Taylors Creek Strategic Plan

Merri Creek Management Committee Inc

For Mitchell Shire Council.

September 2009

MERRI CREEK
MANAGEMENT
COMMITTEE

Acknowledgements

The following Council staff provided significant assistance in the preparation of this strategy:

Vivian Pasic (Environmental Officer), Elyse Kelly (Environmental Programs Coordinator), Katie Rizzuto (Strategic Planner), Kara Mahoney (Strategic Planner).

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Prepared by Tony Faithfull from Merri Creek Management Committee Inc. for Mitchell Shire, with funding from Melbourne Water. Vegetation assessments by Brian Bainbridge, Maryann Weatherill and Alex Davern from MCMC.

About Merri Creek Management Committee

Merri Creek Management Committee Inc. (MCMC) is an environmental coordination and management agency formed in 1989 to achieve a shared vision for the waterway corridors of the Merri Creek Catchment. Its members include all municipalities in the catchment: Darebin, Hume, Moreland, Whittlesea, Yarra and Mitchell, plus the Friends of Merri Creek and, since 2006, the Friends of Wallan Creek. Representatives of these member groups form the Committee of Management that guides MCMC's activities.

MCMC's primary aim is to ensure the preservation of natural and cultural heritage, and the ecologically sensitive restoration, development and maintenance of the Merri Creek and tributaries, their corridors and associated ecological communities. It employs specialist and dedicated staff and its programs are funded by Council members, by state and federal grant programs, by competitively won tenders, by grants from philanthropic organisations and through sponsorship.

MCMC's mission

MCMC respects and honours the spirit of the land and its peoples, indigenous plants and animals, and works with the community to preserve, restore and promote the Merri Creek, its catchment and neighbouring region as a vital living system.

MCMC prizewinner

MCMC was awarded the 2002 Theiss Services National River*prize* for excellence in waterway management.

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2. Executive Summary

Taylors Creek rises on the southern slopes of Pretty Sally in farming land, flows through the rapidly developing residential northern fringe of Wallan, through the western side of Wallan itself, through future growth areas south of Wallan, and through the old Hernes Swamp. before joining Merri Creek. Taylors Creek's catchment (excluding its tributary Strathaird Creek) covers some 980 ha. From its Headwaters to its junction with Merri Creek Taylors Creek is approximately 9km long.

This Strategic Plan aims to draw on existing strategies, and examine community views and site survey information to create a consolidated plan for the Creek.

A review of 16 strategic documents sets the strategic background to the strategy. These include Mitchell Shire's Council Plan, its Planning Scheme, Environment Strategy, Urban Stormwater Management Plan, Land Capability Study, Open Space Strategy, and Wallan Local Structure Plan. Three documents from the Port Phillip and Westernport Catchment Management Authority were reviewed including the Regional Catchment Strategy, Native Vegetation Plan and River Health Strategy. Melbourne Water's works plans for Taylors Creek were reviewed, but its Taylors Creek Drainage Strategy has not been made available for review. The Merri Creek and Environs Strategy and Merri Creek Management Committee's Merri Creek Development Guidelineswere reviewed along with 2 reports on regional habitat values. Other strategic background included examination of Yarra Valley Water's needs for locating new sewage infrastructure along the Creek, and a look at population growth in Wallan and housing demand and supply.

A broad assessment of flora and habitat values of the creek-side lands was carried out in October and December 2007 through on-ground visits where access was granted, and through Google Earth interpretation where access was not granted. Much of the vegetation is highly degraded, but a number of small areas of remnant vegetation were identified along with larger areas with little or no remnant vegetation. A revised reconstruction of ecological vegetation classes was produced which can be used to guide future revegetation efforts.

Outcomes of the community meeting held in Wallan on 20 November 2007 to gauge community views are summarised in the appendix of the report. Attendees at the meeting were strongly in support of development of a continuous open space corridor along Taylors Creek, a corridor which includes shared pathways, and a revegetated, natural-looking Creek. Participants gave high priority to spending on land purchase to consolidate the corridor. Participants wanted water-sensitive urban design in developments draining to the Creek and wanted erosion dealt with but not by piping the Creek. In fact they supported exposing the piped sections of Creek and re-establishing a natural channel.

One of the key issues for Taylors Creek is the large wetlands which used to occur, and do still to some extent, downstream of Taylors Lane. Because they are so flat they are difficult to drain, and flood-prone, making them difficult to develop. Wetlands are also a very high priority for conservation and restoration.

The following objectives were developed for the Strategy:

O1	Retain natural drainage corridors with vegetated buffer zones at least 30m wide along waterways to maintain the natural drainage function, stream habitat and wildlife corridors and landscape values, to minimise erosion of stream banks and verges and to reduce polluted surface runoff from adjacent land uses.
O2	Preserve floodplains by incorporating them into open space free from development.
O3	Prevent further damage and improve the environmental health of Taylors Creek.
O4	Protect wetland remnants from development and reinstate wetland communities.
O5	Build a continuous network of open space along both sides of Taylors Creek, linking to other nearby areas of open space, to be used for recreation and conservation of natural and cultural environments.
O6	Development adjacent to Taylors Creek provides a positive, visually attractive and safe interface with open space along the Creek.
O7	To provide good and safe access to open space along Taylors Creek from surrounding

	residential areas, but prevent unauthorised vehicular access.
O8	To provide for recreation and play, informal sport, social interaction and peace and solitude, uninterrupted by formal sporting facilities, and to link these opportunities with walking and recreational cycle trails and rights of way.
O9	Protect and enhance Flora and Fauna and habitat values.
O10	Establish Taylors Creek as part of a habitat corridor network around Wallan.
O11	Weeds are controlled in a way that enhances indigenous vegetation and habitat values.
O12	Taylors Creek should be an attractive landscape based on the use of local native (i.e. indigenous) plant species and incorporating and protecting natural features.
O13	Improve development practices to protect and enhance Taylors Creek.
O14	Increase the capacity and participation of people and organisations in catchment management.
O15	Protect Aboriginal Cultural Heritage.
O15	Protect areas of geological and/or geomorphological significance

For each objective a strategic justification is outlined, along with the community's expressed views about the subject area. Targets and recommendations are then derived to contribute to achievement of the objective.

The Strategy then looks at Taylors Creek reach by reach, starting with the headwaters, and working down to the confluence with Merri Creek. Key recommendations arising from this section include:

- protection of the drainage corridor and associated floodplain and wetlands from development by including them in open space
- development of an Environmental Significance Overlay to protect the corridor, floodplain and wetlands
- Revegetation to create habitat corridors

More detailed recommendations are included in sections 12 and 13 of the report.

3. Vision

The following vision is based on the Vision for Merri Creek contained in the Merri Creek and Environs Strategy:

Taylors Creek is a healthy living stream flowing through an attractive environment which provides habitat for native animals and is valued by the community as a peaceful passive open space haven. Natural and cultural features are protected and rehabilitated through sensitive management which provides a lasting benefit for the community.

4. Introduction

Taylors Creek is a tributary of Merri Creek which flows through Wallan township to the north of Melbourne. It rises on the southern slopes of Pretty Sally in farming land and flows through the rapidly developing residential northern fringe of Wallan, through more established urban areas and then through areas set aside for future development to the south of Wallan. Finally it flows through a system of swamps of at least state significance for their habitat and fauna before joining Merri Creek.

Merri Creek flows south through Melbourne's northern suburbs to join the Yarra River at Clifton Hill. Ultimately the Yarra River Flows into Port Phillip Bay.

This strategy covers Taylors Creek from its headwaters to its confluence with Merri Creek. Strathaird Creek, although a tributary, is not part of the brief for this project.

Taylors Creek's catchment covers some 980 ha (excluding Strathaird Creek's catchment). From its Headwaters to its junction with Merri Creek Taylors Creek is approximately 9km long. The upper half of Taylors Creek is in the Central Victorian Uplands bioregion, and the lower half in the Victorian Volcanic Plain Bioregion. Soils in the upper section are volcanic originating from eruptions of Pretty Sally. In the lower sections of Taylors Creek, soils are mostly recent (in geological terms) swamp deposits caused by lava flows blocking Merri Creek.

Very little of the original vegetation of the catchment remains. The fragments that do remain, and the soil types suggest that the lower reaches had wetland or swampy vegetation and the upper reaches grassy woodland.

Typical of the Merri Creek's rural catchment[1], Taylors Creek is currently in very poor condition, extensively modified, with serious erosion problems, almost no native riparian vegetation, and probably poor water quality. The poor condition is exacerbated as Wallan itself has a high impact on health of waterways flowing through it.[2]

At present Taylors Creek hosts one playground, and approximately one kilometre of gravelled pedestrian pathway with little other recreational development in its current form. It is not well linked to other spaces and facilities in Wallan.

Taylors Creek is within the Port Phillip and Western Port Catchment, management of which is supervised by the Port Phillip and Westernport Catchment Management Authority, but implementation is the role of Melbourne Water.

Mitchell Shire Council is the Planning Authority for the area under the Planning and Environment Act 1987, and is responsible for maintenance of open spaces they own or for Crown land whose management is delegated to them under the Crown Land Reserves Act 1978. Works on the bed and banks of the Creek are the responsibility of Melbourne Water.

Wallan Township is located approximately one hour's drive to the north of central Melbourne. Its population in 2006 (the latest figures available) was approximately 5400, growing rapidly at approximately 6% per annum. Housing approvals peaked in 2002-3 at around 200 for the year and appear to have declined by approximately half that peak in 2006-7.

Taylors Creek flows through the western side of Wallan and provides a good opportunity to create linear parkland for recreational and environmental purposes in addition to the drainage function. Much work will be required to achieve this, although a large amount of the expense will be the responsibility of developers.

Council's 2005 Recreation and Open Space Strategy (ROSS) identifies the development of a series of off road trails around Wallan, the Recreation Reserve, and through new residential developments as a priority. The ROSS will be continuously reviewed as an adopted Council strategy. The Wallan Local Structure Plan also identifies waterways as important open space linkages in future development of Wallan. As these strategies play out the importance of waterways as linear open space will increase, and the community's interest in and valuing of waterways and the natural spaces along them will increase.

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[1] See summary of Port Phillip and Westernport Regional River Health Strategy 2007 in section 6.1.5.

[2] According to the Mitchell Shire Stormwater Management Plan (Meyers 2008) p8

5. Background and methodology

Mitchell Shire Council contracted Merri Creek Management Committee in October 2007 to prepare the Taylors Creek Strategic Plan, according to a brief which was advertised in April 2007.

