periodic drought and lightning ignitions. Unlike the modified landscapes such as pine forests and pasture, the native vegetation communities proposed for the study area are fire-adapted ecosystems. This means that:

- They require a certain burning regime to stay healthy

- Significant ecological change is likely to occur over long time periods if burning regimes change (e.g. become too frequent, infrequent, intense or widespread)

The threat posed by inappropriate fire regimes is recognised in Victoria with the listing of 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Inappropriate fire regimes causing disruption to sustainable ecosystem processes and resultant loss of biodiversity', as Potentially Threatening Processes under the Victorian *Flora and Fauna Guarantee Act 1988*. Similarly in NSW, 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' is listed as a Key Threatening Process under the NSW *Threatened Species Conservation Act 1995*.

The Commonwealth Government has nominated⁴ 'fire regimes that cause biodiversity decline' as a key threatening process under the *Environment Protection and Biodiversity Conservation Act 1999*. The listing of a key threatening process has no regulatory implications other than requiring the Minister to decide whether or not to have a threat abatement plan. If a threat abatement plan is considered appropriate, the plan would provide national guidelines to governments about possible ways to improve fire management to reduce potential negative impacts on biodiversity. The Threatened Species Scientific Committee is due to complete its assessment and provide the Minister with a recommendation by 31 March 2011.

In addition, there is still considerable uncertainty about the use of fire as a management tool, including the extent to which the results of burning in one area can be extrapolated and applied to other areas⁵.

An adaptive management approach should be applied to create and maintain healthy ecosystems in the riparian corridor using fire. This will require monitoring on-ground conditions, responsive management and implementation of a mosaic burn pattern. The burning regime will need to reflect floristics, fauna habitat value, season, fuel hazards, bushfire history, and other management activities such as weed removal and bush regeneration. Some weed species or undesirable native species may increase with burning so would need follow-up treatment.

TAMS (PCL) provides fuel and fire suppression guidelines for Pink-tailed Worm Lizard habitat (further details about this species are given in the following section). The guidelines including the following comment:

In managing for good conservation outcomes, it is important to consider the ecosystem as a whole, including animals, plants, soil and soil biota, rather than thinking in terms of individual

4 Department of Sustainability, Environment, Water, Population and Communities (2010). EPBC Nomination to list Fire regimes that cause biodiversity decline as a key threatening process. Viewed 24 November 2010. <http://www.environment.gov.au/biodiversity/threatened/ktp/pubs/fire-regimes-nomination.pdf>

5 Department of Sustainability, Environment, Water, Population and Communities (2010). Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory in Community and Species Profile and Threats Database, Department of Sustainability, Environment, Water, Population and Communities, Canberra. Available from: <http://www.environment.gov.au/sprat>. Accessed 2010-11-24T12:15:56.

species. Disturbance to the composition or structure of the community can have impacts on the functioning of the system as a whole.

5.1.6 Pink-tailed Worm Lizard

This section outlines potential threats and recommended management measures to protect the threatened Pink-tailed Worm Lizard. Management recommendations are consistent with requirements of the EPBC Act referral decision (see **Appendix E**).

Direct and indirect threats from urban development in the Molonglo Valley could impact on some habitat areas for this species (refer to **Figure 7** for habitat distribution). Direct impacts could occur from construction of roads, buildings and other infrastructure. Indirect impacts could be associated with the nearby urban development (e.g. sediment and nutrient run-off, and spread of weeds).

The following activities would result in direct harm to local populations of Pink-tailed Worm Lizards.

Direct threats

Construction directly on occupied habitat, direct loss of occupied habitat through excavation, leveling of ground, and the construction of roads, buildings and service facilities have the potential to degrade or destroy Pink-tailed Worm Lizard habitat. Depending on the scale of these activities, all or part of the habitat could be removed. Typically such activities are not compatible with the protection of the species.

Of particular concern in the Molonglo area are linear construction activities (such as roads and bridges) that cross through the areas on interconnected habitat along the slopes of the Molonglo River.

