

Site 1. Glenfern Road Woodland, Upper Ferntree Gully

A grazing property abutting the Melbourne metropolitan area, plus abutting roadside. There is a hillside with woodland and native pasture, and a narrow strip of Riparian Forest along Ferny Ck on one boundary. Melway ref. 74 E8.

Site Significance Level: *Regional*

- Valley Grassy Forest is listed as regionally Vulnerable, and is rare in the Dandenong Ranges;
- There are many large, old trees in the Valley Grassy Forest and the Riparian Forest;
- Many regionally rare fauna species have been observed on adjoining land and there is strong potential for some of these species to be found within the site if a survey were to be conducted.



Aerial photograph taken February 2001

Boundaries

This site comprises 157 Glenfern Rd and the abutting road verges, as outlined in red and labelled ‘Glenfern Road Woodland’ above. The wavy part of the boundary follows either the creek or an adjacent fence. Site 2 can be seen abutting to the northeast, and part of Site 99 to the north.

The Knox Planning Scheme maps show a more complicated boundary between 157 Glenfern Rd and Gilmour Park than that shown above. The former does not accurately reflect the reality that there is a fence along the red line shown above, which divides the land between private grazing and public park management.

Land use & tenure: A single, private Rural Living lot, used for grazing.

Note: Permission was not obtained to enter this property, so the inspection was done from the fence and aerial photographs. The extent of native ground flora could not be reliably determined.

Site description

This 31-hectare site is on a ridge at the edge of the Dandenong Ranges volcanic geological formation, descending to the floodplain of Ferny Ck. Glenfern Rd runs along the ridge top, and there is a minor spur running roughly parallel to New Rd, as marked above. The ridgeline and spur appear on the aerial photograph above as paler areas. The western half of the site faces north, and the eastern half has contours encircling the knoll marked above. Elevations vary from 113 m where Ferny Ck exits the site (in the northwest) to 167 m on the top of the knoll.

The slope is very shallow in the untreed, alluvial floodplain of Ferny Creek. The slope becomes rather steep (approaching 30%) beside New Rd and near the boundary with Site 2, facing northeast to southeast. The remainder of the site has a typical slope of 20%, facing all directions (but mostly with northerly or easterly components).

The native vegetation on the site comprises Riparian Forest on the floodplain and Valley Grassy Forest elsewhere. The former would once have covered the floodplain, but is now probably confined to a narrow, fragmented strip along both banks of Ferny Ck. There is a slight chance that there are patches of Riparian Forest ground flora south of this strip, on the floodplain, but this could not be checked without obtaining permission to enter the property. There are substantial numbers of very large, old Manna Gums on the creek banks, as well as several locally rare shrubs (e.g. *Gynatrix pulchella*). Environmental weeds are a serious degrading influence, as usual along creek corridors.

The occurrence of Valley Grassy Forest is very unusual in the Dandenong Ranges. It contains some fine specimens of Yellow Box and there are Candlebarks, which are rare in Knox and the Dandenongs. The density of trees probably reaches the pre-European density in some parts, but is mostly thinner than natural. Even where trees are very sparse, the ground flora is often native pasture with a large or substantial component of indigenous ground flora. Therefore, the area of native vegetation is larger than the area of tree cover. The richness of ground flora species appears to be rather low, looking from the fenceline, which could be because the area is grazed. Environmental weeds seem not to be a significant problem in the Valley Grassy Forest at this site.

There has been some infill planting of indigenous species on the verge of Glenfern Rd, just northwest of the slight bend.

Relationship to other land

This site and Site 2 appear separately in this report because one is public land and the other is private. From an ecological point of view, the two should be considered together, and also in conjunction with the larger area of bushland on the other side of New Rd, in the Shire of Yarra Ranges. Some fauna no doubt rely on each site to provide different habitat needs; e.g. the lake in Site 2 provides water for woodland birds that forage in Site 1. Native birds and mammals are often seen moving across New Rd.

Probably the most biologically significant area on the other side of New Rd is the 'Glenfern Valley Bushlands' – a 40-hectare area of Crown Land recently reserved as a 'Conservation Area of Natural Interest and Recreation' and managed by a Committee of Management.

Ferny Ck no doubt acts to some degree as a habitat corridor through the area but it reaches a dead end in Site 1 due to the creek's highly unnatural state further downstream. The amount of Riparian Forest in Site 1 is similar to that on the opposite side of Ferny Ck, which is in Site 99 (the Dandenong Ranges buffer zone). Both sides of the creek are equally important for the ecological function and aesthetic appeal of the creek corridor.

Some native birds, mammals and insects that reside in, or visit, the treed neighbourhood to the north (in Site 99) no doubt use the creek corridor as a source of water and food and as a refuge from hot weather.

Bioregion: Highlands Southern Fall

Habitat types

The total area and ecological condition of native vegetation in either EVC is not known, due to absence of permission to enter the site. All the vegetation seen was in fair to poor ecological condition (rating C or D).

Perennial Stream (No EVC number). 6 aquatic flora species found.

Riparian Forest (EVC 18, 'Least Concern' conservation status in the bioregion): 22 indigenous plant species were found by Mr John Reid on 26/3/1997 along both sides of the creek.

Dominant canopy trees: *Eucalyptus viminalis*.

Dominant lower trees: *Acacia melanoxylon*, with fewer *Pomaderris aspera*.

Shrubs: *Coprosma quadrifida*, *Bursaria spinosa*, *Gynatrix pulchella*, *Ozothamnus ferrugineus* and *Prostanthera lasianthos*.

Vines: *Calystegia marginata* is present but very scarce.

Ferns: *Pteridium esculentum* is present.

Ground flora: Mostly weeds. Indigenous species include *Epilobium hirtigerum*, *Juncus gregiflorus*, *J. sarophorus*, *Lobelia anceps*, *Lomandra longifolia*, *Poa ensiformis*, *Senecio minimus* and *S. quadridentatus*.

Valley Grassy Forest (EVC 47, **regionally Vulnerable**): 32 indigenous plant species were found by G. Lorimer looking from the roadside. A substantially larger number might be detected with the benefit of being able to enter the private land.

Dominant canopy trees: *Eucalyptus melliodora* and *E. goniocalyx*, with fewer *E. rubida* and *E. radiata*, widely spaced.

Dominant lower trees: *Exocarpos cupressiformis*, with fewer *Acacia melanoxylon* and *Acacia mearnsii*.

Shrubs: Practically absent on the private property. On the roadsides, *Bursaria spinosa* and *Kunzea ericoides* are the dominant shrubs, and there are also small numbers of *Acacia myrtifolia*, *A. paradoxa* and *A. stricta*.

Vines: none could be seen from the roadside.

Ferns: none could be seen from the roadside.

Ground flora: The private property appears to have extensive areas of native pasture dominated by *Microlaena stipoides*, *Rytidosperma penicillatum*, *Themeda triandra* and other native grasses. The character species *Veronica gracilis* is also present.

Plant Species

The following plant species were observed in 1997. The column headed ‘Risk’ indicates the indigenous species’ risk of extinction in Knox as follows: ‘C’=Critically Endangered, ‘E’=Endangered; and ‘V’=Vulnerable. The *Calystegia* and *Potamogeton* are rare throughout the Melbourne area.

<u>Risk</u>	<u>Indigenous Species (alphabetical)</u>	<u>Risk</u>	<u>Indigenous Species (alphabetical)</u>
V	<i>Acacia mearnsii</i>		<i>Juncus sarophorus</i>
V	<i>Acacia melanoxylon</i>		<i>Kunzea ericoides</i> spp. agg.
	<i>Acacia paradoxa</i>	E	<i>Lobelia anceps</i>
E	<i>Acacia stricta</i>		<i>Lomandra filiformis</i> subsp. <i>coriacea</i>
V	<i>Acaena echinata</i>		<i>Lomandra filiformis</i> subsp. <i>filiformis</i>
	<i>Alisma plantago-aquatica</i>		<i>Lomandra longifolia</i>
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>		<i>Microlaena stipoides</i>
	<i>Bursaria spinosa</i>	E	<i>Ozothamnus ferrugineus</i>
E	<i>Calystegia marginata</i>		<i>Persicaria decipiens</i>
V	<i>Coprosma quadrifida</i>	E	<i>Persicaria hydropiper</i>
	<i>Dianella admixta</i>		<i>Poa ensiformis</i>
V	<i>Dianella longifolia</i> s.l.		<i>Poa morrisii</i>
	<i>Dichondra repens</i>	E	<i>Pomaderris aspera</i>
	<i>Elymus scaber</i>	V	<i>Potamogeton crispus</i>
	<i>Epilobium hirtigerum</i>	E	<i>Prostanthera lasianthos</i>
	<i>Eucalyptus goniocalyx</i>		<i>Pteridium esculentum</i>
E	<i>Eucalyptus macrorhyncha</i>	E	<i>Rubus parvifolius</i>
V	<i>Eucalyptus melliodora</i>		<i>Rytidosperma laeve</i>
E	<i>Eucalyptus radiata</i>		<i>Rytidosperma penicillatum</i>
C	<i>Eucalyptus rubida</i>		<i>Rytidosperma racemosum</i>
E	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	E	<i>Senecio minimus</i>
V	<i>Exocarpos cupressiformis</i>		<i>Senecio quadridentatus</i>
E	<i>Gynatrix pulchella</i>		<i>Themeda triandra</i>
V	<i>Isolepis inundata</i>	E	<i>Typha ?orientalis</i>
	<i>Juncus gregiflorus</i>	V	<i>Veronica gracilis</i>

Introduced Species

<i>Anthoxanthum odoratum</i>	<i>Fraxinus angustifolia</i>	<i>Ranunculus repens</i>
<i>Aster subulatus</i>	<i>Genista monspessulana</i>	<i>Rosa rubiginosa</i>
<i>Callitriche stagnalis</i>	<i>Hedera helix</i>	<i>Rubus anglocandicans</i>
<i>Chrysanthemoides monilifera</i> subsp. <i>monilifera</i>	<i>Helminthotheca echioides</i>	<i>Rumex crispus</i>
<i>Cirsium vulgare</i>	<i>Ipomoea indica</i>	<i>Salix babylonica</i> s.l.
<i>Crataegus monogyna</i>	<i>Jasminum</i> sp.	<i>Solanum mauritianum</i>
<i>Crococsmia</i> × <i>crococsmiflora</i>	<i>Nassella trichotoma</i>	<i>Tradescantia fluminensis</i>
<i>Cyperus eragrostis</i>	<i>Pennisetum clandestinum</i>	<i>Ulex europaeus</i>
<i>Dactylis glomerata</i>	<i>Phalaris aquatica</i>	<i>Verbena bonariensis</i> s.l.
<i>Ehrharta erecta</i>	<i>Pitiosporum undulatum</i>	
<i>Foeniculum vulgare</i>	<i>Prunus cerasifera</i>	

Fauna of special significance

Powerful Owls are Vulnerable in Victoria (DSE 2003b) and have been recorded as recently as 2003 in the adjacent Glenfern Valley Bushlands. They are likely to occasionally visit any forest in the district.

Platypus were found in the creek during a 1996-7 trapping campaign (Serena *et al.* 1998) but subsequent attempts to find platypus have failed and this species has probably ceased to visit this area, at least for the time being.

Many of the significant fauna listed for Site 2 would also occur occasionally in Site 1, but no data could be obtained in the absence of permission to enter the private property.

Fauna habitat features

- There are many large eucalypts with hollows that would suit roosting or nesting of certain birds and mammals;
- The stream supports Platypus (or at least, was known to do so until 1997) and hence is likely to have reasonable habitat for stream invertebrates.

Significance ratings

The following is an assessment of the site's significance against the Department of Sustainability & Environment's standard criteria (Amos 2004).

Regionally Threatened Ecological Vegetation Class

According to the criteria of 'Victoria's Native Vegetation Management – A Framework for Action' (NRE 2002a), even quite degraded examples of a regionally vulnerable EVC (including Valley Grassy Forest) have a conservation significance rating of Medium. This status applies to at least some of the vegetation in this site, and it is possible that the highest quality vegetation may reach High conservation significance. As a consequence, the site meets criterion 3.2.3 for a site of at least **Regional** significance. If a more detailed site inspection in accordance with the Framework were to show that the most significant part of the Valley Grassy Forest has a habitat score of at least 0.3 (which seems unlikely), the site's significance rating should be raised to State.