Work commenced in October with a review of the strategic background to the plan. Sixteen documents were reviewed and relevant parts summarised in section 6.1 of this report. The documents included:

- Mitchell Shire's Council Plan, its Planning Scheme, Environment Strategy, Urban Stormwater Management Plan, Land Capability Study, Open Space Strategy, and Wallan Local Structure Plan.
- Port Phillip and Westernport Catchment Management Authority's Regional Catchment Strategy, Native Vegetation Plan and River Health Strategy.
- Melbourne Water's works plans for Taylors Creek[3].
- The Merri Creek and Environs Strategy and Merri Creek Management Committee's Development Guidelines for Merri Creek.
- Reports on regional habitat values including: Sites of Biological Significance in the Merri Corridor- A Preliminary Investigation, (Schulz. and Webster 1991), and Sites of Faunal and Habitat Significance in the North East Melbourne (Beardsell 1997, also known as the 'NEROC Report').

Other strategic background investigations included examination of Yarra Valley Water's requirements for locating new sewage infrastructure along Taylors Creek, and examination of population growth in Wallan and housing demand and supply, using statistics from the Australian Bureau of Statistics.

Vegetation in the catchment was inspected on three dates in 2007: 10th October, 5th December and 13th December. Approximately 3km of the creek was able to be inspected directly, 1km was inspected from the outside boundary of private property and using Google Earth, and 2 km inspected only on Google Earth. Present vegetation condition was examined, and original ecological vegetation classes tentatively reconstructed. More information on the native vegetation of the study area is contained in section 8 of this report.

Community consultation included a community meeting held in Wallan on 20 November 2007 to gauge community views. Outcomes of the meeting are discussed in summarised in section 9 of this report and in more detail in the appendix. Other methods of community consultation included local paper articles, written invitations to community groups to provide input and the provision of feedback forms, but these resulted in no further input.

From the analysis of the strategic background, community views and vegetation information, fifteen objectives were derived. For each objective (see section 7 of the report) the strategic justification for the objective is outlined, along with the community's expressed views about the subject area. Targets and recommendations to achieve of the objectives are then outlined.

Taylors Creek was then examined reach by reach (see section 10 of the report), starting with the headwaters, and working down to the confluence with Merri Creek. Recommendations which would help achieve the objectives of the plan in the individual reaches are given.

This strategy is not a detailed inventory of the vegetation or the condition of Taylors Creek's bed and banks, water quality or in-stream biota as this is primarily Melbourne Water's responsibility.

[3] Melbourne Water's Taylors Creek Drainage Strategy has not been made available for review at this stage.

6. Strategic background to the plan

Understanding what can be achieved on Taylors Creek requires an understanding of relevant strategies, policies and legislation which have already been prepared either by Council, State or Federal Governments or agencies, or by groups like the Merri Creek Management Committee. It also requires an understanding of the requirements of agencies like Yarra Valley Water which will be installing upgraded sewerage infrastructure along sections of Taylors Creek in the next 15 years.

The following sections attempt to summarise key policies, strategies and plans as well as infrastructure needs.

6.1. Relevant plans and strategies

6.1.1. Mitchell Shire Council Plan

Mitchell Shire's current Council Plan (2007-2011) includes the Strategic Objective:

> "Develop and implement a range of environmental strategies to ensure that Council is among the leading local government authorities in pursuing an environmentally sustainable operation."

One of the strategies for achieving the objective is:

> "To strive to be a leader in environmental practice and a custodian of our local natural resources that is committed to preserving and enhancing the Shire's natural and built environmental assets through:
>
> • …development and ongoing support of programs which protect and enhance our built and natural environment
>
> • continuing to promote sustainable land use through best practice and environmental standards
>
> • working in partnership with other stakeholders in environmental management throughout the Region
>
> • continuing to support Landcare, Friends of, Environment Groups and Committees of Management
>
> • … protect and rehabilitate Council's environment and bushland reserves.

6.1.2. Mitchell Shire Council Planning Scheme

Mitchell Shire Council has recently adopted the Wallan Structure Plan (see 6.1.12 below) which will lead to changes in some of the existing planning controls along Taylors Creek. Nonetheless the existing controls are described below.

Land use zoning

As shown in Figure 1, the headwaters of Taylors Creek are in the Farming Zone (FZ), along with the sections from Taylors Lane to the Northern Highway, and between the Northern Highway and Hume Freeway. FZ is sometimes used as a holding zone for land within a growth boundary, as some of this land is.

Residential zoned land dominates the middle reaches of the Creek, from an unnamed government road in the north of the town to Taylors Lane in the south. Low Density Residential land abuts the Creek on the west side between King Street and Duke Street.

The Council reserves between King Street and Watson Street, which include part of the Creek, are zoned Public Park and Recreation Zone (PPRZ), the appropriate zoning for recreational open space.

A narrow strip of land roughly along the Creek between Lisa Place and Duke Street is within the Public Conservation and Resource Zone (PCRZ).

From the Hume Freeway east to the Wallan Sewage Treatment Plant is a Mixed Use Zone (MUZ), to provide for a range of residential, commercial, industrial and other uses, and the Sewage Treatment Plant land is Public Use Zone (PUZ)

To the east of the Northern Railway the Creek flows through Farming Zone again to its confluence with Merri Creek.

No floodway zonings are in place, however Taylors Creek is covered with a number of flooding-

related overlays discussed below.

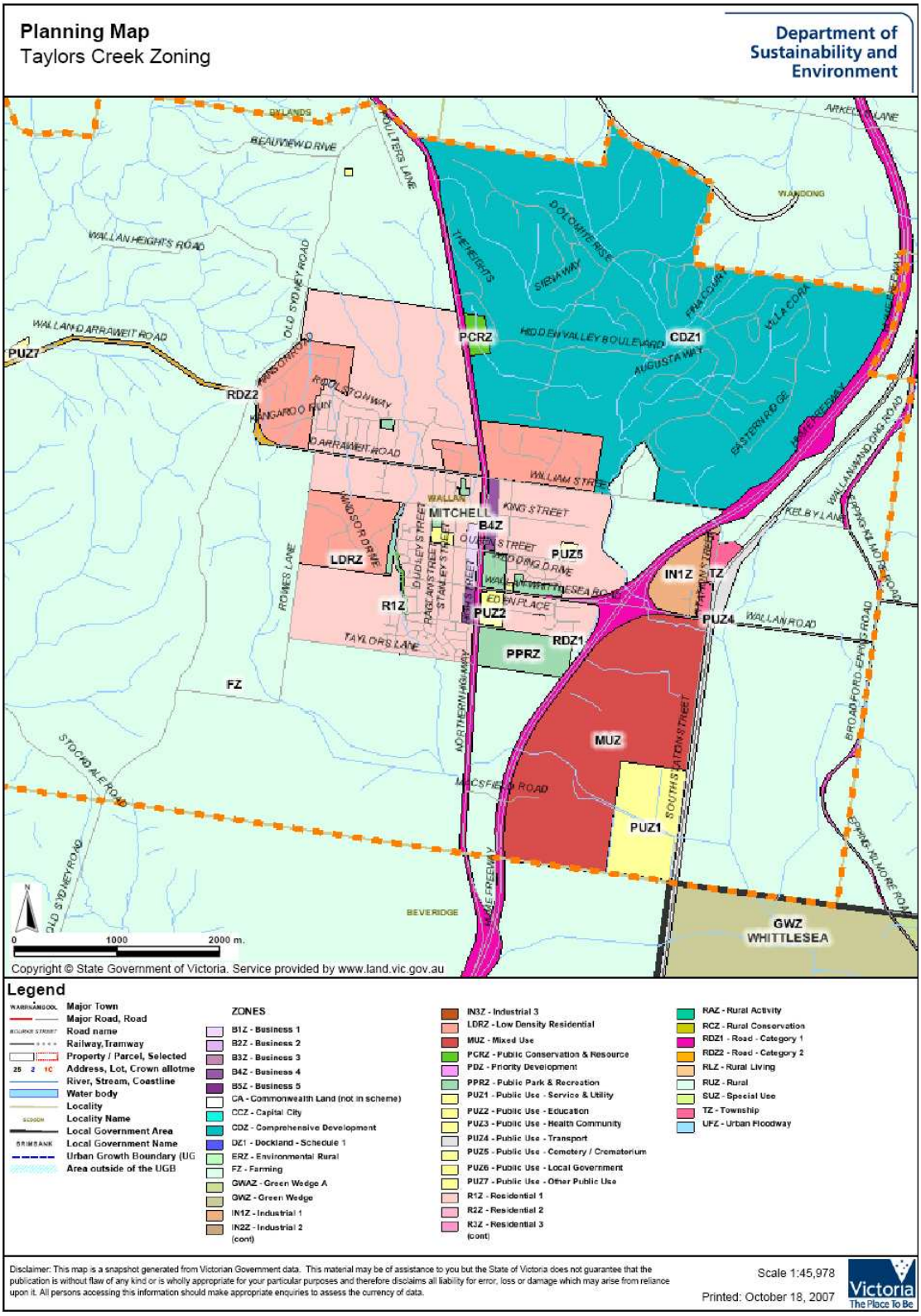


Figure 1 – Planning Scheme Zones for Taylors Creek
(from Planning Maps Online 18/10/07)

Overlays

The Planning Scheme Overlays map (see Figure 2) shows all of the overlays applying to Taylors Creek.

All of the Taylors Creek catchment is covered by a Salinity Management Overlay (SMO) with the exception of the existing residential areas. This identifies the area which should be managed to reduce salinity problems.

From Stewart Drive south to the Creek's confluence with Merri Creek a Floodway Overlay (FO) roughly follows the Creek. This overlay identifies areas with the greatest risk of flooding so that development maintains free passage and storage of floodwaters, minimizes flood damage etc, and to protect water quality and waterways as natural resources.

A Development Plan Overlay (DPO) in northwest Wallan includes the upper slopes but not the very headwaters of Taylors Creek, another in southwest Wallan includes the reach of the Creek between Lisa Place and Duke Street, and another includes the area between the Hume Freeway and the Northern Railway. The DPO is used to identify areas which require the form and conditions of future use and development to be shown on a development plan before a permit can be granted to use or develop the land. An application is exempt from notice and review if it is generally in accordance with a development plan.

Extensive areas adjacent to Taylors Creek downstream from Taylors Lane are covered by Land Subject to Inundation Overlay (LSIO). This is not surprising given that much of this land historically was swamp. The LSIO is used to identify land affected by the 1 in 100 year flood, to ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity, and to protect water quality.

Small parts of the catchment south of Taylors Lane are covered by an Erosion Management Overlay (EMO) which is used to protect areas prone to erosion, landslip or other land degradation processes, by minimising land disturbance and inappropriate development.