Direct loss of occupied habitat through construction of ponds in and near the Molonglo River corridor has the potential to flood some habitat areas. The degree of impact would depend on the depth of the ponds and the extent of any mechanical damage to the river banks and slopes associated with construction. The immediate impact may be minimal if the pond surface lies below the lower edges of any nearby habitat.

Habitat for Pink-tailed Worm Lizard typically does not occur in the immediate riparian zone of the river. The position of the lower edge of the habitat has not been measured but typically occurs above the level of regular floods which would otherwise influence the habitat by silt deposition etc.

Indirect threats

There is a considerable area of planned urban edge that will directly abut potential habitat along the upper slopes of the corridor in this area. Whilst this may not directly impact lizard habitat, indirect impacts from urban runoff and human activities (e.g. dumping rubbish, removing rocks etc) could be expected from this development because the edge will often be located immediately upslope of the corridor habitat.

It is possible after residential development and other construction activities have been completed there will be an increased likelihood of the spread of weeds into the rocky native grassland patches preferred by the species. Weed spread is already an extensive problem in the ACT with highly invasive species like Paterson's Curse, St John's Wort and Blackberry smothering rocky outcrops at many sites, along the lower Molonglo River corridor. There is the potential for other highly invasive plants to escape from gardens, or be dumped by people or moved by animals to the nearby patches of habitat.

Planting trees should not occur on sites that support Pink-tailed Worm Lizards. The species is very rarely found in tree-covered sites in the ACT, and it is thought that the shade from foliage might influence the ground temperature suitable for activity by this species.

Recommended management

Measures that need to be taken to avoid significant impacts are outlined in the EPBC Act referral decision⁶ and summarised in the following table. Additional detail regarding recommended management is tabulated below.

Table 4: Pink-tailed Worm Lizard management

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
Maintain a buffer zone of at least 20 m from moderate and high quality <i>A. parapulchella</i> habitat	20 m buffers are shown around moderate and high quality habitat patches in Figure 7 . Areas within the buffers should be treated in the same manner as habitat itself i.e. no direct or indirect impact, similar fire regime
Ensure vehicles do not drive over and keep all forms of disturbance, such as heavy earth moving equipment and other construction activity away from moderate and high quality <i>A. parapulchella</i> habitat	Until permanent fencing is constructed, temporary fencing should be used to define exclusion zones i.e. habitat and buffers. All construction staff should be trained/inducted so that they understand their responsibilities regarding environmental protection
Prevent construction spoil and any material used in soil stabilization and revegetation from running down slope over habitat areas	Install sedimentation and erosion controls to protect habitat and buffers
Prevent the spread or planting of trees, shrubs or weeds within 20 m of high and moderate quality habitat. Trees and shrubs should not be planted in areas that could potentially shade moderate and high quality habitat and buffers	Monitor vegetation growth and manage (e.g. weed control, remove unwanted plants) in accordance with desired vegetation community objectives. Urban edge landscaping treatment to consider potential impacts of shade from mature trees and shrubs
Wash all construction machinery to prevent the spread of weeds prior to entering the site. Wash all machinery operating below the proposed edge road if machines have been offsite, or entered or operated in the area of former pine plantation	Provide wash-down areas for construction vehicles and machinery to avoid impacts to habitat areas and buffers. Educate construction personnel and site visitors through signage and induction training
Prevent stormwater occurring as a result of the development from flowing over moderate and high quality habitat patches below the sewer line	Water sensitive urban design for development to ensure that the stormwater regime does not change in habitat areas and buffers
Erect permanent fencing to enclose all moderate and high quality habitat. Design fencing to minimize	Figure 11 indicates the proposed position of permanent fencing to protect habitat areas. Refer to Section 5.1.7