Threatened flora and fauna

The likely occasional visits of Powerful Owls to the site represent **Local** significance under criterion 3.1.3, given that Powerful Owl is a vulnerable species in Victoria.

The other species listed as 'Fauna of special significance' above, and all the locally threatened plant species listed under the heading 'Plant species', give the site **Local** significance under criterion 3.1.5 (except perhaps a few species that may not have viable populations).

Threats

- Possible future residential development;
- Rapid escalation of environmental weeds if grazing ceases and other control measures are not taken;
- Environmental weeds invading the Riparian Forest from properties to the north of the creek, the worst species being: Hawthorn (*Crataegus monogyna*), Ivy (*Hedera helix*), Sweet Pittosporum (*Pittosporum undulatum*), Blackberry (*Rubus discolor*), Willows (*Salix* species), Wandering Jew (*Tradescantia albiflora*) and introduced grasses such as Cocksfoot (*Dactylis glomerata*);
- Environmental weeds invading the Valley Grassy Forest, the worst species being: Sweet Vernal-grass (*Anthoxanthum odoratum*), Hawthorn (*Crataegus monogyna*), Montpellier Broom (*Genista monspessulana*) and Sweet Briar (*Rosa rubiginosa*);
- Possibly loss or decline of plant species that are present in dangerously small numbers, due to inbreeding, poor reproductive success or vulnerability to localised chance events, but population sizes could not be checked in this study;
- Predation of wildlife by pets;
- Damage to creek banks by stock.

Administration matters

- This site is worthy of inclusion within the proposed Environmental Significance Overlay, ESO2, because of its biological significance (known and potential), the possibility of future subdivision, the presence of riparian habitat and the presence of a threatened vegetation class (Valley Grassy Forest) that is highly fragmented and highly concentrated on private land;
- The site is included within Vegetation Protection Overlay VPO1 of the Knox Planning Scheme. This was partly because part of the site was recognised as biologically significant by Water Ecoscience (1998, Site 27), but the presence of indigenous ground flora had been overlooked. The site is also covered by Significant Landscape Overlay Schedule 2;
- The site is zoned Green Wedge Zone Schedule 2 (GWZ2). It abuts, and is just outside, the Urban Growth Boundary for Melbourne;
- The granting of planning permits for land development within areas of Valley Grassy Forest would be restricted because of the status of the vegetation as a regionally vulnerable EVC and the Victorian government's policy for native vegetation management (NRE 2002a; Victoria Planning Provisions). Any development proposal for the site would have to be accompanied by an ecological assessment that is much more thorough than was possible from the perimeter;

- Some of the site has a slope exceeding 20% and some lies within a riparian zone. Both of these attributes are given a Very High land protection hazard rating by the Native Vegetation Management Framework (NRE 2002a) and they trigger certain planning controls.

Information sources used in this assessment

- A site survey by Dr Lorimer on 19th December 1997 for the report, '*A Survey and Management Plan for Significant Vegetation of Roadsides in Knox*' by G.S. Lorimer for Knox City Council (May 1998, 137 pp.). This included a map of vegetation quality around the perimeter of the site and two lists of plant species (indigenous and introduced) for different areas of Valley Grassy Forest;
- The report '*Vegetation Survey of Linear Reserves – A Management Strategy for Riparian and Flood Plain Vegetation*' by J.C. Reid, H. Moss and G.S. Lorimer for Knox City Council (September 1997, 130 pp.), along with supporting field data gathered along the creek by Mr John Reid on 26th March 1997. This included a vegetation map showing EVCs and vegetation quality along the creek, and two lists of plant species (indigenous and introduced) – one for aquatics in the creek and the other for the Riparian Forest;
- A list of fauna observed during each of the above botanical surveys;
- Lists of fauna observed in the area during 2001-2003, carefully compiled by Mr Mark Fanthorpe for this project, based on surveys by him and his fellow members of the Friends of Glenfern Valley Bushlands: I. Rainbow, L. Living & R. Sinclair;
- '*Status and Habitat Relationships of Platypus in the Dandenong Creek Catchment – II. Results of Surveys and Radio-Tracking Studies, September 1997 - March 1998*', a report by M. Serena, J.L. Thomas and G.A. Williams of the Australian Platypus Conservancy to Melbourne Water, September 1998;
- Aerial photography from February 2001 and April 2003;
- Satellite imagery of the district;
- The Department of Sustainability & Environment's BioMaps of the area;
- Maps of geology and topography produced by agencies of the Victorian government.

Acknowledgment

Thank you to Mr Mark Fanthorpe and his fellow volunteers in the Friends of Glenfern Valley Bushlands for their fauna list.



Fenny Creek Reserve, Upper Ferntree Gully

24/02/2016

Disclaimer:

Roads and Title Boundaries - State of Victoria, Knox City Council
 Planning Scheme Information - DPCD, Knox City Council
 Aerial Photography - AAM (Flown January 2013 - unless otherwise stated)
 Melbourne Water Drainage Information - Melbourne Water

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Scale 1:6408



Ferny Creek Reserve Landscape Plan

Version DRAFT 0.1, 12 July 2015

Prepared for

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Executive Summary

This document provides a pictorial and tabular landscape plan for Knox City Council's recently acquired reserve along Ferny Creek in Upper Ferntree Gully – see the fold-out pages 18 and 19. The plan is only conceptual, to provide a vision for the reserve's future, exploiting the opportunities and honouring the constraints and management needs. Community consultation is planned before any work commences, with the expectation that the proposals here will evolve to better meet the aspirations of Council, Melbourne Water and the local community. It is likely to be an iterative process.

This document provides a detailed assessment of the current conditions of Ferny Creek Reserve and its surroundings, including the topography, scenery, vegetation, wildlife, flooding dynamics, erosion and other management needs. It also investigates opportunities and constraints for the reserve's future. These lead to the conceptual landscape plan itself in Chapter 4.

The reserve can be divided into three separate zones: the floodplain (as seen on the cover); the creek channel; and a strip of lightly treed hillside flanking Gilmour Park. The floodplain and hillside were pasture until recently, with cattle grazing right to the bed of Ferny Creek, in places.

The creek channel has substantial problems of flooding and erosion ('scouring'), both caused by willows and clearing of the catchment. Melbourne Water plans to deal with these problems using heavy machinery in the creek channel. The details of the work are being left open until community consultation around this landscape plan has occurred. For this reason, and because of strict flood-related constraints on what work can be done in a creek channel, this document provides little guidance for the future of the creek channel.

The floodplain also has constraints related to flooding: Any changes that significantly impede floodwater could exacerbate flooding of houses around the western end of the reserve. A substantial part of the floodplain is proposed to be vegetated in a way that mimics the natural vegetation of local floodplains, but with the selection of species and the density of trees and shrubs adjusted to avoid problems during floods. An artificial seasonal wetland is also proposed.

The patchwork design of the proposed planting has been done in conjunction with the design for a path through the reserve, to provide path users with alternating scenes of forest, creek, wetland and farmland.

An initial phase of planting is intended to provide screening between the path and houses, before the path is constructed. That phase is also intended to provide vegetation adjacent to some trees that will have to be removed for Melbourne Water's creek work, well prior to the work commencing. These measures are intended to maintain visual amenity for neighbours.

There is no alternative but for the path to grade from the top of the retarding basin levee at Gilmour Park to the floodplain, 60 m away and 5 m lower in elevation. While this incline presents no problem for able-bodied walkers, it is difficult to meet Council's design standards for generally accessible paths. This problem is unresolved.

The reserve's hillside zone, beside Gilmour Park, has fewer constraints than the creek channel and floodplain but it also offers fewer opportunities for park users - particularly because of its steep cross-slope. Bushfire protection and landscape consistency have prompted the response here of planting scattered trees on most bare parts of the hillside zone and slashing the grass. However, no tree planting is proposed near the retarding basin levee, so that the attractive views across the farmland, floodplain and adjacent hills are retained.

1. Introduction

1.1 Purpose and Goals

This landscape plan is to provide options for development of public land along Ferry Creek in Upper Ferntree Gully, between New Rd and Waters Avenue. This land is referred to in this document as Ferry Creek Reserve and it is outlined in red on Figure 1. Ferry Creek flows through the reserve from the southeast corner of the map to the northwest corner, but it is piped underground through the strip coloured green in the northwest.

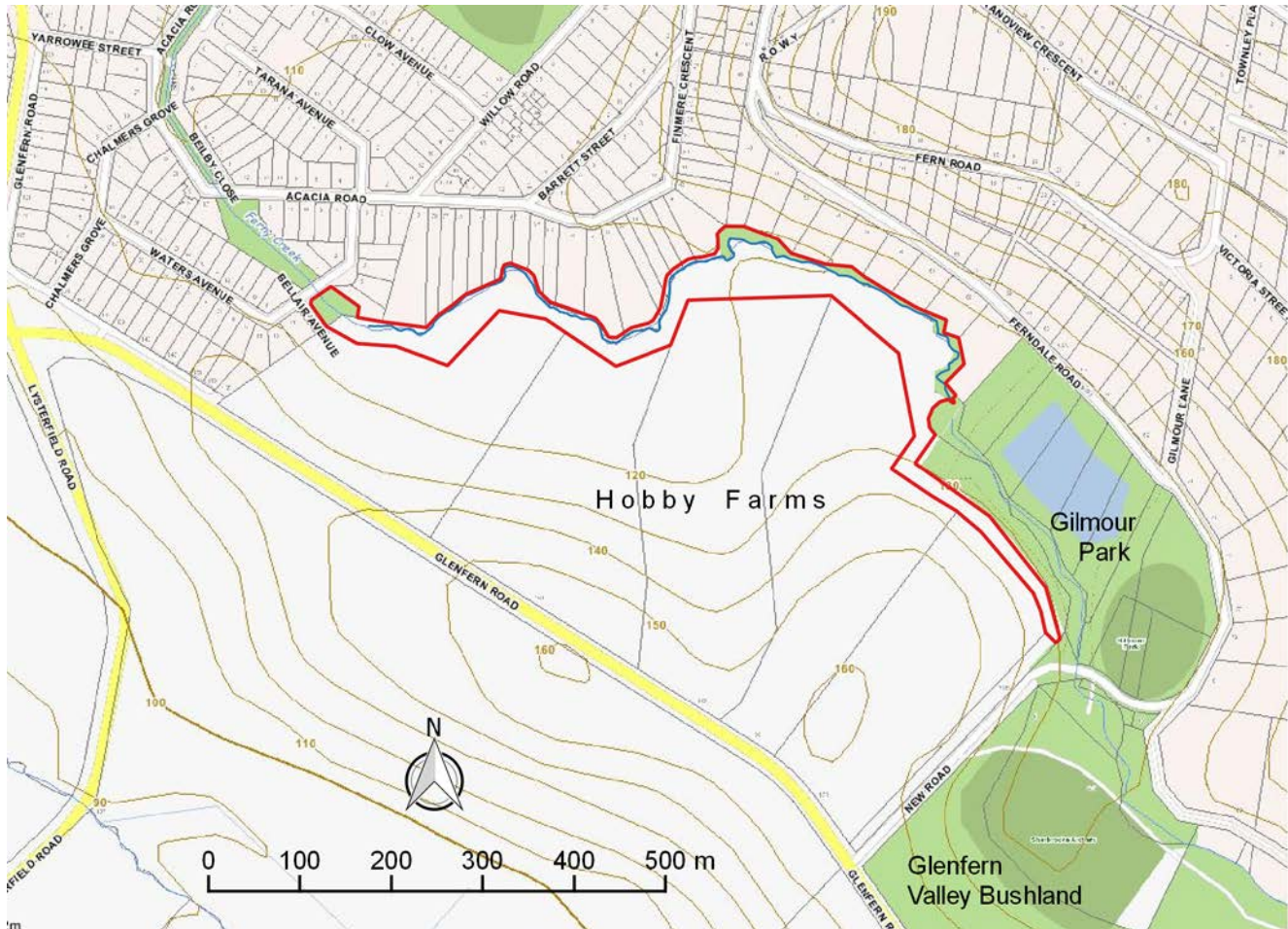


Figure 1. Locality map of Upper Ferntree Gully showing Ferry Creek Reserve outlined in red.