A Vegetation Protection Overlay follows the Hume Freeway, to protect the scenery for users of the freeway, and also to preserve indigenous vegetation and flora and fauna species, and to maintain and enhance habitat corridor requirements for indigenous fauna.

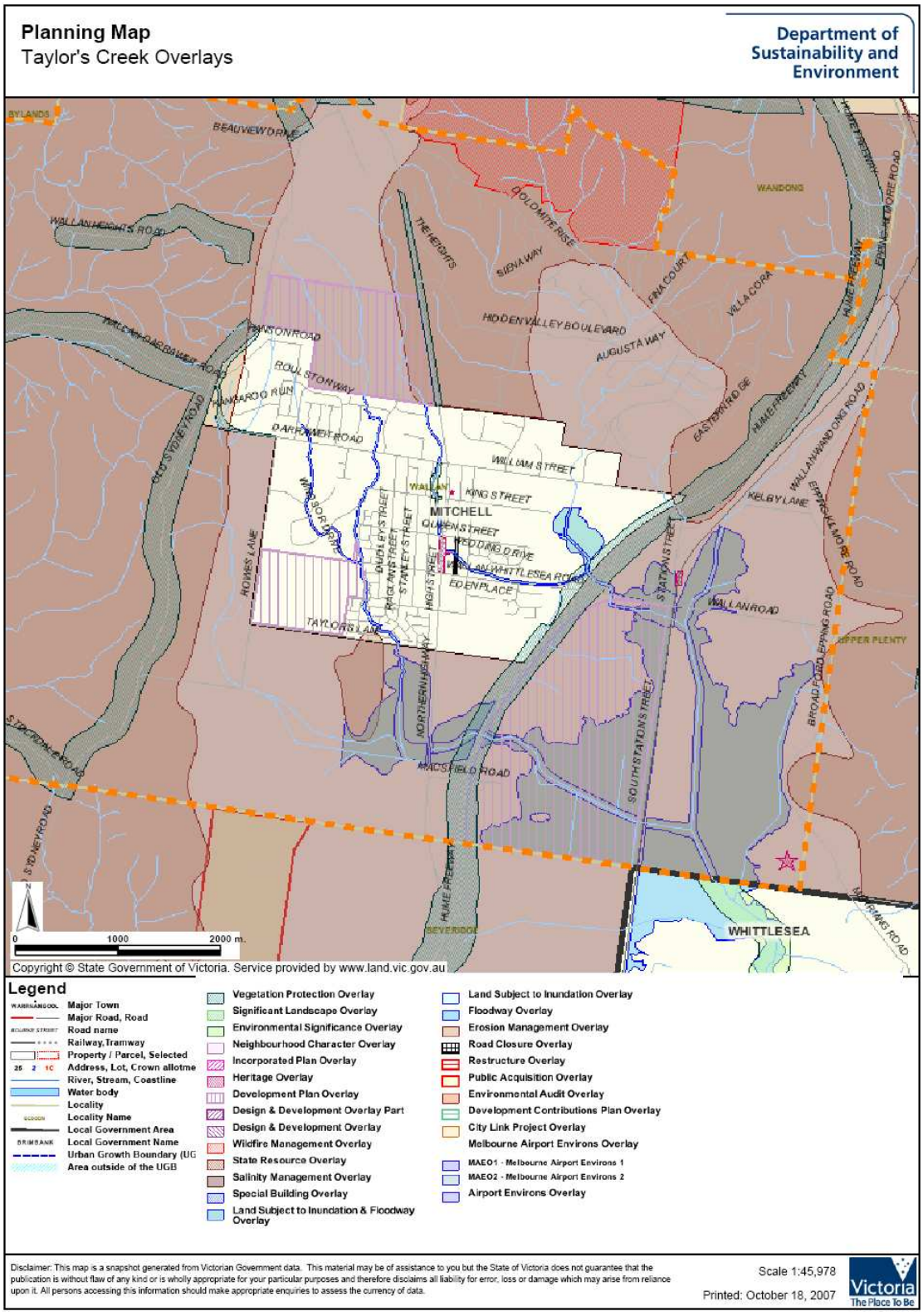


Figure 2 – Planning Scheme Overlays
(from Planning Maps Online)

State Planning Policy Framework

This section of the Planning Scheme is the same for all municipalities throughout the state, and is amended by the State Government. The SPPF is to inform planning authorities and responsible authorities of those aspects of State level planning policy which they are to take into account and give effect to in planning and administering their respective areas.

Clause 12.05 A Great Place to Be

This Clause in the State section of the Mitchell Shire Planning Scheme includes the Objective:

> "To create urban environments that are of better quality, safer and more functional, provide more open space and an easily recognisable sense of place and cultural identity."

The clause goes on to identify as a strategy:

> "Improve the quality and distribution of open space and ensure long-term protection of public open space by applying open space planning principles to the planning and management of public open space. These principles include:
>
> - Ensuring land identified as critical to the completion of open space links is transferred for open space purposes.
> - Ensuring public access is not prevented by developments along stream banks and foreshores.
> - Ensuring public land immediately adjoining waterways and coastlines remains in public ownership.
> - Providing new parkland in growth areas and in areas that have an undersupply of parkland.
> - Ensuring that urban open space provides for nature conservation, recreation and play, formal and informal sport, social interaction and peace and solitude. Community sports facilities should be accommodated in a way that is not detrimental to other park activities.
> - Ensuring open space is designed to accommodate people of all abilities, ages and cultures."

Clause 15.01 Protection of catchments, waterways and groundwater

Clause 15.01 of the State section of the Mitchell Shire Planning Scheme includes the objective:

> "To assist the protection and, where possible, restoration of catchments, waterways, water bodies, groundwater, and the marine environment."

According to the clause, planning authorities must have regard to relevant aspects of strategies or special area plans approved under the Catchment and Land Protection Act and Action Statements prepared under the Flora and Fauna Guarantee Act 1988 which states that:

> "Planning and responsible authorities should consider the impacts of catchment management on downstream water quality and freshwater, coastal and marine environments and, where possible should encourage:
>
> - The retention of natural drainage corridors with vegetated buffer zones at least 30m wide along waterways to maintain the natural drainage function, stream habitat and wildlife corridors and landscape values, to minimise erosion of stream banks and verges and to reduce polluted surface runoff from adjacent land uses.
> - Measures to minimise the quantity and retard the flow of stormwater runoff from developed areas.
> - Measures, including the preservation of floodplain or other land for wetlands and retention basins, to filter sediment and wastes from stormwater prior to its discharge into waterways.
>
> Responsible authorities should ensure that works at or near waterways provide for the protection and enhancement of the environmental qualities of waterways and their in-stream uses and are consistent with Guidelines for Stabilising Waterways (Rural Water Commission 1991) and Environmental Guidelines for River Management Works (Department of Conservation and Environment 1990), and should have regard to any relevant river restoration plans or waterway management works programs approved by a catchment management authority."

Clause 15.10 General implementation

Clause 15.10 of the planning scheme includes the objective:

> "To assist creation of a diverse and integrated network of public open space commensurate with the

needs of urban communities and rural areas."

It goes on to say:

> "Planning authorities should plan for regional open space networks to be used for recreation and conservation of natural and cultural environments.
>
> Planning and responsible authorities should ensure that open space networks:
>
> - Are linked through the provision of walking and cycle trails and rights of way.
> - Are integrated with open space contributions from abutting subdivisions.
> - Incorporate, where possible, links between major parks and activity areas, along waterways and natural drainage corridors, connecting places of natural and cultural interest, as well as maintaining public accessibility on public land immediately adjoining waterways and coasts.
>
> Planning and responsible authorities should ensure that land is set aside and developed in residential areas for local recreational use and to create pedestrian and bicycle links to commercial and community facilities.
>
> Planning and responsible authorities should ensure that land use and development adjoining regional open space networks, national parks and conservation reserves complements the open space in terms of visual and noise impacts, treatment of waste water to reduce turbidity or pollution and preservation of vegetation."

Local Policy Planning Framework

This clause of the planning scheme designed by Mitchell Shire Council identifies long term directions about land use and development in the municipality and provides the rationale for the zone and overlay requirements and particular provisions in the scheme.

Clause 21.04 Strategic Vision

This clause identifies five factors which are the basis of a strategic vision for land use planning and development for the Shire. Relevant ones include:

- Providing for a controlled expansion of existing townships in a rural setting reflecting [Mitchell Shire's] position to the north of metropolitan Melbourne.
- Improving the condition of the Shire's environment, its land resources and the water quality in its rivers and streams including the implementation of an active environmental improvement program for Council owned land.
- The provision and management of new rural residential and low density residential development associated with selected existing settlement centres as shown on the various town structure plans.
- Providing for new residential development while maintaining the character and rural-urban mix of the Shire's existing settlements through attention to design, landscape features and the staging and co-ordination of infrastructure provision.

Clause 25.05 Objectives

Under the heading Natural Resources and Environment this clause identifies four objectives including:

- To protect and manage the natural attributes and features of the Shire, including the foothills and ranges, the river catchments, particularly the Goulburn River and its tributaries, and the variety of flora, fauna and forested areas of the Shire.
- To improve the environmental performance and management of the Shire's ecology and enhance the quality of the rural and urban landscapes.
- To protect places of cultural heritage and support preservation of those sites threatened by development or neglect.

The factors from Clause 21.04 and the objectives above provide a strong basis for residential growth as well as environmental protection and improvement along Taylors Creek. Environmental objectives and implementation are further detailed in Clause 22.03.

Particular Provisions

The particular provisions show requirements for specific uses and developments.

Clause 52.17 Native vegetation

This clause is to protect and conserve native vegetation to reduce the impact of land and water degradation and provide habitat for plants and animals. It specifies that a permit is required to remove native vegetation (with exceptions) and sets up offsetting requirements where removal of native vegetation cannot be avoided.

Clause 56.05 Urban Landscape

This clause includes standards for subdivision landscape designs and public open space provision.

Standard C12 specifies that an application for subdivision that creates streets or public open space should be accompanied by a landscape design which should amongst other things:

- Implement any relevant streetscape, landscape, urban design or native vegetation precinct plan, strategy or policy for the area set out in this scheme.
- Create attractive landscapes that visually emphasise streets and public open spaces.
- Respond to the site and context description for the site and surrounding area.
- Maintain significant vegetation where possible within an urban context.
- Protect and enhance any significant natural and cultural features.
- Protect and link areas of significant local habitat where appropriate.
- Support integrated water management systems with appropriate landscape design techniques for managing urban run-off including wetlands and other water sensitive urban design features in streets and public open space.
- Promote the use of drought tolerant and low maintenance plants and avoid species that are likely to spread into the surrounding environment.
- Ensure landscaping supports surveillance and provides shade in streets, parks and public open space.
- Develop appropriate landscapes for the intended use of public open space including areas for passive and active recreation, the exercising of pets, playgrounds and shaded areas.
- Provide for walking and cycling networks that link with community facilities.
- Provide appropriate pathways, signage, fencing, public lighting and street furniture.
- Create low maintenance, durable landscapes that are capable of a long life.