⁶ Please refer to **Appendix E** for full text

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
unregulated public access, rock collection, access by domestic animals and unregulated stock grazing	for more detail
Construct an edge road to separate residential development from the river corridor	Urban edge features are described and illustrated in Section 3
Habitat values for high and moderate quality habitat patches below the edge road are maintained and improved, including removal and ongoing management of weeds	Long-term commitment of resources to be provided for integrated, adaptive management of the corridor
Conduct any fire, biomass management, or fuel reduction required as a result of the action within 20 m of moderate and high quality habitat in an ecologically sympathetic manner with the conservation of <i>A. parapulchella</i> . Grazing should only be used as a management technique when it is undertaken in accordance with expert advice	<p>To protect the PTWL, fire management should:</p> <ul style="list-style-type: none"> • Not disturb the scattered rocks • Favour growth of native grasses • Not be too frequent/infrequent or intense • Be done in patches to allow recolonisation of burnt areas <p>See Section 5.1.5 for more information about ecologically appropriate fire regimes</p> <p>Grazing by native fauna should be encouraged by providing connectivity with other natural areas along the Molonglo River corridor and adjoining reserves, and reducing threats from domestic animals such as uncontrolled cats and dogs</p>
Erect signs containing educational/public information concerning the conservation of <i>A. parapulchella</i> in the Molonglo Valley in consultation with expert advice	Dr Will Osborne (or similar expert) to be consulted regarding the content and suitable locations for signage
Plan and design access ways in accordance with expert advice to minimize impact and conserve habitat values. Access ways should not pass through high quality habitat	Suggested access routes are indicated in Figure 13 . Associated features are described in Section 5.1.7
Surface rocks suitable for <i>A. parapulchella</i> from within the Coombs pond inundation area and access way alignments should be used to rehabilitate areas of potential habitat below the sewer line in accordance with expert advice. Rehabilitation should not take place within high quality habitat. Rocks and any machinery should be washed of all soil and organic matter prior to use for rehabilitation	Areas that may be suitable for reuse of rocks taken from the construction area are indicated in Figure 11 . These areas are adjacent to existing moderate habitat. Dr Will Osborne (or similar expert) should undertake detailed site inspection of the proposed receiving sites to determine the suitability of these areas prior to rocks being moved
A monitoring program developed in accordance with expert advice should be implemented to survey rehabilitated habitat areas annually for five years, following final completion of the trunk sewer. As part of	<p>Monitoring should be undertaken in existing and rehabilitated habitat areas to:</p> <ul style="list-style-type: none"> • map the extent and quality of habitat

REFERRAL DECISION REQUIREMENTS	ADDITIONAL DETAIL
the monitoring program, a baseline survey should be conducted prior to the construction of houses and annual results should be published on an appropriate ACT Government website	<ul style="list-style-type: none"> • record numbers of lizards • identify plant species (including weeds) and vegetation structure <p>Monitoring reports should also describe management treatments that have been applied during the past year, any threats that have arisen and recommendations for future management</p>
A wildlife expert experienced with <i>A. parapulchella</i> should check all potential habitat that is disturbed prior to construction. Any <i>A. parapulchella</i> specimens found should be relocated to the nearest suitable habitat	Dr Will Osborne (or similar expert) to undertake pre-clearance survey and relocation, if required

5.1.7 Fencing

The EPBC Act referral decision (**Appendix E**) requires that areas of moderate and high quality Pink-tailed Worm Lizard habitat be fenced to minimise unregulated public access, rock collection, access by domestic animals and unregulated stock grazing. Rather than fence each patch of habitat it is recommended that fences be constructed in areas shown in **Figure 11**. This approach is intended to:

- Provide an opportunity to increase connectivity and fauna movement between existing patches
- Concentrate public access in certain, clearly defined areas
- Provide fences or walls that are aesthetically pleasing and consistent with the broader landscape i.e. using natural materials such as rock and/or wood
- Create rocky habitat in the wall itself

Steep areas between patches of habitat that are designed for public access may need steps or paths to be constructed. Consideration should be given to incorporating rocks in the steps and paths.

Rocks to be used to build the wall, path or steps should be of a similar type to rocks within the habitat area. However, rocks **MUST NOT** be sourced from the habitat areas to be conserved. Civil contractors working in the urban areas should stockpile rocks so that they can be reused to improve habitat and possibly create fencing/walls/paths in the river corridor.