The green areas on Figure 1 have long been public land, including two segments of Ferry Creek Reserve. Knox City Council acquired the remainder of Ferry Creek Reserve (lot RES1, PS708004) in 2014 as part of subdivision of farmland that extends to Glenfern Rd. The newly reserved land has a long history of cattle grazing.

Council sought this landscape plan to identify the opportunities, constraints and management needs that will affect development of the reserve for recreation, amenity and environmental values. Council will use the information in this document to consult with the community and decide how to proceed. The proposals here are expected to evolve in response to community feedback.

It is also hoped that this landscape plan will be useful to Melbourne Water, but it does not provide enough hydrological assessment for flood mitigation or waterway management. Safety

issues are identified below which need the attention of a hydrologist and risk manager. The work that Melbourne Water decides to do along Ferny Creek may require alteration to some of the proposals below.

In preparing this landscape plan, the author conducted 13½ hours of fieldwork at Ferny Creek Reserve and spent four hours inspecting the site with representatives of Knox City Council, Melbourne Water and Friends of Glenfern Green Wedge.

2. Current Environmental Conditions

The land of Ferny Creek Reserve falls naturally into three very distinct zones mapped on Figure 2:

- The creek channel of Ferny Creek, where the terrain, flora, fauna, environmental issues and various legal conditions derive from the flow of water, particularly the rapid flow of floodwater (Section 2.3);
- The adjacent floodplain, whose representation within the reserve extends downstream from Gilmour Park’s levee bank to Waters Avenue (Section 2.2); and
- A sparsely treed strip of hillside with a steep cross-slope between the levee bank and New Rd (Section 2.1).

These zones differ most importantly in their slope, hydrology, erodibility, soil type, flora, fauna and suitability for recreation. Management objectives must therefore vary among the zones according to their different opportunities and constraints.

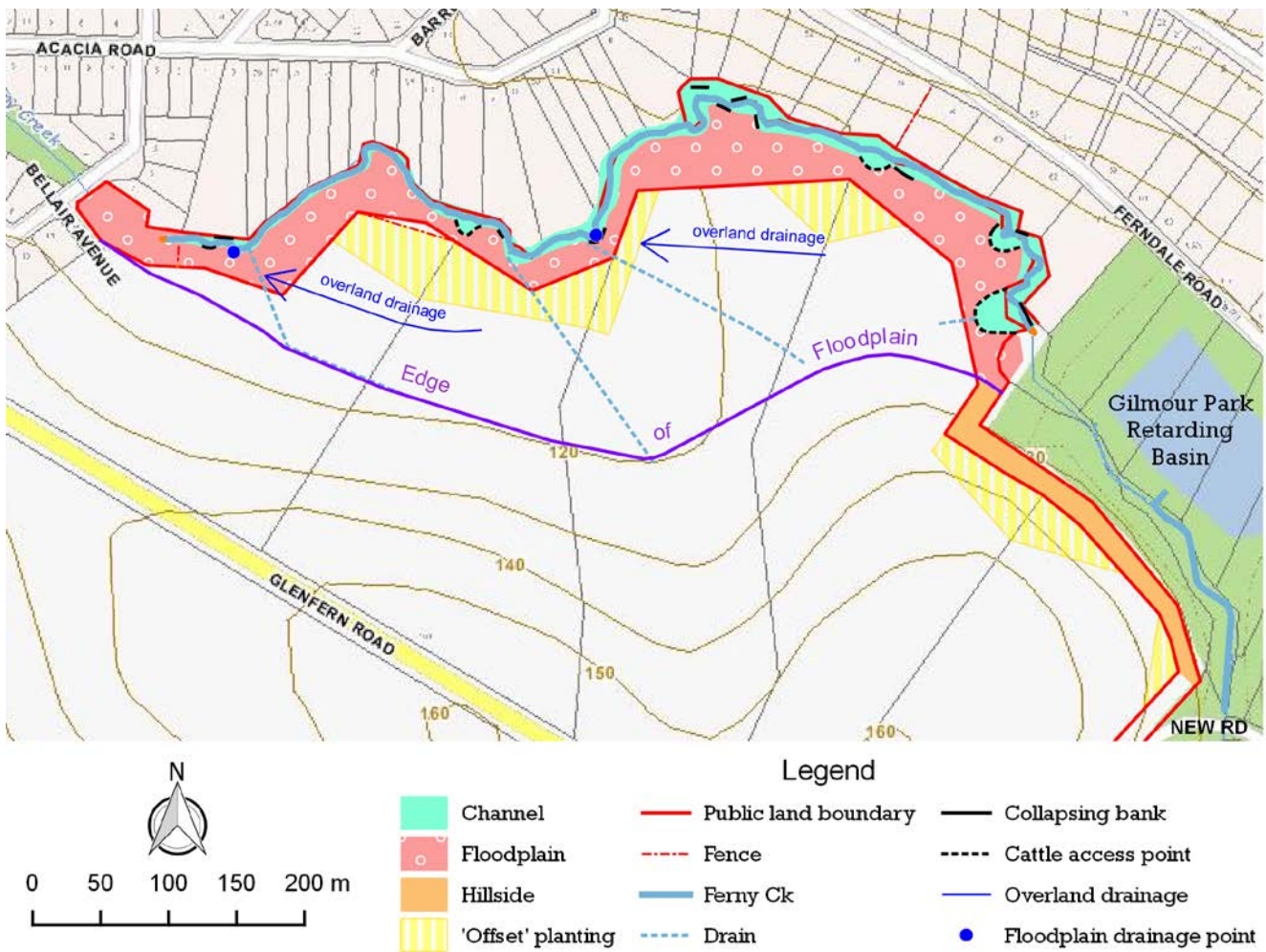


Figure 2. Map of the three zones within Ferny Creek Reserve, and related features.

2.1 Hillside

Figure 3 shows a representative view along the strip of hillside. When I inspected it from its northeastern boundary in 1997 (Reid *et al.* 1997; Lorimer 1998, 2010), it contained scattered

Bundy trees (*Eucalyptus goniocalyx*) over pasture that contained a significant proportion of indigenous ground cover plants – remnants of the vegetation type known as ‘Valley Grassy Forest’. When I revisited the site in 2010, I wrote that the property had recently ‘been sown with rye-grass, brome grass and clover, and fertiliser has been applied. This has resulted in a flourishing pasture of introduced species and the suppression of native vegetation on most (but not all) of the land’.

Today, eight Bundies remain but the ground flora contains very few indigenous plants and has become dominated by pasture weeds – particularly Rat-tail Grass (*Sporobolus africanus*). The detailed composition of the vegetation is given in Section 2.3.2.



Figure 3. A representative view along the reserve’s hillside strip, which lies downhill from the fence at left and extends almost as far downhill as the trees on the right (which are on Melbourne Water land). The levee of the retarding basin can be seen in the distance at right.

The Bundies are good habitat trees because of their high carbohydrate production and the many hollows they contain, but they are sparse. In other respects, this strip of land has very little habitat value in its present state.

The vegetation is adjusting to the recent cessation of fertilising, sowing and grazing. Changes in both the indigenous and introduced species will occur, even if Council were to leave the land alone. Introduced species that benefit from fertiliser, such as the rather abundant grass, Cocksfoot (*Dactylis glomerata*), will decline as fertility decreases. Rat-tail Grass is hardier and may persist well. Some of the indigenous species present prior to 2010 may be able to re-establish in the absence of grazing, particularly if fire occurs.

The cross-slope of the hillside strip of land provides a natural disincentive for pedestrians to enter it from the path in Gilmour Park that runs parallel and slightly downhill (seen at bottom-right of Figure 3).

Most of the uphill edge of the hillside section of Ferny Creek Reserve is flanked by new revegetation of indigenous plants on private land and most of the lower side is flanked by the semi-natural forest of Gilmour Park.

2.2 Floodplain

The floodplain supports pasture of introduced species, principally Perennial Ryegrass (*Lolium perenne*), Cocksfoot (*Dactylis glomerata*), Prairie Grass (*Bromus catharticus*) and White Clover (*Trifolium repens*), supported by fertiliser that has been applied until recently and still leaches from the adjacent hillside. Leaving aside trees on the lip of the creek channel, the floodplain's indigenous flora amounts to only a few small patches of the hardy Weeping Grass (*Microlaena stipoides*), a couple of Broom Rushes (*Juncus sarophorus*) and a cluster of seedlings of Black Wattle (*Acacia mearnsii*) and Bundy (*Eucalyptus goniocalyx*) where there has been a recent campfire.



Figure 4. A representative view of the floodplain, flanked by trees along the lip of the creek channel at left and private land over the fence at right. The retarding basin levee can be seen in the distance at right.

As in the case of the hillside section of the reserve, the vegetation is adjusting to the recent cessation of grazing, fertilising and sowing. The observed germination of Black Wattles and a Bundy following a recent campfire indicates that some seeds of indigenous plants in the soil are capable of germinating when conditions suit them. Hazel Pomaderris (*Pomaderris aspera*) is a species strongly adapted to regeneration after fire or other suitable disturbance. It would once have been abundant on the floodplain but it died out sometime between 1997 and 2014.

Contour maps show that a typical cross-section through the floodplain is very close to flat except near the lip of the creek channel, where it rises gradually by a few tens of centimetres. The raised

lip or levee is a normal feature of floodplains, resulting from deposition of sediment when the stream bursts its banks.

Water on the floodplain drains rather uniformly westward, following the axis of the floodplain, whereas the creek zigzags northwest and southwest. Hydrologic modelling provided by Melbourne Water indicates that the floodplain's natural tendency is to drain back into the creek predominantly at the two locations marked with blue dots on Figure 2 (page 3). However, the four agricultural drains shown on Figure 2 (and a couple of smaller ones) now provide additional routes for water to drain to the creek. The more rapid the drainage from the floodplain, the greater the flooding downstream.

The floodplain provides pleasant pastoral views across the lightly wooded hillside to the south, creating a strong rural character that adds to the sense of place. Recent revegetation on the adjacent farmland will soon obstruct the view of the hillside from much of the reserve. This landscape plan proposes to exploit the remaining views and not create further obstruction.



Figure 5. A pastoral view from the reserve's west across the adjacent hobby farms.

2.3 Creek Channel

Ferry Creek enters Ferry Creek Reserve via a pipe out of the Gilmour Park retarding basin. It takes a more or less natural course until it enters a pipe 65 m east of the Waters Avenue bridge.

The creek channel raises the most pressing and complex management needs in Ferry Creek Reserve. Its depth varies from 1.5 m amid willows in the west to 5 m near its most northerly point. It has clearly defined lips and sides that are mostly steep except at several locations where cattle or heavy machinery have accessed the creek, as seen in Figure 6.



Figure 6. A representative scene within the creek channel, showing the water, an inclined bank apparently created by heavy machinery (bottom left) and steep, eroding banks with variable vegetation.

The flora and fauna in the channel form three communities:

- Aquatic and amphibious species in the water and on the creek bed and silt deposits;
- Flood-tolerant (but not aquatic or amphibious) species on the channel slopes and terraces; and
- Species typical of ‘Riparian Forest’, dominated by Manna Gums, at the top (or ‘lips’) of the channel.

Details of the plants found in the creek channel are given in Section 2.3.2.

There are more indigenous plants in the creek channel than on the floodplain or hillside but they are still less abundant than introduced plants. Importantly, Manna Gums and Wattles provide an almost unbroken canopy in the eastern two-thirds of the zone. The downstream third is instead dominated by willows and ashes, which promote flooding and scouring of the banks when they are situated low in the channel (Section 2.3.1).

Most of the reserve’s indigenous fauna are strongly associated with the creek channel and its vegetation. They include eels, tree frogs, ducks, Buff-banded Rails and a range of forest birds in the trees. Very few native fish other than eels can reach the reserve because of pipes and barrages further downstream and the retarding basin upstream. Platypus were sought but not found in 1997-8 but were found at nearby Glenfern Valley Bushland (from where they seem to have subsequently disappeared).