In addition the landscape design must include a maintenance plan that sets out maintenance responsibilities, requirements and costs.

Standard C13 specifies that the provision of public open space should amongst other things:

- Implement any relevant open space plan, strategy or policy for the area set out in this scheme.
- Provide a network of well-distributed regional and local open space that includes:
    - Regional public open space where appropriate, including along foreshores, streams and permanent water bodies.
    - Regional parks of at least 3 hectares, combining passive and active use, within 2 kilometres of all dwellings.
    - Large local parks of at least 1 hectare for active and passive use, within 500 metres safe walking distance from all dwellings.
    - Small local parks within 150 metres to 300 metres safe walking distance of all dwellings, where appropriate.
- Include land used for drainage control or stream and floodway purposes if generally available for recreational use.
- Be integrated with urban water management systems including watercourses and water bodies.
- Incorporate natural and cultural features where appropriate.
- Meet the social, cultural, recreational and sporting needs of the community including different age groups and abilities.
- Be linked to existing or proposed future public open spaces where appropriate.

Land provided for public open space should be:

- Of a quality, quantity and character that makes it fit for its potential functions.
- Located so that every lot in the subdivision is within 500 metres street walking distance of existing or proposed public open space.

- Related to the street and lot layout in a manner that promotes personal safety and surveillance of users of the public open space from streets along public open space boundaries.
- Of an area and dimensions to allow easy adaptation to different uses in response to changing community sport and recreational preferences.

Clause 56.07-4 Urban runoff management

This clause sets objectives and standards for integrated water management. Standard C25 for urban runoff specifies amongst other things that the urban stormwater management system be:

- Designed to meet the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater – Best Practice Environmental Management Guidelines (Victorian Stormwater Committee 1999) as amended.
- Designed to ensure that flows downstream of the subdivision site are restricted to pre-development levels unless increased flows are approved by the relevant drainage authority and there are no detrimental downstream impacts.

The standard also specifies that the design of the local drainage network should (amongst other things):

- Include water sensitive urban design features to manage run-off in streets and public open space.

6.1.3. Port Phillip and Western Port Regional Catchment Strategy

According to section 26 of the Catchment and Land Protection Act 1994, statutory authorities that manage land (and therefore Mitchell Shire Council) must have regard to the approved Regional Catchment Strategies except where a provision of the Strategy conflicts with an Act of Parliament.[4] This is reinforced in Clause 15.01 of the Planning Scheme. The Regional Catchment Strategy which applies to Taylors Creek is the Port Phillip and Western Port Regional Catchment Strategy.

Much of this strategy is directly applicable to Taylors Creek. Particularly relevant objectives include:

WO2: Protect and improve the environmental health and social and economic values of waterways and wetlands

WO4: Improve water quality in waterways, aquifers, wetlands, estuaries, bays and seas

WO5: Ensure the management of water resources minimizes risks to natural ecosystems, public land, private assets and public safety.

LO3: Ensure sensitively located and functional urban and urban-rural fringe areas with minimal impacts on the region's biodiversity, water resources and heritage values

LO5: Provide a high-quality network of parks and open space across urban and rural areas managed for community and environmental benefit

BO1: Achieve a net gain in the quantity and quality of indigenous vegetation. (This is to be achieved by protection and restoration of existing indigenous vegetation as well as major revegetation programs.)

BO4: Improve the connectivity and long-term security of indigenous habitats and species

Targets include:

WT6: to improve the condition of the region's waterways so that… all natural waterways will be in good or better condition by 2025

WT 15: No net loss in the extent and health of wetlands of each existing type

WT16: Progressively improve the overall health and social value of natural wetlands...

WT9: to have no loss of hydraulic capacity and environmental values of floodplains

6.1.4. Port Phillip and Western Port Native Vegetation Plan

The native vegetation plan published in 2006 is a subsidiary plan to the Regional Catchment Strategy. It sets a number of targets, the most relevant of which relates to Ecological Vegetation Classes (EVCs), or types of vegetation, which is Resource Condition Target 4:

At least 95% of the region's EVCs represented to at least 5 per cent of their pre 1750 extent by 2015.

[4] section 26, Catchment and Land Protection Act 1994

This is to be achieved by retaining and restoring remnant vegetation, but also by revegetation.

Management Action Target MAT22 also has some relevance:

> Provide demonstrations and on-site information in urban areas regarding the values of native vegetation

The plan also identifies priority EVC's for revegetation and management.

6.1.5. Port Phillip and Westernport Regional River Health Strategy 2007

This strategy, which is also subsidiary to the Regional Catchment Strategy, doesn't specifically mention Taylors Creek[5], although comments relating to the Merri Creek Catchment, particularly the Merri Creek Rural and Forested section apply to Taylors Creek.

The Merri Creek Rural section is identified as being of low regional importance, low social value, and in poor condition currently. The management condition target is to prevent further damage. Activities for the period 2007-2012 are expected to concentrate on the downstream urban sections of the Merri Creek catchment, although grants will help to improve and protect streamside vegetation.

Figure 3 – Condition summary for the Merri Creek Rural Management Unit
Overall the condition of the Merri Creek Rural Management Unit (highlighted in bright red) is poor. Source: Regional River Health Strategy.

The Resource Document forming part of the Strategy includes the following relevant actions relating to the Merri Creek Rural Management Unit[6]:

- Implement water quality actions to address high nutrient levels in this sub-management unit
- Create opportunities to improve habitat for Growling Grass Frog
- Ensure that large woody debris is retained within the stream channel and identify key sites for reintroduction
- Implement localised bed and bank restoration activities proposed in the Merri Creek Waterway Activity Plan[7]
- Consider sub-management unit in "natural floodplains and wetlands strategy"[8]
- Develop, review and implement floodplain protection overlays to ensure protection of natural floodplain values
- Protect heritage values within this sub-management unit and investigate additional measures under local planning schemes
- In partnership with local landholders continue to implement stream frontage management addressing revegetation, stock access and localised weed issues as recommended in the Merri Creek Waterway Activity Plan, where opportunities exist

The only actions where Council is identified as having lead responsibility are the sixth and seventh:

[5] It does mention another Taylors Creek, the tributary of the Maribyrnong River
[6] See page 493 of the Resource Document.
[7] The latest draft available of the Merri Creek WMAP (2003) doesn't include any bed and bank restoration activities, however future drafts may.
[8] Melbourne Water is listed in the Resource Document of the Strategy as the lead agency for preparation of a regional wetlands management plan to be completed by 2009.

- protect heritage values within this sub management unit and investigate additional measures under the planning scheme.
- develop, review and implement floodplain protection overlays to ensure protection of natural floodplain values.

Melbourne Water has prepared an addendum to the Port Phillip and Westernport Regional River Health Strategy to take it up to 2013. In terms of capital works on Taylors Creek by Melbourne Water, small sections of weed control and revegetation much like the recent works south of King William Drive are likely to be carried out on public land as a result of the addendum.

6.1.6. Melbourne Water plans, report/s and Drainage Schemes

Melbourne Water assets are marked on Figure 4 below. These include waterways with catchments of greater than 60 ha, the management of which is their responsibility. Melbourne Water has some immediate plans for works on its assets.

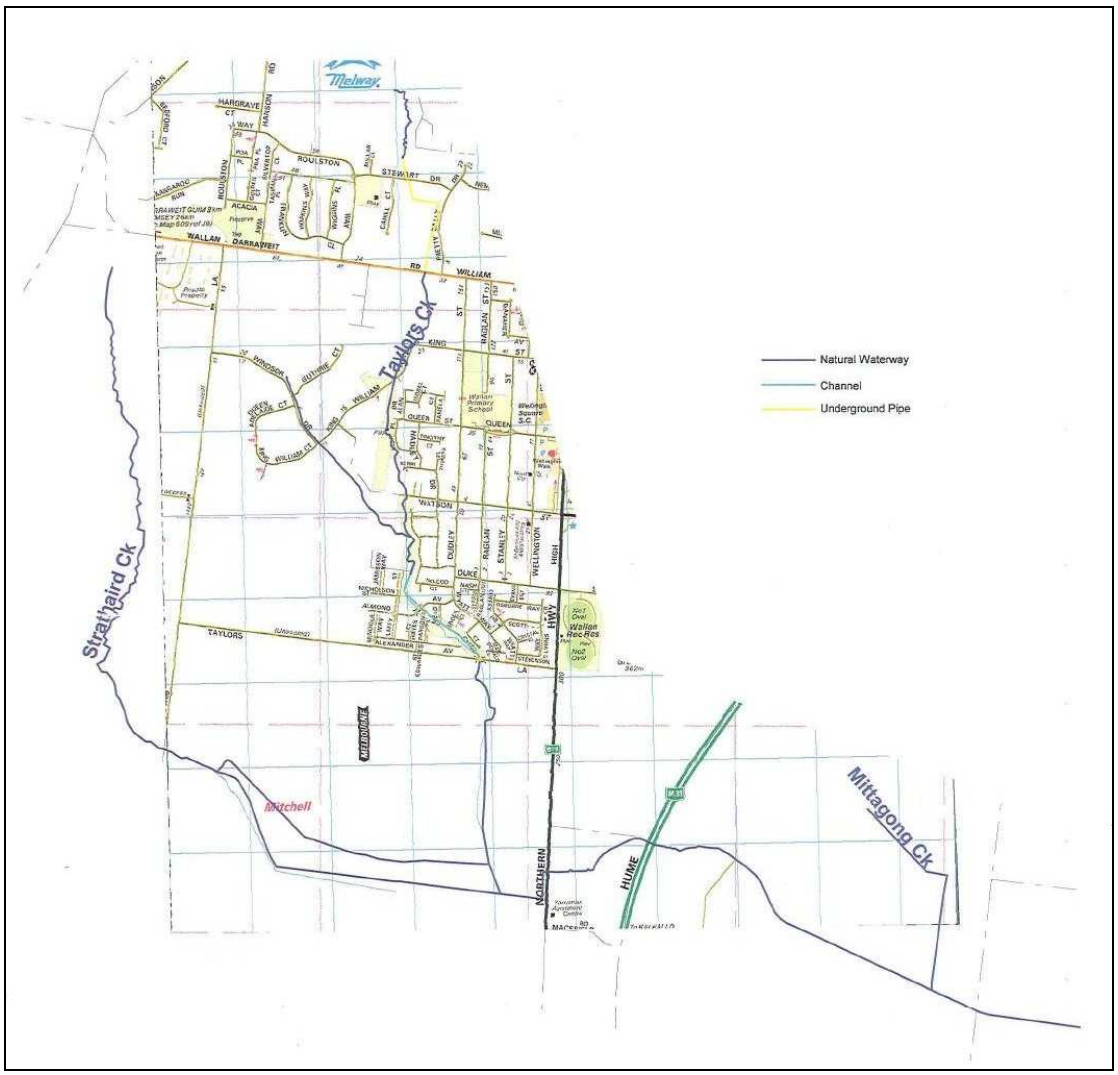


Figure 4 – Plan of Melbourne Water Assets
I.e. waterways they consider their responsibility.