Fence design should consider requirements of other fauna species and management access.

5.1.8 Aquatic ecosystems and water quality

Removal of stock should result in an improvement in water quality and fringing aquatic ecosystems.

Riparian corridors adjacent to areas of urban development typically experience a range of adverse impacts that include weed encroachment, rubbish dumping, vandalism, and stormwater pollution.

The ACT Water Report 2007-08 found that water quality and aquatic ecosystems in urban areas appear to be more degraded than non-urban sites. Urban sites are commonly impacted by human impacts such as altered flow regimes, nutrient enrichment, weed infestation, increased pollutants, predation and disturbance of wildlife by domestic cats and dogs, and soil disturbance as a result of recreational use. Urban water quality is thought to remain poor during drought conditions because stream flows are generally low and any pollutants entering waterways are not diluted and frequently do so as part of

storm events. Long dry periods combined with sudden storm events can allow the development of heavy silt loads in runoff water from urban areas under development.

Good design and community environmental education can help to minimise the risk of these potential impacts. The Coombs and North Weston urban developments will incorporate water sensitive urban design features such as the stormwater ponds shown in **Figure 5**.

Monitoring will be needed to determine how water quality and aquatic ecosystems change as surrounding land practices change.

5.2 RECREATION AND AMENITY

As Coombs, Wright and North Weston are developed over the next few years, the riparian corridor will help define the character of the landscape and suburbs. Amenity will be highly valued by residents and visitors to the area. Views, safety, opportunities for recreation, access and the natural environment are some of the factors that contribute to amenity.

Residents and visitors to the area are more likely to value the natural environment and become involved in its protection and management if appropriate access is provided.

There will be a need to maintain and improve recreation opportunities and amenity as population density increases with adjacent urban development. The existing track network, river crossings and urban edge facilities will provide the foundation for ongoing recreational activities such as walking, mountain bike riding and equestrian. Connectivity will need to be established with tracks, paths and open space areas in adjoining areas.

Detailed assessment and design of tracks, crossings, signage and other recreational facilities (e.g. picnic areas) should be undertaken as part of the Concept Plan and Plan of Management. There may be some rationalization of existing tracks and/or new tracks identified. Design and maintenance of tracks and crossings will need to address issues raised in **Section 2**, including erosion and safety.

Table 5 identifies the types of recreational activities expected to occur in the study area and their requirements. Issues that were raised by various recreational user groups during preparation of this Strategy have been incorporated in the table. Recommended strategic actions for recreational areas and river crossings are provided in **Figure 13**.

5.2.1 Domestic animals

Dogs in the riparian corridor should be leashed at all times to help protect native fauna. Any dog off-leash area would need to be fenced to prevent uncontrolled access to adjacent areas. The grassed area between the proposed Pink-tailed Worm Lizard fence and the riparian corridor boundary should be investigated for suitability as an off-leash area.

The ACT Government has a cat containment policy which requires domestic cats to be kept indoors or caged outside. This policy aims to help protect native fauna which are predated by cats.

5.2.2 Tracks

As illustrated in the schematic cross-section in **Figure 9**, the urban edge on the southern side of the river should comprise:

- A sealed footpath adjacent to the residential property boundaries

- A landscaped verge
- A sealed road
- A landscaped verge incorporating WSUD features
- A multi-use sealed path (e.g. for cycling and pedestrian)
- A landscaped zone
- An unsealed track suitable for pedestrian, mountain biking and equestrian

It is recommended that the main track along the north side of the river be unsealed and graded, suitable for a range of recreational uses such as mountain biking, walking and equestrian. Detailed planning of the track network will determine the appropriate width and alignment of the track, and need for sections of the track to be split or separated if needed for different users.

The alignment of the main tracks on both sides of the river needs to connect with tracks and paths in adjacent areas. In designing these intersections, careful consideration needs to be given to safety issues associated with sight lines and merging recreational activities.

Track design must consider requirements for emergency services. For example, Schedule B of the *Strategic Bushfire Management Plan for the ACT* (2009) recommends standards for access by fire-fighting vehicles and personnel.