The most pressing management needs in Ferry Creek Reserve relate to erosion of the creek and consequent instability of the banks. These problems appear to be caused by two main mechanisms: scouring of the channel during high flows, and (to a lesser degree) hydrological disturbance where the bank has been scalloped to provide a gradual incline to the creek for cattle or heavy machinery.

2.3.1 Scouring of the Channel

Contour maps obtained from Knox City Council in 1997 – undated but predating the Gilmour Park retarding basin – show the creek channel taking almost the same path as today and with a depth varying from just under 2 m in the west to just over 2 m in the east. In the willow-dominated western section, the channel depth above low-flow level has remained stable or slightly reduced to 1.5 m, attributable to the bed being raised by willow root mats. In the middle, the channel depth has increased greatly to a maximum of 5 m, with extensive bank instability typified by Figures 6 and 7. Further east, the channel depth reduces to typically 3.2 m near the outlet from the retarding basin – still substantially deeper than the old contour maps.

These changes in depth suggest that scouring by floodwater in the central and eastern sections of Ferry Creek Reserve has incised the channel deeper into the floodplain than prior to settlement. Clearing of the catchment and creation of impervious surfaces would be major causes of more powerful floods, except that this has been countered by the Gilmour Park retarding basin. Clearing of the original dense vegetation cover on the banks would have left the banks more vulnerable to each flood.

Banks that are collapsing, such as those in Figures 6 and 7, are called ‘cut banks’. Cut banks occur naturally but are unnaturally prevalent in Ferry Creek Reserve. They are a safety hazard for people, a source of excessive sediment in floodwater and a challenge for revegetation. On the right bank (where private land abuts), bank instability is also reducing the usable land and posing a risk of undercutting at least one house.

Some of the introduced deciduous trees that now make up much of the riparian tree cover are also affecting the natural channel profile. Most significantly, willows with dense root mats across the bed of the stream are trapping sediment and slowly raising the bed. This may seem to be desirable in a stream whose channel has been deepened by scouring but it can have three adverse consequences illustrated by Figure 8:

- Increased overbank flooding due to a reduction in the channel cross-section (a problem in the western third of the reserve);
- Even during non-flood conditions, water accelerates as it descends from the raised root mat and can cause scouring; and
- A substantial tree trunk in a channel causes floodwater to divert around it and increase scouring of the adjacent banks. The vorticity that is generated in the flow exacerbates the problem.

Interestingly, indigenous trees tend to grow at the top of creek banks but rarely in channels, and never with root mats like willows. The natural courses and channels of local streams have evolved in response to indigenous vegetation and are destabilised by trees that interact differently with stream flows.



Figure 7. A dangerously undercut bank.



Figure 8. Scouring of the creek bank by water that must divert around a willow trunk and then accelerate in its descent from the mound of the root mat.

2.3.2 Creek Bed Access Points

There are four locations where cattle have regularly accessed the creek, marked on Figure 2 with dotted black semicircles at the edge of the channel. Heavy machinery has also accessed the creek at these points (and others) for works such as placing rocks on the creek bed. The machinery has scalloped the bank to provide a gradual incline to the water. Soil has then gravitated down the incline and accumulated at the bottom, slightly intruding into the creek. Figure 6 on page 7 shows an example where the accumulation of soil at the foot of an incline has forced the creek toward the opposite (right) bank, causing scouring and the ‘cut bank’ seen on the right of the photograph. This is similar to what happens naturally on a bend in a stream, but in this case the bend is only slight and created by the incline leading to the creek.

Now that cattle no longer access the creek from the reserve, it is possible that some of the associated bank instabilities will alleviate. Revegetation would tend to help that process. On the other hand, the formation of a cut bank on the outside of a slight bend in a stream is inherently unstable and it may tend to worsen. This is a problem to be addressed by a hydrologist.

2.4 Plant Species Present

The general nature and composition of the vegetation in each zone of the reserve are discussed above. This section provides more detailed information about the species present.

2.4.1 Indigenous Plants

Table 1 lists all the indigenous plants that were found during the current study or by Reid *et al.* (1997). None of them has been planted. A few additional species are likely to be detectable in late spring or early summer.

Table 1. Indigenous plant species of Ferry Creek Reserve.

The ‘Status’ column indicates each species’ risk of extinction in Knox, as assessed by Lorimer (2010) according to the international ‘Red List’ criteria. ‘EN’ means endangered (the second-highest category) and ‘VU’ means vulnerable (the lowest level of threatened species).

The last four columns of the table represent different parts of the reserve. Within those columns, the entry for each species indicates the species’ abundance, using the following symbols:

- × Not seen since the 1997 survey of Reid *et al.* (1997);
- Scarce, or so concentrated in one or two locations as to be at risk of being destroyed by chance;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the relevant vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

Status	Scientific Name	Common Name	Hillside	Floodplain	Channel lip	Channel sides	Creek bed
Trees							
VU	<i>Acacia mearnsii</i>	Black Wattle	–	–	D	–	
	<i>Acacia melanoxylon</i> ¹	Blackwood			✓	–	
	<i>Eucalyptus goniocalyx</i>	Bundy, Long-leaf Box	D	–	–		

¹ *Acacia melanoxylon* was classified as locally vulnerable by Lorimer (2010) but it has since become secure.

Status	Scientific Name	Common Name	Hillside	Floodplain	Channel lip	Channel sides	Creek bed
EN	<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint			×		
EN	<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum			D	–	
VU	<i>Exocarpos cupressiformis</i>	Cherry Ballart			×		
EN	<i>Pomaderris aspera</i>	Hazel Pomaderris			×		
<u>Shrubs</u>							
	<i>Acacia paradoxa</i> ²	Hedge Wattle	–				
	<i>Bursaria spinosa</i>	Sweet Bursaria			–		
VU	<i>Coprosma quadrifida</i>	Prickly Currant-bush			–	–	
EN	<i>Gynatrix pulchella</i>	Hemp Bush				✓	
EN	<i>Leptospermum scoparium</i>	Manuka			✓		
EN	<i>Melaleuca ericifolia</i>	Swamp Paperbark			–	✓	
EN	<i>Ozothamnus ferrugineus</i>	Tree Everlasting			×		
EN	<i>Prostanthera lasianthos</i>	Victorian Christmas-bush			×		
EN	<i>Rubus parvifolius</i>	Small-leaf Bramble	–				
VU	<i>Solanum laciniatum</i>	Large Kangaroo Apple			–	–	
?	<i>Solanum ?opacum</i> ³	Green-berry Nightshade		–			
<u>Vine</u>							
EN	<i>Calystegia marginata</i>	Forest Bindweed			×		
<u>Fern</u>							
	<i>Cyathea australis</i>	Rough Tree-fern				–	
	<i>Pteridium esculentum</i>	Austral Bracken				–	
<u>Grassy plants</u>							
	<i>Carex appressa</i>	Tall Sedge					–
	<i>Carex breviculmis</i>	Short-stem Sedge	–				
EN	<i>Carex fascicularis</i>	Tassel Sedge					–
VU	<i>Isolepis inundata</i>	Swamp Club-rush					M
	<i>Juncus gregiflorus</i>	Green Rush					✓
	<i>Juncus procerus</i>	Tall Rush		–	–		–
	<i>Juncus sarophorus</i>	Broom Rush		–	–		–
	<i>Juncus subsecundus</i>	Finger Rush	–				
	<i>Lomandra longifolia longifolia</i>	Spiny-headed Mat-rush			–		
	<i>Microlaena stipoides</i>	Weeping Grass	✓	–	✓		
	<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass			–	–	
	<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	–		–	–	
	<i>Themeda triandra</i>	Kangaroo Grass	✓				
EN	<i>Typha orientalis</i>	Cumbungi					×
<u>Creepers</u>							
	<i>Dichondra repens</i>	Kidney-weed	–				
EN	<i>Geranium gardneri</i>	Rough Crane's-bill			–		
EN	<i>Lobelia anceps</i>	Angled Lobelia					×
	<i>Oxalis exilis/perennans</i>	Wood-sorrel	–				

² *Acacia paradoxa* is represented only by overhanging branches of one plant each.

³ This species is very rare in the Melbourne region but it is regarded by some botanists as introduced to Australia. The two specimens beside Ferry Ck are slightly atypical for the species, creating doubt about identity and significance.

Status	Scientific Name	Common Name	Hillside	Floodplain	Channel lip	Channel sides	Creek bed
<u>Others</u>							
	<i>Alisma plantago-aquatica</i>	Water Plantain					✓
VU	<i>Alternanthera denticulata</i>	Lesser Joyweed					–
	<i>Epilobium hirtigerum</i>	Hairy Willow-herb					–
EN	<i>Euchiton involucratus</i>	Common Cudweed					–
	<i>Persicaria decipiens</i>	Slender Knotweed					M
EN	<i>Persicaria hydropiper</i>	Water-pepper					×
VU	<i>Potamogeton crispus</i>	Curly Pondweed					×
VU	<i>Potamogeton ochreatus</i>	Blunt Pondweed					–
EN	<i>Senecio minimus</i>	Shrubby Fireweed				–	–
	<i>Senecio quadridentatus</i>	Cotton Fireweed			×		

Taking into account the size of the study area and the diversity of habitat (aquatic, amphibious, floodplain and dry slopes), the range of indigenous plant species in Table 1 is far below what would be expected in a pristine landscape. This reflects the extensive modification of the landscape by clearing, agriculture, planting, weeds and creek erosion. These types of modification are very common on and near floodplains in lowland Victoria, and the depletion of indigenous plant species in Ferry Creek Reserve is typical.

The first column of Table 1 indicates which species are at risk of disappearing from Knox in coming decades. A designation of ‘endangered’ is equivalent to at least a 20% probability of disappearing within twenty years or five generations of the species (up to a maximum of one hundred years). A designation of ‘vulnerable’ means at least a 10% probability of disappearing within a century. The reserve’s populations of *Eucalyptus viminalis* (Manna Gum), *Gynatrix pulchella* (Hemp Bush), *Carex fascicularis* (Tassel Sedge) and *Geranium gardneri* (Rough Crane’s-bill) make small but significant contributions to the wild stocks of those species in Knox. The two plants identified tentatively as *Solanum opacum* (Green-berry Nightshade) are the first records for that species in Knox. If the identity is confirmed from the herbarium specimen that has been taken, and if the species is deemed native to Australia (which is the prevailing view), the two plants would be of greater significance than any others in the reserve. The populations of other species listed as vulnerable or endangered make lesser contributions to the security of those species in Knox.

Figure 9 maps the locations of species that are very scarce in Ferry Creek Reserve, most of which are listed as vulnerable or endangered in Knox. Many of those species are represented by fewer than four individuals. Figure 9 also marks in purple the locations of species that were recorded by Reid *et al.* (1997) but are no longer present at those locations 2015.