Capital Works plans

In 2008 Melbourne Water is planning a number of works downstream of King William Drive, summarized in Figure 5 below. Melbourne Water identifies parts of Taylors Creek as the Pretty Sally Drive Drain in Figure 5.

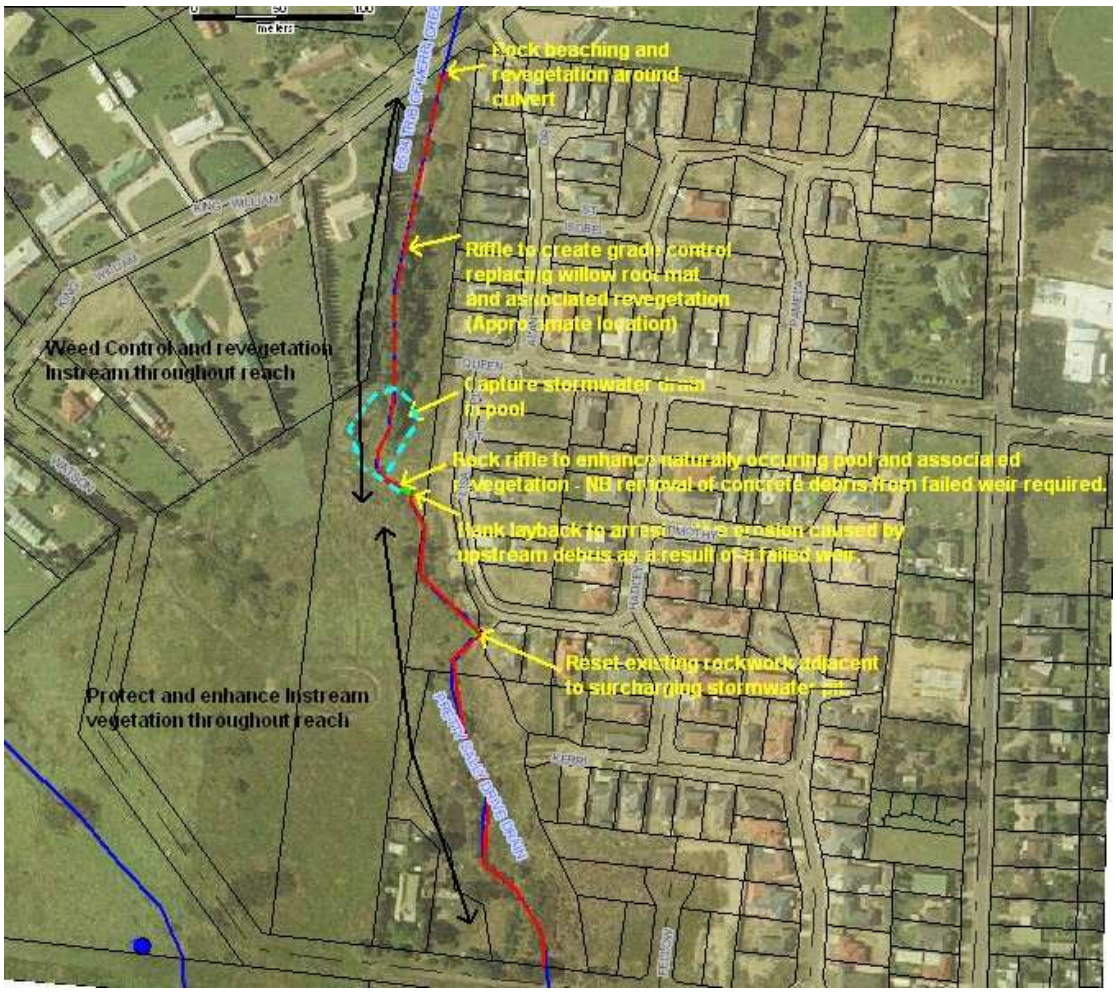


Figure 5 – Melbourne Water 2008 Capital Works downstream of King William Drive
The intention of the works is to reduce erosion and improve bank stability and to revegetate the Creek banks.

Taylors Creek Drainage Schemes

Drainage schemes enable appropriate planning to recover costs of infrastructure necessary to ensure urban development meets the current Melbourne Water standards for flood protection and environmental protection. They are based on careful modeling of flooding and investigations of environmental values.

The ProposedTaylors Creek Development Services Scheme (Jan 2009 shown in Figure 6) includes:

Retarding basins - Three relatively small retarding basins are shown to the west and northwest of Australis Drive in the upper catchment, a small one on the Windsor Drive Tributary, and one large retarding basin immediately to the east (upstream) of the Northern Highway.

New channels – in order to divert flows away from the sections of Taylors Creek which are apparently below capacity, a new channel is proposed to the west of Taylors Creek, capturing flows from the Windsor Drive Tributary, and directing it into the lower Strathaird Creek, upstream of the proposed large retarding basin. Channel work is also indicated on Taylors Creek downstream of Taylors Lane.

The Taylors Creek Drainage Scheme does not include the area to the east of the Hume Freeway, which is included in the Wallan Airfield Development Services Strategy. The drainage of this area is complex. It includes Wallan, Taylors and Merri Creeks and their artificial drainage channels through the former Hernes Swamp. Due to the very flat terrain floodwaters back up and flow over land, joining with water from other sub-catchments, and a separate Drainage Scheme is being prepared for this floodprone area, the extent of which is indicated by the Land Subject to Inundation Overlay.

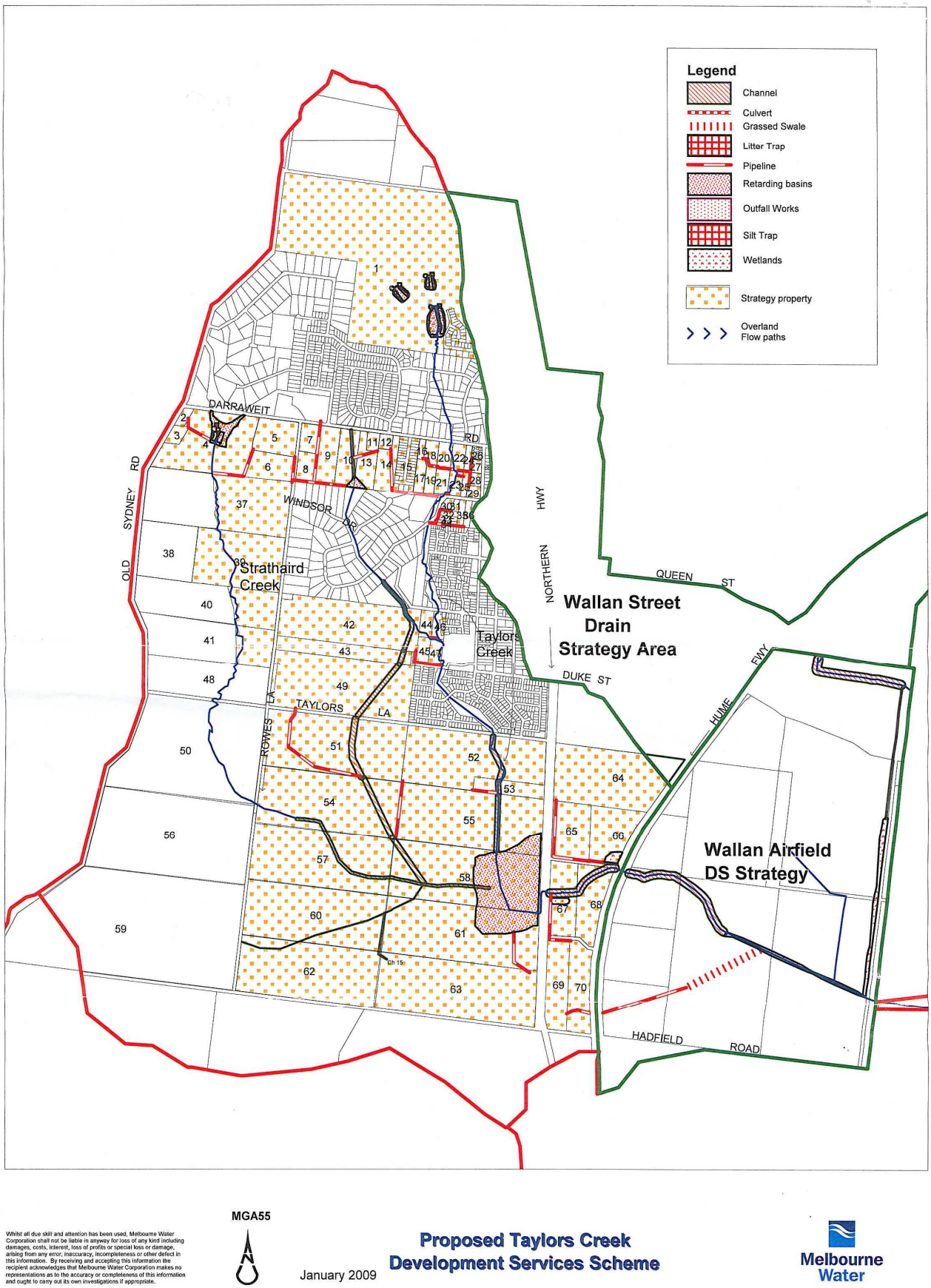


Figure 6 - Proposed Taylors Creek Development Services Scheme – from Melbourne Water.