Where possible, the track alignment should be designed and constructed to minimize the risk of erosion and associated maintenance costs.

Table 5: Requirements for recreational activities

TYPE	REQUIREMENTS
All	<p>Recreational facilities to conform to the <i>TAMS Design Standards for Urban Infrastructure No.20 - Urban Edge Management Zones</i> (refer to Section 3.1 for further details)</p> <p>Conditions to be maintained consistent with emergency services' requirements</p> <p>Recreational users will need to be educated/informed regarding trail etiquette, consistent with Stromolo Forest Park procedures⁷</p> <p>Safety railings are needed on bridge river crossings. Design of railings needs to consider floodway requirements</p> <p>Bridge river crossings and their approaches need maintenance or improvement</p> <p>The width of the main tracks needs to allow multiple uses (as illustrated in Figure 9). If the tracks are not wide enough, markers should be used to separate users, or separate designated tracks should be available</p> <p>Lines of sight need to be clear, particularly on bends, bridges and underpasses. Where recreational users are forced into close proximity, a fenced trail accessible via cavaletti may be required (e.g. as the trail leaves the river's edge and turns along Holdens Creek)</p> <p>Connectivity needs to be maintained with surrounding track networks, including during the development construction phase</p> <p>Recreation 'traffic' needs to be directed away from sensitive areas toward more robust areas</p>
Walking	<p>Variety of unsealed tracks, including road-width to single-file walking tracks</p> <p>Directional and interpretive signage</p> <p>Destinations (e.g. picnic areas and lookouts) and loop tracks</p>
Mountain biking	<p>Unsealed, formed tracks that offer a variety of experiences i.e. easy to challenging (note that Stromlo Forest Park is and will continue to be the focus for mountain biking in the region)</p> <p>Restrict to designated tracks to reduce environmental impact</p> <p>May require separation from other track users (e.g. equestrian, walkers) in some areas for safety reasons</p>

⁷ <http://www.stromloforestpark.com.au/mtb/etiquette.php>

TYPE	REQUIREMENTS
Equestrian	<p>Unsealed track along the urban perimeter (see Figure 9) and away from the river itself to avoid bank erosion and water quality problems</p> <p>Existing river crossings with safety railings designed to cater for flood conditions</p> <p>Clear sight lines, particularly on bends, bridges and underpasses</p> <p>Separation of use for safety reasons</p>
Trail bikes	Not permitted because of noise, erosion and safety issues
Swimming	<p>Not permitted unless water quality improves</p> <p>If water quality improves, swimming should be in large natural pools</p>
Fishing	<p>Not permitted until monitoring indicates that water quality and aquatic ecosystems have reached acceptable standards</p> <p>If fishing is allowed at a future date it will need to be ecologically sustainable (e.g. fishing permits) and may require additional fish stock to be added to the river</p>
Dog walking	<p>Dog off-lead areas should be provided in the urban area</p> <p>On-lead dog walking should be allowed along the urban perimeter</p> <p>Dogs should be prohibited from ecologically sensitive areas (e.g. Pink-tailed Worm Lizard habitat) through signage and fencing</p> <p>Education to manage waste and other potential impacts</p>
4WD	Unauthorised 4WD activity will be prohibited primarily because of public safety concerns along multi-use tracks
Road cycling	<p>Requires sealed surface along urban perimeter</p> <p>Separation of use for safety reasons</p>
Picnicking	<p>Suitable picnic areas should be level, cleared and safe</p> <p>Seats, BBQs and waste bins may need to be provided</p> <p>Maintenance e.g. mowing, rubbish removal</p> <p>Suitable picnic areas are to be situated based on environmental sensitivity, accessibility and potential value of the picnic experience (e.g. access to water, play areas, views)</p>
Bird watching	Once native vegetation has been re-established, consider the possibility of installing a bird hide
Lookouts and seating	<p>Provide seating and interpretive signage at the top of the main hills and other viewpoints in the study area</p> <p>Seating should be provided at regular intervals, preferably in shady areas, along walking tracks to provide rest points</p>
Camping	Not allowed because of the potential impacts in the narrow riparian corridor