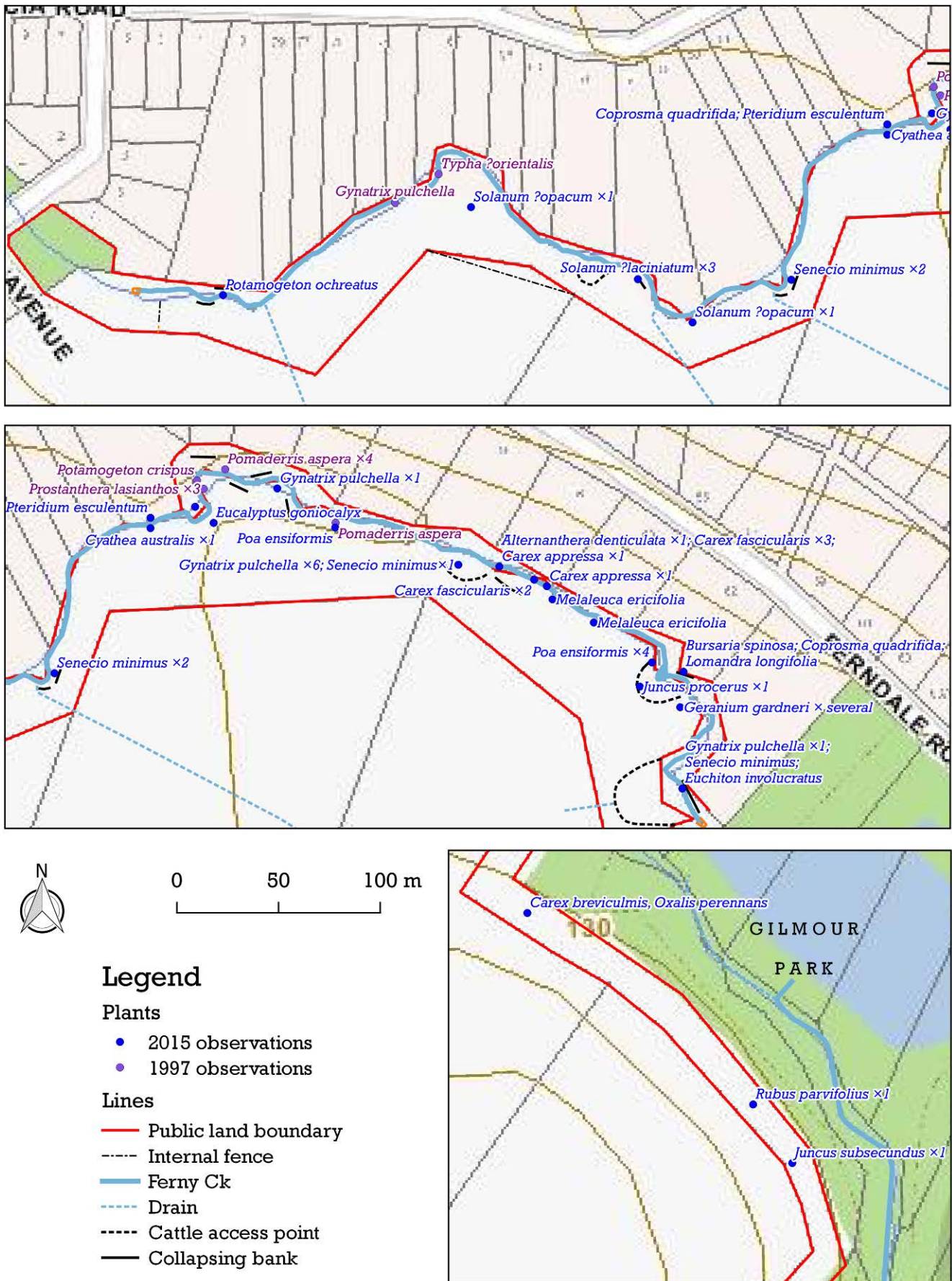


Figure 9. Maps of scarce and locally rare plants. The uppermost map is for the reserve’s western section. Its right edge overlaps the left edge of the middle map, and the bottom map is for the reserve’s strip of hillside beside Gilmour Park.

2.4.2 Introduced Plants

Table 2 lists the wild introduced species that have been recorded in Ferry Creek Reserve. The small number of species that have been planted and not gone wild are omitted. Some species have gone wild after being originally planted for pasture (e.g. ryegrass) or amenity (e.g. Weeping Willows). Some (e.g. ryegrass) are likely to dwindle or die out now that they no longer have the support of fertiliser and cultivation, while others (e.g. Ivy, Blackberry and Sweet Pittosporum) are very persistent and threaten the remaining indigenous flora.

As for the indigenous species, a few extra introduced species are likely to be detectable in late spring or early summer.

Table 2. Wild introduced plant species of Ferry Creek Reserve.

Scientific Name	Common Name	Hillside	Floodplain	Channel lip	Creek sides	Creek bed
Trees						
<i>Fraxinus angustifolia</i>	Desert Ash			✓	✓	
<i>Paulownia tomentosa</i>	Paulownia				-	
<i>Pittosporum undulatum</i>	Sweet Pittosporum			-	✓	
<i>Populus alba</i> 'Pyramidalis'	'Pyramidalis' White Poplar			✓	-	
<i>Prunus cerasifera</i>	Cherry-plum			-		
<i>Salix babylonica</i>	Weeping Willow				✓	✓
<i>Salix ?fragilis</i>	Crack Willow (ID uncertain)			✓	✓	✓
Shrubs						
<i>Crataegus monogyna</i>	Hawthorn			-		
<i>Chrysanthemoides monilifera</i> ssp. <i>monilifera</i>	Boneseed			-	✓	
<i>Rubus anglocandicans</i>	Blackberry			-	✓	
<i>Solanum mauritianum</i>	Tobacco-bush			-	-	
<i>Ulex europaeus</i>	Gorse (Furze)			×		
Vines						
<i>Hedera helix</i>	Ivy			✓	M	
<i>Ipomoea indica</i>	Lear's Morning-glory			-		
<i>Jasminum polyanthum</i>	Jasmine				-	
Grassy plants						
<i>Agrostis capillaris</i>	Brown-top Bent		✓	✓		
<i>Alopecurus pratensis</i>	Fox-tail Meadow-grass		-			
<i>Avena barbata</i>	Bearded oat		-			
<i>Bromus catharticus</i>	Prairie Grass		M	✓		
<i>Cyperus eragrostis</i>	Drain Flat-sedge					✓
<i>Dactylis glomerata</i>	Cocksfoot	M	✓	✓		
<i>Ehrharta erecta</i>	Panic Veldt-grass			✓		
<i>Holcus lanatus</i>	Yorkshire Fog		-	-		
<i>Lolium perenne</i>	Perennial Rye-grass		D	D		
<i>Paspalum dilatatum</i>	Paspalum		-			
<i>Paspalum distichum</i>	Water Couch					✓
<i>Phalaris aquatica</i>	Toowoomba Canary-grass			×		
<i>Sporobolus africanus</i>	Rat-tail Grass	D	-			
<i>Vulpia bromoides</i>	Squirrel-tail Fescue	✓	✓	✓		
Creepers						

Scientific Name	Common Name	Hillside	Floodplain	Channel lip	Creek sides	Creek bed
<i>Callitriche stagnalis</i>	Pond (or Common) Water-starwort					✓
<i>Galium aparine</i>	Cleavers	✓	✓			
<i>Nasturtium officinale</i>	Watercress					✓
<i>Ranunculus repens</i>	Creeping Buttercup				✓	✓
<i>Tradescantia fluminensis</i>	Wandering Jew				✓	✓
Others						
<i>Allium triquetrum</i>	Angled Onion			✓	M	M
<i>Arctotheca calendula</i>	Capeweed		-			
<i>Aster subulatus</i>	Aster-weed				-	-
<i>Cirsium vulgare</i>	Spear Thistle	✓			✓	
<i>Foeniculum vulgare</i>	Fennel			×		
<i>Helminthotheca echioides</i>	Ox-tongue				✓	
<i>Hypericum tetrapterum</i>	Square-stem St John's Wort			✓	M	M
<i>Hypochaeris radicata</i>	Cat's Ear	-				
<i>Malva sp.</i>	a mallow		-			
<i>Plantago lanceolata</i>	Ribwort	✓	-			
<i>Romulea rosea</i>	Common Onion-grass	-				
<i>Rumex crispus</i>	Curled Dock		✓	✓		
<i>Rumex pulcher</i>	Fiddle Dock		-			
<i>Solanum nigrum</i>	Black Nightshade		-	-		
<i>Sonchus oleraceus</i>	Sow-thistle		-	-		
<i>Taraxacum officinale</i>	Dandelion		✓			
<i>Trifolium repens</i>	White Clover		M			
<i>Trifolium subterraneum</i>	Subterranean Clover	-				
<i>Verbena bonariensis</i>	Purple-top Verbena				✓	✓
<i>Zantedeschia aethiopica</i>	White Arum Lily				-	

3. Land Tenure and Management Responsibilities

It appears that a fence erected in 2014 between Ferry Creek Reserve and the northeast corner of 157 Glenfern Rd (200-275 m east of the Waters Avenue bridge) has been wrongly placed. It is marked with a red dash-dot line on Figure 2. As a result, there is a narrow triangle of land measuring 260 m² that lies on the reserve's side of the fence but is not actually part of the reserve. The new revegetation (an 'offset' planting) on the southern side of the fence was intended to extend to the property boundary. It would be desirable for Council and the private landowner to resolve what should be done with the triangle. There is probably a planning permit condition that requires it to be revegetated and maintained by the landowner.

While most of Ferry Creek Reserve belongs to Knox City Council, it appears that a strip of land on the northeastern edge has no title and no ownership. It is part of a lot that extends approximately 730 m along Ferry Creek from New Rd to the rear of 45 Finmere Crescent, typically 10-15 m wide. The state cadastre describes it as 'Allot. XX Parish of Narree Worran'. At the time of writing, Melbourne Water is investigating the land's status. It may affect Melbourne Water's capacity to conduct work on the right bank.

More generally, the *Water Act 1989* gives Melbourne Water the authority and responsibility for undertaking work along Ferry Creek and on adjacent land (regardless of ownership) and to engage with the community about the waterway's management. Of particular relevance to this landscape plan is Section 189 of the Act, which gives Melbourne Water the following functions (among others):

- 'To identify and plan for State and local community needs relating to the use and to the economic, social and environmental values of land and waterways;
- 'To develop and to implement effectively schemes for the use, protection and enhancement of land and waterways;
- 'To—
 - (i) develop and implement plans and programs; and
 - (ii) carry out works and activities—
to improve the environmental values and health of water ecosystems, including their biodiversity, ecological functions, quality of water and other uses that depend on environmental condition;
- 'To educate the public about any aspect of waterway management'.

In this context, 'land' refers to land which abuts or is within 20 m of a waterway (Section 188A), regardless of ownership. In the case of a creek like Ferry Creek where the channel has a definite lip, the waterway is taken to include the whole channel, up to the lip.

By-law No. 2 under the *Water Act* prohibits anyone other than Melbourne Water from undertaking a wide range of activities in a waterway or on the land described above, unless Melbourne Water issues permission. The activities include such things as construction, use of any vehicle (e.g. for slashing), removal of vegetation, planting vegetation that is likely to affect drainage, lighting a fire or depositing waste. Council should obtain the necessary written permission for any such activities that it intends to undertake at Ferry Creek Reserve, e.g. slashing, weed control and planting.

Melbourne Water seeks co-operation, understanding and support from landowners (private and public) rather than relying on its broad powers under the *Water Act* and By-law No. 2.

It is proposed below to eventually construct a path from Bellair Avenue to New Rd, partly by upgrading the existing track in Gilmour Park between New Rd and the retarding basin levee. Gilmour Park is owned by Melbourne Water. For this reason, and because of the desirability of a consistent approach to land management between Gilmour Park and Council's adjacent land, it is recommended that the two organisations negotiate a licence or lease agreement for Council to use and conduct works in parts of Gilmour Park.