Land Development Manual

Melbourne Water has a Land Development Manual, available on the web at http://ldm.melbournewater.com.au. The Manual describes the process for developers in relation to managing drainage, including Melbourne Water policies and technical requirements. For subdivisions permit conditions must address:

- Payment by the Owner to Melbourne Water of drainage contributions as provided for in section 269A of the *Melbourne and Metropolitan Board of works Act - 1958 (as amended)*
- Provision by the Owner of permanent or temporary Melbourne Water Works that are necessary to:
    - provide a drainage outfall for the development,
    - protect the development from flooding,
    - minimise the effects of changes in catchment hydrology and water quality resulting from the development.
- Provision of drainage reserves where they are required by Melbourne Water over floodways, waterways and flood plains within the development.
- Provision of easements over existing and proposed drains, floodways and waterways and shown on the plan of subdivision. The easement must comply with section 12(1) of the Subdivision Act 1988 and be specified on the subdivision plan as being for the use of Melbourne Water.
- Provision of adequate controls on storm and surface water runoff from the development during its construction to ensure that the quality and volume of runoff is not detrimental to the downstream environment.
- Ensuring that the planning, design, construction, operation and maintenance of all development adjacent to waterways identifies and protects streamside areas of environmental significance.

6.1.7. Environmental Guidelines for River Management Works

This report (DCE 1990), although dated is a reference document in the planning scheme, specifically referred to in Clause 15.01 of the scheme, which identifies options for works along waterways, discusses the impacts and effectiveness of the options, and sets guidelines for their use.

Guidelines relevant to Taylors Creek include:

- Urban channelisation by barrel draining with a floodway, or channelisation by hard lining with concrete or rock walling are both considered extreme measures which should be avoided wherever possible.
- Bank battering (excavating steep banks to make them less steep) is very destructive to any natural vegetation surviving on the river bank and removes diversity of bank form, including natural overhangs which can be important habitat. If the bank is not too high, an alternative to battering is fencing and planting without soil disturbance. In any case long lengths of bank should not be battered, and the temptation to make banks tidy should be resisted.
- Rock beaching receives cautious support, providing that bank straightening or battering should be avoided and earthworks should be kept to a minimum, and that coarse uneven sized rock is used which provides large interstices and greater habitat opportunities, and the area is fenced and planted with indigenous species.

This is a very dated report, and in practice most works along Taylors Creek bed and banks require a permit (there are exemptions under Clause 62 of the planning scheme) and must be referred to Melbourne Water, who use their own guidelines, published as the Land Development Manual referred to above.

6.1.8. Mitchell Shire Urban Stormwater Management Plan 2002 & 2008.

In 2008 Mitchell Shire updated its Stormwater Management Plan. The 2008 plan notes "Many of the key findings of the original report are still applicable and the suggested actions to address the issues are still appropriate." The 2008 report therefore needs to be read in conjunction with the 2002 report. The overall aim of the Mitchell Urban Stormwater Management Plan articulated in the 2002 report is to improve and then maintain the quality of urban stormwater run-off in the Shire of Mitchell, in order

to assist and protect the values of receiving waterways in the municipality whilst minimising flooding and providing the community with opportunities to enjoy the environmental, recreational, cultural and economic benefits of those waterways.

The 2002 plan lists the following key stormwater threats in the Wallan subcatchment which apply to Taylors Creek:

- Residential land use and development (i.e. subdivision works) and building site runoff (lot scale) pose a high threat, particularly due to poor site management practices, sedimentation and littering, such as appears in the south of the town.
- Unstable and degraded waterways represent a high threat due to the impacts of land clearing, erosion and sediment runoff, weed infestation, development encroachment, vegetation loss, and eroded and unstable riparian zones.
- Septic and sewer leakage poses a very high threat to stormwater quality. The 2000 Nutrient Study [no reference was given] identified sewage as an issue for Wallan, and the Wallan East Sewage Treatment Plant has been known to generate overland flow, though outside Wallan's urban area [although within the lower Taylors Creek].

These threats were restated in the 2008 report, which identified that they were having a high impact on waterways in Wallan.

The 2002 Plan (p 27) observes that the receiving environment of the Wallan subcatchment:

> "drains to two natural waterways [i.e. Taylors and Wallan Creeks] that are degraded. There are few recreational opportunities along the waterways and little visual appeal associated with the creek, although planned works in the south of the town will increase its recreational amenity to a high rating. Both waterways are part of the headwaters to Merri Creek."

The only action listed in the 2002 plan that relates to Taylors Creek is Action 3.14, which noted that Goulburn Valley Water were addressing the Wallan Sewage Treatment Plant overflows. Since the publication of that plan, Yarra Valley Water took over operation of the plant and upgrades to the sewage treatment plant have reduced the risk of overland flows to Taylors Creek. Largely this has been achieved by establishing a reclaimed water facility at Camerons Lane in Beveridge which disposes of the treated sewage by irrigating pasture land.

The 2008 Stormwater Management Plan notes (p20) that "Future development around Wallan will be required to provide water quality works, however any proposal to revegetate and rehabilitate existing waterways such as Wallan or Taylor's Creek would provide significant water quality and waterway health benefits."

It identifies a high priority for Creek rehabilitation and revegetation works downstream of urban development in Wallan which would provide improved waterway health, water quality and habitat.

The report suggests working with local community groups to secure funding and undertake waterway improvement works downstream of urbanised areas. Specific areas may include:

- Taylors Creek downstream of Duke Street where creek has been filled and partially piped

The report notes two project risks:

- Council works on existing waterways should not reduce the requirements placed on future developers within the catchment to properly manage waterways.
- Rehabilitated creeks will need to adhere to public safety criteria.

These risks are not difficult to avoid.

6.1.9. Mitchell Shire Environment Strategy 2008

The aim of the Mitchell Shire Environment Strategy is to encourage and promote environmentally sustainable management of our land, water and biological resources. And to ensure that Council operations and decision making processes incorporate best environmental practices, so that the Shire develops in an ecologically sustainable manner. Much of the Environment Strategy is relevant for Taylors Creek. The following aims and actions are most relevant to Taylors Creek:

Climate Change Goal: To reduce greenhouse gas emissions

Relevant Objectives:

CC3: Plan for sustainable communities through careful strategic planning.

On Ground Actions:

CCA2: Maintain, upgrade, construct new and promote the use of walking and cycling paths with the aim of decreasing reliance on powered vehicles whilst promoting the health and social benefits of using such facilities.

Land aims: To protect and enhance indigenous flora and fauna and mitigate land degradation such as salinity and erosion.

Relevant Objectives:

L2: Protect existing local native vegetation and habitat

L3: Control declared and environmental pes plants and declared pest animals (declared under the CALP Act 1994)

L5: Address and mitigate erosion and salinity issues

L8: Improve the connectivity and long term security of indigenous habitats and species

L9: Create a mosaic of bushland patches and linkages through the Mitchell Shire.

On Ground Actions:

LA6: Use indigenous flora species for revegetation works, including landscaping projects, using the best practice native vegetation management website for guidance.

LA9: Erect signage stating that 'rubbish must be taken home' along both existing and proposed walking trails and/or in natural bushland areas.

Water Goal: to improve the quality of water in waterways and catchments through the principles of integrated catchment management and minimise water use in the Mitchell Shire.

Relevant Objectives:

W1: Protect and restore native vegetation corridors along waterways

W2: Minimise the quantity and retard the flow of stormwater run-off from urbanised areas and minimise the water quality impacts on receiving waterways from development.

W3: Create wetlands where possible to encourage natural flow systems, improve stormwater quality and encourage and increase native biodiversity

W4: Maintain and improve water quality and environmental flows.

W5: Increase the community, council and developers understanding and appreciation of the environmental significance of waterways.

W6: Increase participation in activities to protect and enhance the natural features of waterways

On Ground Actions:

WA1. Continue, expand and improve Council's current weed control program on Council managed land, focusing on waterways

WA2. Provide for rubbish collection and recycle bins or signage stating rubbish must be taken home in public areas to reduce the amount of litter in our waterways

WA3. Continue to implement, and seek funding for, the Mitchell Shire Urban Stormwater Management Plan including capital works programs to address water quality issues in township areas, such as Waterford Park using initiatives such as constructed wetlands and reed beds and litter traps.

WA4. Ensure that any chemical spraying for weed control on or near a waterway involves the use of chemicals that are not harmful to water quality and native aquatic flora and fauna. This will be achieved by continuing to use the current Council contract specifications and educating the general community, through mediums such as the new residents kit, landcare groups, media releases and the Councils Environment newsletter. Works undertaken by other agencies, such as Melbourne Water and Catchment management Authorities should also follow these guidelines.

WA5. Revegetation and maintenance of revegetation occur on Council owned land using local indigenous species, on all identified riparian zones. Priority areas include … Taylors Creek….

WA7. Develop trails and interpretive signs which improve accessibility and understanding of the values of waterways and wetlands. Also continue the program to erect signs with waterway names and their related catchment at crossings to increase community awareness and 'ownership' of our creeks and streams.

Policy Actions

WA9. Work with the relevant CMA's, Melbourne Water and other relevant government authorities and the local community to develop and implement action pans for local waterways. These action plans should include the control of weeds, including trees such as willows, blackberries and hawthorn and replacing them with suitable locally indigenous species.

WA10. Promote and support appropriate Water Sensitive Urban Design in new developments, by ensuring that developments are undertaken in accordance with Clause 56 of the Victorian planning Provisions.WA15. Establish a process to ensure that works Council undertakes along waterways are planned to minimise disturbance and not damage the natural form of the waterway

WA16. Ensure that the natural forms of waterways and corridors are retained during residential developments, including the development of open space and drainage infrastructure.WA17. Seek a minimum of 30m vegetation buffers along waterways during the planning stage for new developments, in addition to any public open space contribution. This is in accordance with the set backs for development from waterways required under the Victorian State Planning Provisions.

WA18. Review the current Environmental Significance Overlays covering waterways and consider appropriate methods to achieve the objectives of this strategy and the Catchment management strategies for waterway protection.

Community Development and Education Actions:

WA27. Provide information to landholders regarding the value of riparian land, threats to riparian land and appropriate and inappropriate activities on riparian land including the planting of potential weed species.

WA32. Encourage landholders to protect existing vegetation and/or revegetate using local indigenous plants along waterways on their private property to provide habitat links, filter runoff, improve water quality and prevent weed establishment and spread.

Community goals:

• Increased community willingness and capacity to get involved in programs concerning the natural environment and to make the necessary changes that will lead to sustainable use of our natural assets.

• Increased community understanding and appreciation of our natural environment, including the threats and values

• An engaged and empowered community involved in the decision making processes on natural resource management.

Relevant objectives:

CA1. Increased awareness and involvement in environmental management of the Shire's landholders, residents, workers, local business & industry and visitors.

CA4. Maintain or increase the number and geographic coverage of community groups participating in catchment management in the region,

CA6. Increased cooperation between Council, community groups and other environmental agencies.

Community Actions:

CA1. Install environmental interpretive signs in Mitchell Shire Open Space areas.

CA16. Continue to liaise with and support local Landcare and Environment Groups to increase the capacity, membership and on ground works of these groups.