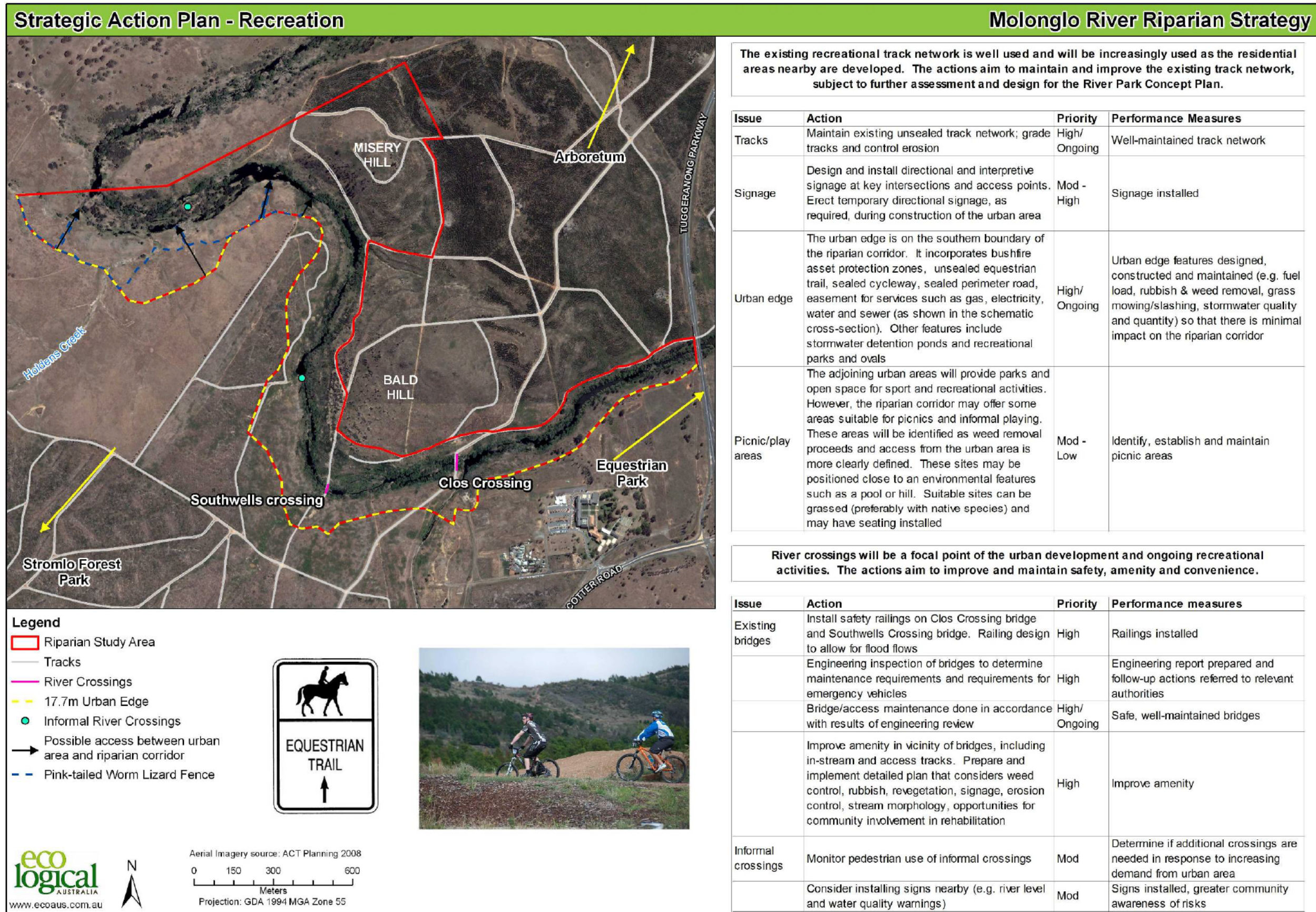


Figure 13: Recreation areas strategic action plan