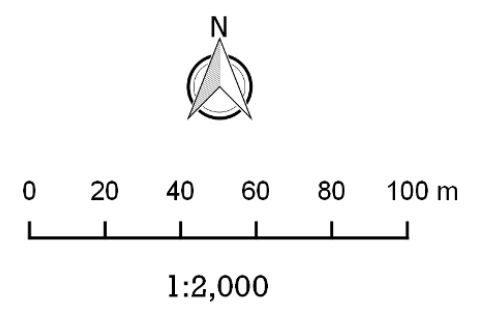
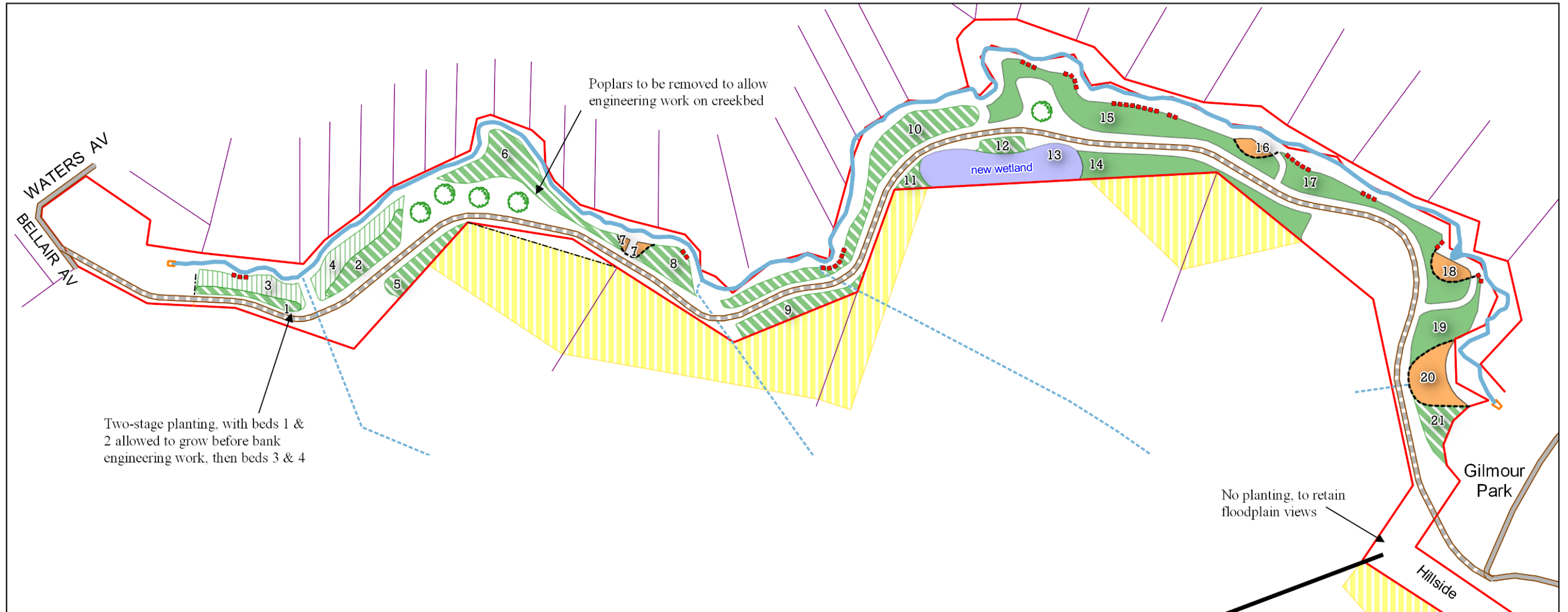
It is, of course, important for Knox City Council and Melbourne Water to ensure that developments in the reserve do not create safety hazards for visitors. Providing public access to water or beneath potentially dangerous trees needs to be considered with safety in mind, as has been done in the next chapter. Flash flooding does not appear to be a significant issue in the reserve because the flow of Ferny Creek is regulated by the retarding basin, which limits the flow rate until water spills over the levee.

4. Recommended Actions

4.1 Summary

Section 4.1 begins this chapter begins with a pictorial plan (Figure 10) and Table 3, which together summarise a concept for park creation and management in Ferny Creek Reserve over a period of about five years. The subsequent sections of this chapter provide more detail about the rationale and detailed implementation of the proposed actions.

As discussed in the introduction, the purpose of this document is to provide a vision for the reserve's future, exploiting the opportunities and honouring the constraints and management needs. Before any work commences, it is expected that the proposals here will evolve through consultation to better meet the aspirations of Council, Melbourne Water and the local community.



- Legend**
- Public land boundary
 - Private land boundary
 - - - Internal fence
 - Fenny Ck
 - - - Drain
 - - - Cattle access point
 - Existing path
 - Proposed path
 - Dangerous banks
- Planting beds, numbered
- A: Full Riparian Forest
 - B: Thin Riparian Forest
 - C: Very thin Riparian Forest
 - D: Erosion reclamation
 - E: Seasonal wetland to be created
 - Scattered tree planting
 - Specimen Manna Gum
 - Existing planting

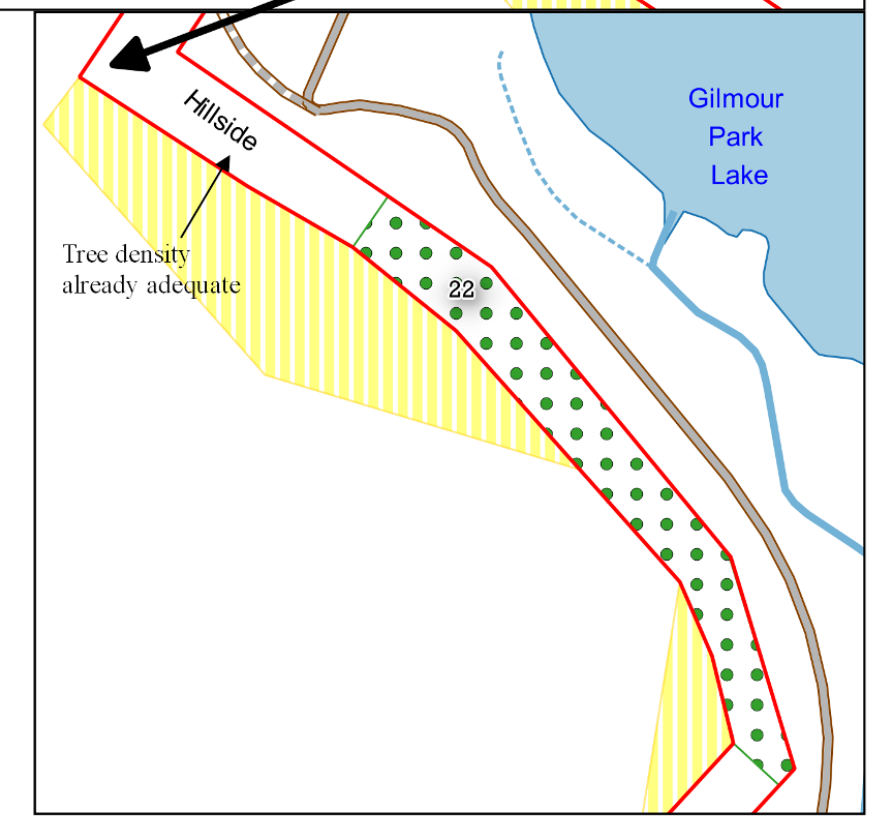


Table 3. Summary of recommended actions, to be read in conjunction with Figure 10.

Category	Objective	Action	Specific Requirements	Staging
Safety	Reduce the hazard posed by vertical or undercut creek banks	1. Assess steep banks to determine which ones warrant a warning sign and/or a simple fence. Banks posing a risk of falling at least 2 m from the reserve side of the creek bank are marked on Figure 10.	Bank stability will need to be checked after each flood and perhaps between floods. Any fences will have to be constructed to collapse in floodwater or avoid trapping flood-borne debris.	Immediate
Community engagement	Ensure the reserve's development suits the community as much as possible	2. Seek community responses to this landscape plan (or Council's response to it) and conduct a field day to promote dialogue		2015
	Engender cooperation in waterway management between Council, Melbourne Water and owners of abutting land	3. Ask experts in hydrology, waterway ecology and waterway management to address the field day and discuss these matters with neighbours	One matter to discuss is provision of visual screening between houses and a future path. Seek complementary planting on both sides of the creek to achieve screening where wanted.	2015
Administration	Coordinate land management and provision of services for users of Gilmour Park and the adjacent Council land	4. Council and Melbourne Water to negotiate a licence or lease agreement for Council to use parts of Gilmour Park		2015-16
Waterway management (capital works)	Minimise damage that heavy machinery might do to any future assets in the reserve (e.g. paths, revegetation) while removing problematic trees or doing rockwork	5. Melbourne Water to decide what foreseeable work requires heavy machinery and schedule as much as practicable before a path is constructed	See Section 4.2. Use of heavy machinery should be avoided when feasible.	2015
Waterway management (recurrent), Habitat management	Protect indigenous flora and fauna that are under threat from weeds	6. Kill declared weeds such as blackberry, boneseed and hawthorn, and where feasible, any other species that are actively displacing indigenous plants (e.g. Ivy and Sweet Pittosporum)	On the creek bank, avoid soil disturbance and bare ground. Melbourne Water's approval will be required.	Every year from 2015
Visual amenity, Habitat creation, Waterway management (capital works)	Vegetate parts of the floodplain to stabilise creek banks and to provide habitat, a natural landscape and visual screening	7. Revegetation as per Figure 10 and Section 4.3.1 using standard riparian techniques	Planting will require Melbourne Water approval. Geotextiles take the place of mulch on a floodplain. Normal weed control will be required after planting.	Order plants by December 2015 so planting can occur in spring 2016 and autumn 2017
Visual amenity, Habitat creation	Provide wetland habitat and landscape diversity	8. Create an shallow, seasonal wetland at the location shown on Figure 10	Excavation and planting will need Melbourne Water approval. A suggested planting list included in Section 4.3.1.	Ideally excavate before the proposed path is constructed, to avoid the risk of machinery damaging the path. Planting can be staged as for the other floodplain planting
Visitor experience	Prevent a build-up of rank grass that would be a barrier to walking along the floodplain	9. Each spring and summer (and autumn, if seasonal conditions dictate), slash parts of the floodplain that are not vegetated (or at least a corridor for walkers)		Every year from 2015
Visual amenity, Habitat creation	Vegetate part of the hillside to provide habitat and a more coherent landscape	10. Plant scattered trees as per Section 4.3.1 (p. 23) in the green-dotted area on Figure 10		Spring 2015 or autumn 2016

Category	Objective	Action	Specific Requirements	Staging
Bushfire protection, Visual amenity	Reduce the fire hazard associated with dense grass growth on the hillside and maintain a more park-like landscape	11. Slash the hillside (avoiding trees) each summer as required but each spring, check for any regeneration of plants that should be protected from slashing		Every year from 2015
Visitor experience	Provide an opportunity to exercise and engage with nature by walking or (possibly) cycling through the reserve	12. Seek to resolve difficulties in meeting design standards for a path from the top of the retarding basin levee to the floodplain	See Section 4.4 (p. 29)	2015
		13. Construct a path between Bellair Av and the retarding basin levee bank and possibly upgrade the existing path to New Rd		After revegetation has started to provide visual screening between the path and houses on the right bank, e.g. 2018

4.2 Waterway Management

The deciduous trees in the reserve – willows, poplars and ashes – are causing the following adverse impacts:

- Willow root-mats on the bed of Ferny Creek are causing the sides of the creek channel to be scoured and the bed to rise, thereby exacerbating flooding and causing the other ill-effects described in Section 2.3.1 (page 8);
- The creek course and cross-section have evolved with few substantial trees in the channel, and have become unstable now that deciduous trees have colonised the channel and altered the bank stability and flow characteristics (Section 2.3.1);
- Deciduous trees support a small number of mostly introduced insect and bird species whereas the indigenous trees and shrubs support a much more diverse array of indigenous insects and birds;
- A stream's food chain relies on input of tree leaves, and the ecology of local streams has evolved to process leaves that are thicker and less seasonal than those of deciduous trees. A stream whose vegetation is dominated by deciduous leaves cannot support the full diversity of indigenous stream organisms; and
- Bare deciduous trees in the cooler months differ from natural riparian vegetation in their shade and their ability to moderate weather, further reducing the indigenous stream organisms that can live there;

For these reasons, Australian waterway authorities generally work to replace deciduous trees with indigenous ones along streams like Ferny Creek.

However, it is important to minimise the temporary visual impact that can result between the removal of deciduous trees and their replacement in the landscape by new indigenous trees. This is a potential problem within approximately 200 m of Waters Avenue (the second bend upstream), where deciduous trees are abundant and there are hardly any indigenous trees. In that segment, it is proposed that before the deciduous trees are removed, a parallel strip of vegetation be planted and allowed to grow large enough to provide visual screening – see Figure 10. That may take 2-4 years. The screening strip is offset from the creek bank by typically 9 m to provide a corridor for heavy machinery to remove the trees and rehabilitate the bed and banks of the creek. Once that work is done, the banks and the access corridor are proposed to be revegetated immediately – see the hatched areas shown as '2nd stage planting' on Figure 10. The second stage of planting must be sparse enough, and with the right species, to avoid impeding floodwater.

The same approach could be taken with other locations where large deciduous trees occur if that is the community's preference, but the visual impact will be much less, anyway, because deciduous trees are only dominant near beds 3 & 4. Smaller deciduous trees can be also left until adjacent revegetation provides screening, but the two-stage process is not needed if the trees are too small to require heavy machinery.