6.1.10. Land Capability Study of the Shire of Mitchell

This study, published in 1996 categorises the municipality into map units, based on soil type, underlying geology, slope etc, and identifies appropriate land uses for each land capability unit.

The land capability units identified for the Wallan area are shown on Figure 7. Most of Taylors Creek is shown as flowing through mapping unit **Qap** – Quaternary Alluvium of the Wallan Alluvial Plain.

According to the accompanying report, these soils have been deposited during flooding of the Merri Creek. They are characterized by Uniform dark grey heavy clay soils with high levels of shrinkage. Only the uppermost headwaters are shown as originating in mapping unit **Qvm** – Quaternary volcanics with moderate slope. These are probably basalts from the eruption point on Pretty Sally. The report says this unit is very susceptible to sheet erosion and mass movement.

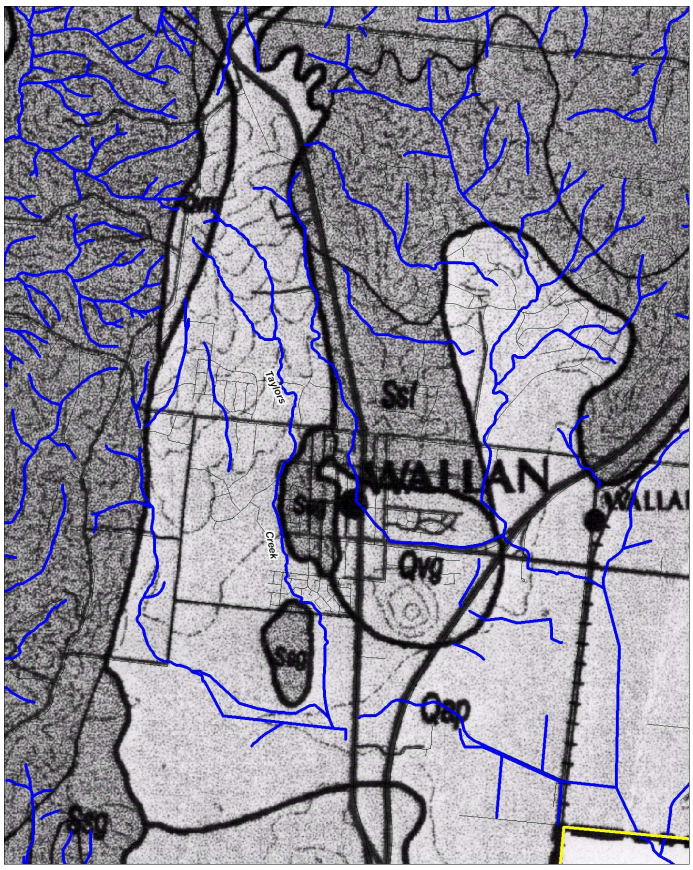


Figure 7 – Land Capability mapping with waterways overlaid.

The mapping in the report is qualified by a statement to the effect that more detailed investigation of areas might be needed, and it is clear from the contours on Figure 7 that Taylors Creek from Watson Street upstream is not an alluvial plain. Nor are the soils are dark grey in that area.

Geological mapping in Figure 8 shows the area north of about King Street as Quaternary or Tertiary extrusive volcanic geology, not Quaternary alluvium, and this fits better with the observations of slope and field observations of soils. In seems likely the upper part of Taylors Creek (north of King Street) is actually land capability unit Qvm, and only the lower part Qap. This means that the susceptibility to mass soil movement in the upper Taylors Creek catchment may have been underestimated.

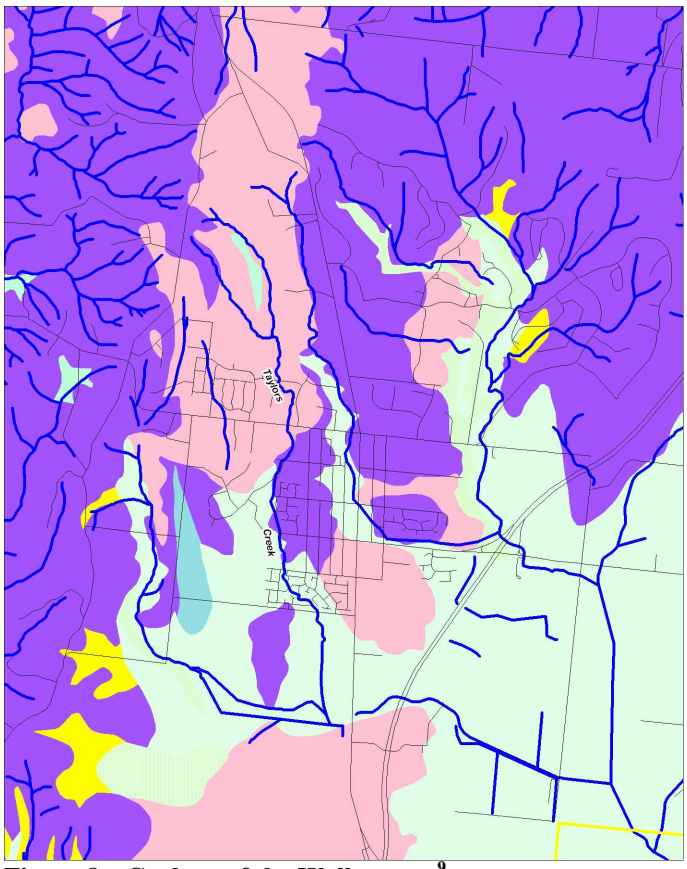


Figure 8 – Geology of the Wallan area[9].
Quaternary and Tertiary Basalts are shown in pink, Quaternary Alluvium in pale green, and the Tertiary marine sediments underlying the Taylors Creek catchment in purple.

6.1.11. Mitchell Shire Recreation and Open Space Strategy

The Mitchell Shire Recreation and Open Space Strategy (2005) identified that the five top priorities for upgrading of parks and open spaces were[10]:

- river/ creek
- regional park for picnicking and walks
- social family/ park with range of activities
- bicycle off road/ walking trail
- bushland/ conservation area

The Recreation and Open Space Strategy (ROSS) also identified priorities for sport and recreation facilities, important features in parks and perceived gaps in provision.

Manage change in Mitchell

One key action here is to use the framework for open space planning provided as appendix 2 in the report[11] (see below)

Encourage walking and cycling

The community survey undertaken as part of the ROSS identified walking as the main activity undertaken across all parks, and walking and jogging as the most important. If funds became available for open space development, 20% of residents nominated 'regional park for picnicking and walks' as their priority, with 'bicycle off road / walking trail' a close third priority (18%). Of note, 'bicycle off road / walking trail' were the clear priorities for open space development in Wallan.

Key actions were to:

[9] Data supplied from Dept of Primary Industry as part of their Geology of Victoria series - also available as downloads from the Department's web GIS server.
[10] Mitchell Shire Council (2005) p 18
[11] Op cit Appendix 2

- Secure the routes along the main waterways to provide off-road trails[12].
- Create localised circuits for exercise by linking up existing open space, off-road paths, disused government roads and street verges, in each township.
- Provide trail connections where possible to shopping centres, schools, transport hubs (ie train stations), community centres and identified trail circuits.
- Create a hierarchy of trails to serve cycling, running, wheel chair users and children's activities (small wheel toys and learn to ride/skate).
- Promote walking/cycling circuits and trails with consistent signage and information (maps, web site etc).
- Promote and sign associated services (eg picnic areas cafes, bike shops, car parks).

Cater for a diverse range of opportunities

Key actions for this section included:

- Ensure there is a social family recreation space or playground within 500 metres of each household in urban centres and in each village or rural hamlet.
- Provide opportunities for adolescents (especially females) to be active as well as just 'hang out', in safe, observable open spaces in each township.
- Provide spaces for BMX dirt jumps in reserves where they will not impact on safety, conservation values and amenity.
- Improve the design of open space to appeal to older adults, and to allow them to feel they belong, without feeling concerned about their safety.
- Provide additional facilities such as seating, paths and toilets, particularly at hubs, to encourage older adults to get out and about.

Design for equity

Key actions for this section included:

- Upgrade park infrastructure and facilities to encourage participation by people with a disability.

Protect natural features

This section includes many relevant actions:

- Ensure remnant vegetation is considered as undevelopable land and excluded from residential development and open space contributions.
- Ensure remnant vegetation and sites of significant natural heritage are identified, and classified or zoned as conservation areas, so they are not subject to land development proposals.
- Protect remnant vegetation along roadsides, ridgelines, watercourses and in open space.
- Minimise the development of tracks and trails through significant sites, and avoid riverbanks by directing uses to specific less sensitive routes.
- Minimise the impact of BMX trail, motor vehicle and dog activities in natural areas by designating and signing appropriate trail routes and areas.
- Encourage private landholders to protect existing vegetation and plant appropriate species that add to neighbourhood character and biodiversity.
- Ensure developers plant appropriate species in new residential developments and ensure these are in good condition before handover.
- Progressively remove weed species and replace with indigenous species where appropriate.
- Work with other Councils and authorities to implement state and regional waterway management and action plans.
- Enhance recreational, amenity, habitat and open space values along Mitchell's waterways, in partnership with other land owners/managers.

[12] Op cit page 26

- Ensure management practices and development within surrounding reserves do not adversely impact on waterways.
- Support the establishment and operation of community groups, including schools, who assist in the maintenance of waterway corridors (eg 'adopt a creek' program).

Asset and information management

- This section includes a number of relevant actions including:
- Encourage and support schools to 'adopt a reserve/creek', particularly those that abut open space. Provide resources to schools for habitat improvements, especially if they are located in habitat corridors.
- Rezone all public open space in RZ1 and CDZ zones to PPRZ.
- Ensure that Council is listed on Titles as the owner of high priority open space to avoid adverse possession claims.