Poplars 240 m east of Waters Avenue can be removed and replaced immediately without risk of denuding the landscape because they abut, and are competing with, indigenous wattles and a large Manna Gum.

The revegetation areas shown on Figure 10 are interrupted at intervals to allow heavy machinery to access the creek for future work. These access points may need adjustment according to Melbourne Water's plans for work, which are not presently crystallised. A risk assessment should be conducted to determine whether signs or other features should be used to alert park users to hazards at the creek bank.

More generally, this landscape plan's proposals for the creek bank may need to be adjusted according to community wishes and a detailed assessment of required stream stabilisation works, which Melbourne Water plans to do following community consultation.

4.3 Revegetation

The planting summarised in Figure 10 has taken into account the following principles, opportunities and constraints:

- The proposed revegetation areas have been designed in conjunction with the route of the proposed path, providing path users with alternating scenes of forest, stream and pastoral landscape;
- Planting between the proposed path and the creek, the planting is intended to provide visual screening for the benefit of both path users and neighbours. The planting is scheduled to occur well in advance of the path;
- Some of the proposed planting effectively extends the recent 'offset' revegetation on abutting private land, without further obscuring the pastoral scenery of the adjacent farmland;
- To avoid harmful obstruction of floodwater, the extent, density and species composition of planting is substantially restricted in the western third of the floodplain part of the reserve and somewhat restricted in the middle third;
- The two-stage planting described in Section 4.2 has been employed downstream of the second bend from Waters Avenue (beds 1-4), subject to support from the community and Melbourne Water. This will provide replacement screening before deciduous trees are removed. Revegetation of the bank (beds 3 & 4) should occur as soon as practicable after the removal of deciduous trees, with a low density of plants and species restricted to those with minimum potential to impede floodwater (see 'Mix C' below);
- Where the bank has been scalloped to provide a gradual incline from the floodplain to the creek bed, the inclines are proposed to be stabilised with plants that bind soil, including Swamp Paperbark (which is inappropriate on the floodplain because it would impede floodwater). However, the planting should leave an access route to the creek for access as required, except in the crater-like area next to the outfall from the retarding basin because the adjacent spillway provides alternative access;
- Revegetation is not proposed in the creek channel other than the scalloped banks;
- Revegetation against banks that are steep and deep is intended to help stabilise the banks and keep people away from the danger of falling;
- A shallow wetland is proposed for construction where the reserve is widest. The adjacent path will provide views across the wetland to the farmland and lightly wooded hillside beyond. To improve habitat value and keep the water cooler in summer, an island of vegetation (including manna gums) has been proposed on the northern shore. The wetland will be well above the watertable so it will dry out seasonally, which affects the species that can grow there;
- Most of the hillside zone of the reserve is proposed to be given a similar tree density to the land on each side (Gilmour Park and private land) by scattered planting of trees where they don't already exist. However, no planting is proposed for the northern quarter of the hillside zone because part of it already has a moderate density of trees and the rest is to be kept clear to retain the attractive view across the floodplain. To aid bushfire protection and deal with the problem posed by the dense Rat's-tail Grass (a tough weed), the hillside zone is proposed to be slashed at least annually (depending on seasonal growth rates). Each spring, before the first

cut of the season, it would be desirable to check for changes in the vegetation's composition and the possible emergence of indigenous species that may warrant protection. The planted trees will need to be made readily visible to a slasher operator.

4.3.1 Composition of the Planting

All the species proposed to be planted are indigenous to the area. On the floodplain, the selected mix of species complements the existing dominant trees (wild Manna Gums, Blackwoods and Black Wattles) and the recent revegetation on adjoining farmland. Similarly, indigenous planting on the hillside strip of the reserve aims to maintain consistency with the species on the land each side of the strip. While introduced deciduous trees presently dominate the western section of the creek bank, most or all of them will have to be removed (Section 4.2) and it is proposed to replace them with indigenous species, for consistency with further upstream and downstream. Indigenous species also provide much better habitat for wildlife (e.g. birds and insects) and an opportunity for people to engage with nature.

For the floodplain, three mixes of species and plant density have been formulated. For the areas of least flood potential (beds 14, 15, 17 and 19 on Figure 10), an extensive list of floodplain species has been used to produce a full groundcover, moderate shrub layer and an almost natural tree cover. This is represented by the list for 'Plant Mix A' below, with a recommended number of plants for each species in each bed. For most of the remainder of the floodplain, the trees and shrubs are sparser and biased toward species that are least likely to impede floodwater and flood-borne debris ('Plant Mix B'). Beds 3 and 4 use 'Plant Mix C', with even sparser shrubs and trees, and are proposed to be planted once Melbourne Water has done whatever work is required on the banks there, after beds 3 and 4 have grown to provide some visual screening.

'Plant Mix D' is for erosion control where the creek bank has been scalloped. It contains species better able to stabilise soil, notably including *Melaleuca ericifolia* (Swamp Paperbark). 'Plant Mix E' is for the proposed new seasonal wetland and 'Plant Mix F' is for the scattered trees that are proposed to be planted on the hillside strip.

The number of plants per species recommended for each bed has mostly been calculated on the basis of target densities of plants in each group and overall, with some rounding off. The exceptions are beds 3 and 4, which are linear and designed for visual screening, so numbers in those beds took into account the number of plants per lineal metre, not just per unit area.

Some of the species in the lists are not commonly available and would probably need to be ordered well in advance to allow propagation material to be collected and raised. Where suggested species cannot be procured in the time available, either:

- If the unavailable species make up only a small fraction of the overall plant cover, then plant what is available and schedule a follow-up planting when the remaining plants will become available; or
- Make up the deficit by increasing the numbers of one or more other species from the same group and with similar size and foliage density.

Plant Mix A – Full Riparian Forest
for geotextile beds in the east

Species	No. per 100 m ²	No. in each bed -----				
		Bed 14	Bed 15	Bed 17	Bed 19	
Trees						
<i>Acacia dealbata</i>	Silver Wattle	0.5	5	8	4	3
<i>Acacia mearnsii</i>	Black Wattle	1	10	16	10	5
<i>Acacia melanoxylon</i>	Blackwood	0.5	5	8	5	3
<i>Eucalyptus goniocalyx</i>	Bundy, Long-leaf Box	0.05	1	1	0	1
<i>Eucalyptus radiata</i>	Narrow-leafed Peppermint	0.05	0	1	1	0
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum	1	10	16	8	5
<i>Pomaderris aspera</i>	Hazel Pomaderris	0.5	5	8	5	3
Shrubs						
<i>Acacia verticillata</i>	Prickly Moses	2	20	30	20	12
<i>Cassinia aculeata</i>	Common Cassinia	2	20	30	16	10
<i>Coprosma quadrifida</i>	Prickly Currant-bush	2	20	30	20	12
<i>Epacris impressa</i>	Common Heath	2	20	30	16	10
<i>Goodenia ovata</i>	Hop Goodenia	3	30	45	24	15
<i>Goodia lotifolia</i>	Golden-tip	1	10	15	10	5
<i>Gynatrix pulchella</i>	Hemp Bush	1	10	15	10	5
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	1	10	15	10	5
<i>Leptospermum scoparium</i>	Manuka	1	10	15	10	5
<i>Olearia lirata</i>	Snow Daisy-bush	1	10	15	10	5
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	1	10	15	10	5
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush	1	10	15	10	5
<i>Rubus parvifolius</i>	Small-leaf Bramble	1	10	15	10	5
<i>Solanum laciniatum</i>	Large Kangaroo Apple	1	10	15	10	5
<i>Spyridium parvifolium</i>	Australian Dusty Miller	1	10	15	10	5
Vine						
<i>Calystegia marginata</i>	Forest Bindweed	1	10	15	10	5
<i>Clematis aristata</i>	Mountain Clematis	2	20	30	18	10
Fern						
<i>Adiantum aethiopicum</i>	Common Maidenhair	1	10	15	10	5
Grassy plants						
<i>Hemarthria uncinata</i>	Mat Grass	15	144	235	135	80
<i>Imperata cylindrica</i>	Blady Grass	1	10	16	10	5
<i>Juncus pallidus</i>	Pale Rush	1	10	16	10	5
<i>Lepidosperma elatius</i> ⁴	Tall Sword-sedge	3	30	45	25	16
<i>Lomandra longifolia longifolia</i>	Spiny-headed Mat-rush	3	30	45	25	16
<i>Poa labillardierei</i>	Common Tussock-grass	2	20	30	20	10
<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass	20	200	315	180	110
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	15	140	240	140	80
Creepers						
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	2	20	30	18	10
<i>Austrocynoglossum latifolium</i>	Rough Hound's-tongue	1	10	15	10	5
<i>Dichondra repens</i>	Kidney-weed	2	20	30	18	10
<i>Centella cordifolia</i>	Centella	2	20	30	18	12

⁴ *Lepidosperma elatius* is rarely available but would be a great asset to the revegetation. It could perhaps be propagated by division if an advance order is made.

Plant Mix A – Full Riparian Forest
for geotextile beds in the east

Species	No. per 100 m ²	No. in each bed -----				
		Bed 14	Bed 15	Bed 17	Bed 19	
<i>Geranium gardneri</i> ⁵	Rough Crane's-bill	1	10	16	10	5
<i>Hardenbergia violacea</i>	Purple Coral-pea	1	10	16	10	5
<i>Lobelia anceps</i>	Angled Lobelia	2	20	30	18	10
Others						
<i>Dianella tasmanica</i>	Tasman Flax-lily	1	10	16	10	5
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	2	20	30	18	10
<i>Euchiton involucratus</i>	Common Cudweed	1	10	16	10	5
<i>Senecio minimus</i>	Shrubby Fireweed	2	20	30	18	12
<i>Solanum ?opacum</i> ⁶	Green-berry Nightshade	1	10	16	10	5
Totals:		106.6	1050	1650	980	565

Plant Mix B – Thin Riparian Forest
for geotextile beds in the west & middle

Species	No. per 100 m ²	No. in each bed -----								
		1	2	5, 8, 21	6	9	10	11	12	
Trees										
<i>Acacia dealbata</i>	Silver Wattle	0.25	0	1	1	2	1	3	0	0
<i>Acacia mearnsii</i>	Black Wattle	0.5	5	5	2	4	2	6	1	1
<i>Acacia melanoxylon</i>	Blackwood	0.25	0	1	1	2	1	3	0	0
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum	1	8	10	3	9	3	20	1	3
<i>Pomaderris aspera</i>	Hazel Pomaderris	0.25	1	2	1	2	1	3	0	0
Shrubs										
<i>Acacia verticillata</i>	Prickly Moses	1	0	0	3	9	5	13	1	2
<i>Cassinia aculeata</i>	Common Cassinia	1	2	4	3	9	5	13	1	2
<i>Coprosma quadrifida</i>	Prickly Currant-bush	1	1	2	3	9	5	13	1	2
<i>Goodia lotifolia</i>	Golden-tip	1	2	4	3	9	5	13	1	2
<i>Gynatrix pulchella</i>	Hemp Bush	1	0	0	3	9	5	13	1	2
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	0.5	1	2	2	4	2	6	1	1
<i>Leptospermum scoparium</i>	Manuka	0.5	1	2	2	4	2	6	1	1
<i>Olearia lirata</i>	Snow Daisy-bush	0.5	2	4	2	4	2	6	1	1
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	0.5	2	4	2	4	2	6	1	1
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush	0.5	1	2	2	4	2	6	1	1
<i>Solanum laciniatum</i>	Large Kangaroo Apple	0.5	1	2	2	4	2	6	1	1
Fern										
<i>Adiantum aethiopicum</i>	Common Maidenhair	1	0	0	0	4	2	6	1	1
Grassy plants										
<i>Hemarthria uncinata</i>	Mat Grass	15	28	64	50	134	69	194	15	24
<i>Imperata cylindrica</i>	Blady Grass	1	2	4	3	9	5	13	1	2
<i>Juncus pallidus</i>	Pale Rush	1	2	4	3	9	5	13	1	2
<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass	20	36	84	68	180	92	260	20	30
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	15	28	64	50	134	69	194	15	24

⁵ *Geranium gardneri* is not generally available in nurseries but could be readily propagated from the plants on site.

⁶ This species should only be propagated and planted if the plants found on the floodplain are confirmed to be *Solanum opacum*. The author will lodge a dried specimen with the National Herbarium of Vic. for confirmation.

Plant Mix B – Thin Riparian Forest
for geotextile beds in the west & middle

Species	No. per 100 m ²	No. in each bed								
		1	2	5, 8, 21	6	9	10	11	12	
Creepers										
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	2	4	8	7	18	9	26	2	3
<i>Austrocynoglossum latifolium</i>	Rough Hound's-tongue	1	2	4	3	9	5	12	1	2
<i>Dichondra repens</i>	Kidney-weed	2	4	8	7	18	9	26	2	3
<i>Centella cordifolia</i>	Centella	2	4	8	7	18	9	26	2	3
<i>Geranium gardneri</i> ⁷	Rough Crane's-bill	1	2	4	3	9	5	14	1	2
<i>Lobelia anceps</i>	Angled Lobelia	2	4	8	7	18	9	26	2	3
Others										
<i>Dianella longifolia</i>	Tasman Flax-lily	4	5	15	14	36	18	52	4	6
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	2	4	8	7	18	9	26	2	3
<i>Euchiton involucratus</i>	Common Cudweed	1	2	4	3	9	5	12	1	2
<i>Senecio minimus</i>	Shrubby Fireweed	1	2	4	3	9	5	14	1	2
Totals:		81.25	156	336	270	720	370	1050	84	132

Plant Mix C – Thinnest Riparian Forest
for second stage planting in the west

Species	No. per 100 m ²	No. in each bed	
		Bed 3	Bed 4
Trees			
<i>Acacia dealbata</i>	Silver Wattle	0.25	1
<i>Acacia mearnsii</i>	Black Wattle	0.5	2
<i>Acacia melanoxylon</i>	Blackwood	0.25	1
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum	1	4
<i>Pomaderris aspera</i>	Hazel Pomaderris	0.25	1
Shrubs			
<i>Cassinia aculeata</i>	Common Cassinia	1	4
<i>Coprosma quadrifida</i>	Prickly Currant-bush	1	4
<i>Goodia lotifolia</i>	Golden-tip	1	4
<i>Gynatrix pulchella</i>	Hemp Bush	1	4
<i>Leptospermum scoparium</i>	Manuka	0.5	2
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	0.5	2
<i>Solanum laciniatum</i>	Large Kangaroo Apple	0.5	2
Grassy plants			
<i>Hemarthria uncinata</i>	Mat Grass	15	62
<i>Imperata cylindrica</i>	Blady Grass	1	4
<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass	20	80
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	15	62
Creepers			
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	2	8
<i>Austrocynoglossum latifolium</i>	Rough Hound's-tongue	1	4
<i>Dichondra repens</i>	Kidney-weed	2	8

⁷ *Geranium gardneri* is not generally available in nurseries but could be readily propagated from the plants on site.

Plant Mix C – Thinnest Riparian Forest
for second stage planting in the west

Species		No. per 100 m ²	No. in each bed	
			Bed 3	Bed 4
<i>Centella cordifolia</i>	Centella	2	8	10
<i>Geranium gardneri</i> ⁸	Rough Crane's-bill	1	4	5
<i>Lobelia anceps</i>	Angled Lobelia	2	8	10
Others				
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	2	8	10
<i>Euchiton involucratus</i>	Common Cudweed	1	4	4
<i>Senecio minimus</i>	Shrubby Fireweed	1	4	5
Totals:		72.75	295	360

Plant Mix D – Erosion reclamation
using weed mats

Species		No. per 100 m ²	No. in each bed			
			Bed 7	Bed 16	Bed 18	Bed 20
Trees						
<i>Acacia dealbata</i>	Silver Wattle	0.5	1	1	1	3
<i>Acacia mearnsii</i>	Black Wattle	0.5	0	1	1	3
<i>Acacia melanoxylon</i>	Blackwood	1	1	1	2	5
<i>Eucalyptus viminalis</i> subsp. <i>viminalis</i>	Manna Gum	1	1	1	2	5
<i>Melaleuca ericifolia</i>	Swamp Paperbark	6	4	6	10	30
<i>Pomaderris aspera</i>	Hazel Pomaderris	0.5	0	1	1	3
Shrubs						
<i>Acacia verticillata</i>	Prickly Moses	2	1	2	3	10
<i>Cassinia aculeata</i>	Common Cassinia	2	1	2	3	10
<i>Coprosma quadrifida</i>	Prickly Currant-bush	5	3	5	10	26
<i>Goodenia ovata</i>	Hop Goodenia	6	4	5	10	31
<i>Goodia lotifolia</i>	Golden-tip	1	1	1	2	5
<i>Gynatrix pulchella</i>	Hemp Bush	1	1	1	2	5
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	1	1	1	2	5
<i>Leptospermum scoparium</i>	Manuka	1	1	1	2	5
<i>Olearia lirata</i>	Snow Daisy-bush	1	1	1	2	5
<i>Ozothamnus ferrugineus</i>	Tree Everlasting	1	1	1	2	5
<i>Prostanthera lasianthos</i>	Victorian Christmas-bush	1	1	1	2	5
<i>Rubus parvifolius</i>	Small-leaf Bramble	1	1	1	2	5
<i>Solanum laciniatum</i>	Large Kangaroo Apple	1	1	1	2	5
Grassy plants						
<i>Hemarthria uncinata</i>	Mat Grass	15	10	15	26	75
<i>Imperata cylindrica</i>	Blady Grass	1	1	1	2	5
<i>Juncus pallidus</i>	Pale Rush	1	1	1	2	5
<i>Lomandra longifolia longifolia</i>	Spiny-headed Mat-rush	3	2	3	5	15
<i>Poa labillardierei</i>	Common Tussock-grass	5	3	5	10	26
<i>Poa ensiformis</i>	Purple-sheathed Tussock-grass	25	15	25	42	128
<i>Rytidosperma racemosum</i>	Clustered Wallaby-grass	10	6	10	16	50
Creepers						
<i>Acaena novae-zelandiae</i>	Bidgee-widgee	4	2	4	7	20

⁸ *Geranium gardneri* is not generally available in nurseries but could be readily propagated from the plants on site.

Plant Mix D – Erosion reclamation
using weed mats

Species		No. per 100 m ²	----- No. in each bed -----			
			Bed 7	Bed 16	Bed 18	Bed 20
<i>Dichondra repens</i>	Kidney-weed	2	1	2	3	10
<i>Centella cordifolia</i>	Centella	2	1	2	3	10
<i>Lobelia anceps</i>	Angled Lobelia	2	1	2	3	10
Others						
<i>Dianella tasmanica</i>	Tasman Flax-lily	4	2	4	7	20
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	2	1	2	3	10
<i>Senecio minimus</i>	Shrubby Fireweed	5	3	5	10	25
Totals:		114.5	74	115	200	580

Plant Mix E – Seasonal wetland

Species		No. per 100 m ²	No. plants
Shrubs			
<i>Leptospermum lanigerum</i>	Woolly Tea-tree	1	10
Grassy plants			
<i>Carex appressa</i>	Tall Sedge	2	24
<i>Baumea arthropphylla</i> or <i>rubiginosa</i>	a twig-rush	0.5	6
<i>Carex fascicularis</i>	Tassel Sedge	1	12
<i>Eleocharis acuta</i>	Common Spike-rush	2	24
<i>Eleocharis gracilis</i>	Slender Spike-rush	2	24
<i>Glyceria australis</i>	Australian Sweet-grass	5	60
<i>Hemarthria uncinata</i>	Mat Grass	5	60
<i>Isolepis inundata</i>	Swamp Club-rush	5	60
<i>Juncus amabilis</i>	a rush	10	120
<i>Juncus gregiflorus</i>	Green Rush	5	60
<i>Juncus holoschoenus</i>	Joint-leaf Rush	2	24
<i>Juncus pallidus</i>	Pale Rush	2	24
<i>Juncus procerus</i>	Tall Rush	2	24
<i>Juncus sarophorus</i>	Broom Rush	5	60
<i>Juncus subsecundus</i>	Finger Rush	2	24
<i>Lepidosperma elatius</i> ⁹	Tall Sword-sedge	2	24
<i>Schoenus apogon</i>	Common Bog-rush	5	60
<i>Triglochin striata</i> (flat leaves)	Streaked Arrowgrass	2	24
Creepers			
<i>Centella cordifolia</i>	Centella	2	24
<i>Crassula helmsii</i>	Swamp Crassula	2	24
<i>Gratiola peruviana</i>	Austral Brooklime	1	12
<i>Lobelia anceps</i>	Angled Lobelia	2	24
Others			
<i>Alisma plantago-aquatica</i>	Water Plantain	1	12
<i>Alternanthera denticulata</i>	Lesser Joyweed	10	120

⁹ *Lepidosperma elatius* is rarely available but would be a great asset to the revegetation. It could perhaps be propagated by division if an advance order is made.

Plant Mix E – Seasonal wetland

Species		No. per 100 m ²	No. plants
<i>Epilobium hirtigerum</i>	Hairy Willow-herb	2	24
<i>Euchiton involucratus</i>	Common Cudweed	2	24
<i>Linum marginale</i>	Native Flax	2	24
<i>Myriophyllum crispatum</i>	Upright Millfoil	2	24
<i>Persicaria decipiens</i>	Slender Knotweed	5	60
<i>Persicaria hydropiper</i>	Water-pepper	1	12
<i>Persicaria praetermissa</i>	Spotted Knotweed	2	24
<i>Persicaria prostrata</i>	Creeping Knotweed	2	24
<i>Persicaria subsessilis</i>	Hairy Knotweed	1	12
<i>Senecio campylocarpus</i>	Floodplain Groundsel	2	24
Totals:		99.5	1192

Plant Mix F – Scattered hillside trees

Species		No. plants
<i>Acacia mearnsii</i>	Black Wattle	2
<i>Acacia melanoxylon</i>	Blackwood	3
<i>Eucalyptus gonicalyx</i>	Bundy, Long-leaf Box	2
<i>Eucalyptus melliodora</i>	Yellow Box	3
<i>Eucalyptus radiata</i>	Narrow-leaf Peppermint	3
<i>Eucalyptus rubida</i>	Candlebark	3
Totals:		16

4.4 Path

The proposed path:

- Takes a route that provides users with alternating scenes of forest, stream and pastoral landscape. Past of the forest scenery is provided by the newly planted revegetation on abutting private land;
- Passes close to points where cattle used to access the creek, so that visitors can get to the water and experience the peacefulness of the water, birds and treed landscape (subject to safety constraints);
- Avoids passing close to the main concentrations of dangerous, vertical or undercut creek banks;
- Effectively extends the existing track through Gilmour Park from New Rd to the retarding basin levee, which may require upgrading (and hence Melbourne Water permission); and
- Is proposed to be constructed after revegetation has had time to grow and provide visual screening between the path and neighbouring houses.

The path is shown on Figure 10 as taking a route from the retarding basin levee to the floodplain that coincides with the route currently being taken by walkers, but this is steeper than Council's normal standards. The path must fall approximately 5 m between the levee and the floodplain, which are approximately 60 m apart. It seems unlikely that any part of the path could be constructed on the retarding basin levee bank for structural reasons and because the bank also serves as a spillway. Taking this into account, the path would require at least three zigzags to achieve a gradient suitable for disabled access. If that were done, many path users would probably take a cross-country shortcut rather than follow the much longer zigzag route. In

addition, a zigzag route would necessarily pass beneath some Manna Gums that contain several active nesting hollows, and normal path construction methods would kill the trees.

The existing path from the southwestern end of the levee to New Rd has similar problems.

Resolution of these difficulties will require further work. Until then, it is not possible to determine whether the path could be a shared (pedestrian and bicycle) path or a lower-level pedestrian path.

The floodplain zone of the reserve is already moderately popular for walking dogs. Waterbirds that currently use the floodplain, and additional birds that will come to the proposed revegetation and wetland, would benefit from dogs being kept on-leash.

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