Wallan

The Wallan Open Space by Function Map from the Open Space Strategy 2005 (see Figure 9) identifies the sections of Taylors Creek between Taylors Lane and King St as having the current function of

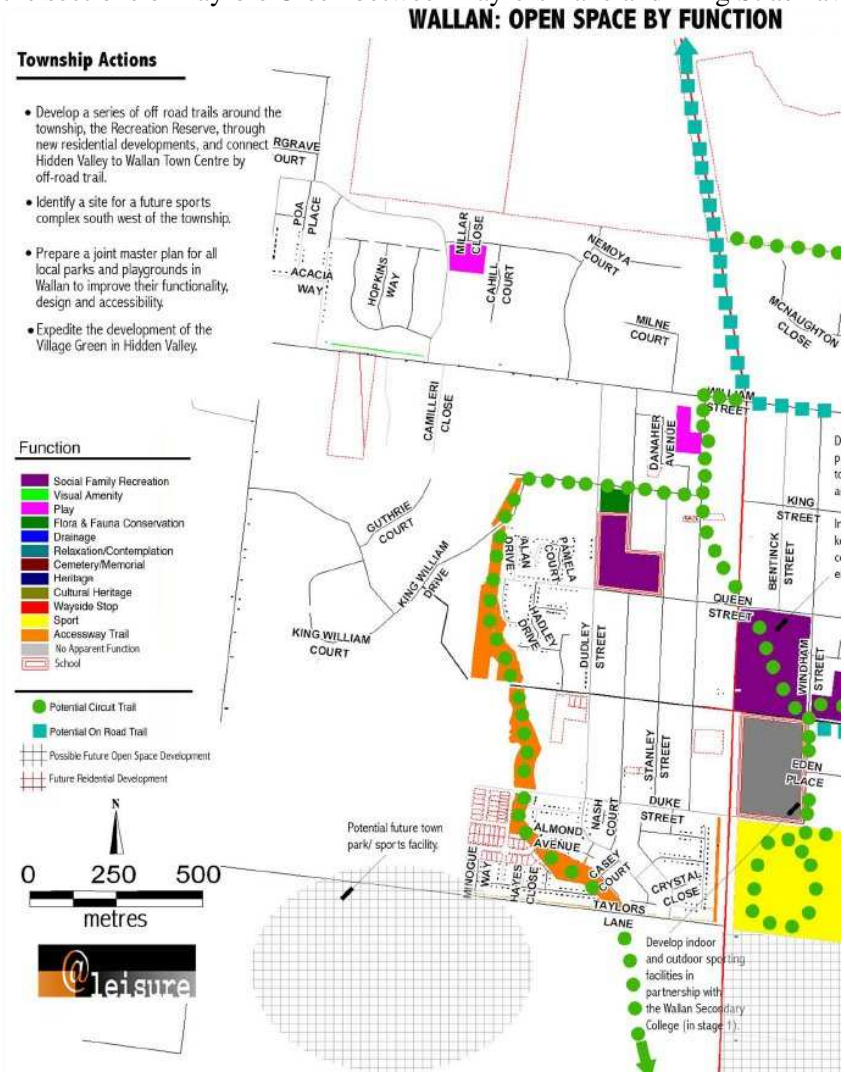


Figure 9 – Wallan Open Space by Function
(Map extract from Open Space Strategy 2005)

"Accessway Trail". No guidance is given as to future open space needs as development proceeds along Taylors Creek north of Wallan, or south of Taylors Lane. A potential circuit trail is identified from King Street south along Taylors Creek past Taylors Lane to an unidentified destination.

The map does not show waterways in Wallan despite the relevance of waterways to open space and

trails as identified above.

The only relevant Priority Action listed for Wallan is:

- Develop a series of off road trails around the township, the Recreation Reserve, through new residential developments.

Appendix 2 – Framework for open space planning

The framework basically summarises the principles identified elsewhere in the report.

6.1.12. Wallan Local Structure Plan

The Wallan Local Structure Plan was adopted by Mitchell Shire Council in late 2007, although the document which is made available on the Mitchell Shire Council website is labelled as a draft. The Plan notes that existing planning provides that:

- Urban development along flood prone areas of the Merri Creek will not be supported.
- Wetlands will need to be developed to reduce flooding and improve water quality.

These actions are supported by the plan (p18). The plan also notes (p22) that:

> "Localised watercourses located in new development areas offer opportunities to improve the water sensitive nature of urban design in the towns. The existing drainage schemes also have limited capacity to accommodate additional loads, and an urban design approach that contains run-off is preferable."

Urban Development practices

Proposed new urban development practices include:

- Larger public open space areas, developed as multi-purpose corridors that include passive and active recreation opportunities, storm water retention, drainage lines, riparian vegetation, water features and habitat protection.
- Implementation of a range of water sensitive urban design initiatives for urban expansion and infill areas, with integration into existing urban areas where possible. The initiatives would reduce the size of the structural storm water system required to accommodate flows and place no additional loads into the existing system. They would include a combination of conventional closed pipes and alternative drainage approaches based on local rainfall volumes.(p22)

Open Space Contributions

The plan sets important expectations for open space from developments in Wallan and outlines various actions needed to amend the planning scheme an increased percentace to be created as POS in new subdivisions. However it is generally accepted that land below the 1:100 flood event is not open space but drainage.

The plan gives no definition for watercourse, and is therefore unclear how much land along watercourses is to be considered unable to be used for passive or active recreation purposes.

Open Space Network

The Structure Plan proposes linear open space networks based on existing creeklines with accessibility to the existing urban areas to include appropriate pedestrian and cycle crossings and connections.(p39)

Expansion

The Wallan Structure Plan proposes expansion of Wallan to the southwest (including the section of Taylors Creek between Taylors Lane and the Northern Highway) and affirms its expansion southeast (including a section of Taylors Creek east to the railway line, almost to Merri Creek). These areas include large areas of flood-prone land as indicated by the Land Subject to Inundation Overlay in the Planning Scheme. Future planning needs to ensure the environmental protection of these flood prone areas.

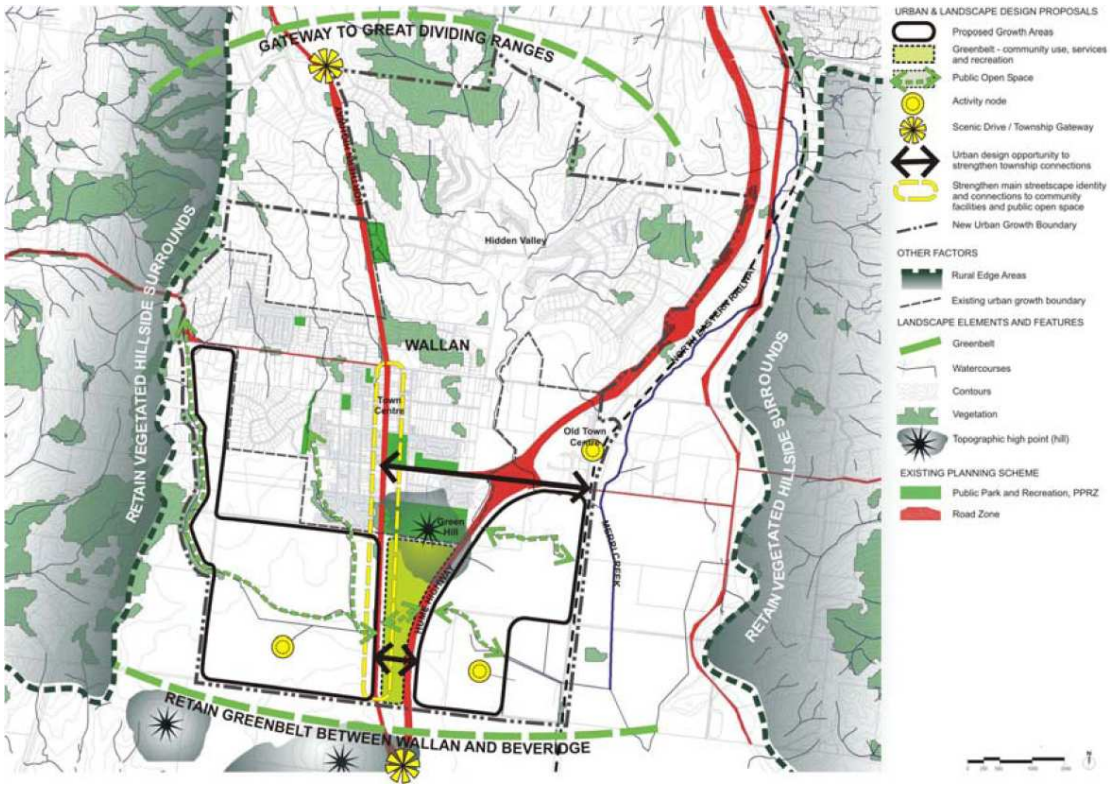


Figure 10 – Wallan Structure Plan Urban Landscape and Design Proposals

Green Spaces

Various elements of the structure plan combine to create an overall impression of the green or rural character of the entire town. These include:

- Recognising proximity to rural landscapes and allowing views out from purpose designed vistas within urban areas.
- New open space connections.
- Native revegetation.
- Rehabilitation of riparian vegetation along creek lines….(p42)

From an analysis of the strategic context, the report concludes that:

> "Taylors Creek will provide the framework for the future open space system which will ultimately connect to the **extensive areas of wetland that will be created to the south of Wallan**" (p64).

Wallan Environment 10 Year Vision

The plan identifies a vision for the environment in Wallan given the pressures and identification of issues, including:

- Strategic development across the catchment – planning now for areas of environmental significance to be preserved in balance with future areas of subdivision and urban development
- An increasing awareness of the environment and an interest in biodiversity by the community and all levels of government
- Establishing native vegetation corridors along the streams for wildlife and recreation, and to enhance and protect waterways.

The maintenance, protection and enhancement of open space:

- along waterways
- including interpretive trails for bike riding, horse riding and walking (p71)

Summary

The Wallan Strategic Plan identifies areas for growth around Wallan, including areas already zoned

for growth (such as Spring Ridge to the north), and the area to the east of the Hume Freeway, and a new growth area to the southwest of Wallan. It provides strong support for a native vegetation corridor and open space along Taylors Creek, and envisages that Taylors Creek will connect to extensive wetland areas which will be created to the south of Wallan. It identifies that land to be provided as [recreational] open space should be in addition to that required for drainage, including watercourses, wetlands and associated riparian vegetation. The plan supports the creation of larger public open space areas, developed as **multi-purpose corridors that include passive and active recreation opportunities, storm water retention, drainage lines, riparian vegetation, water features and habitat protection**.

6.1.13. Merri Creek and Environs Strategy

The Merri Creek and Environs Strategy 2009-2014 (MCES) is a joint strategy of the member organisations of Merri Creek Management Committee, and is a referred document in most MCMC member council planning schemes, but not the Shire of Mitchell's. As a tributary of Merri Creek, a number of actions from the MCES apply to Taylors Creek.

Aboriginal Heritage

Taylors Creek, is unarguably a waterway, and so land within 200m of Taylors Creek are areas of archaeological sensitivity under the Victorian Aboriginal Heritage Act (2006) and Aboriginal Heritage Regulations (2007), except where there has been significant ground disturbance.

A Cultural Heritage Management Plan must be prepared for high impact activities like land subdivision, but also activities like path construction where these activities use earthmoving equipment.

The Act also imposes responsibilities on Council in considering planning applications.

This chapter recommends Council undertake archaeological surveys along Taylors Creek after agreement from the relevant Aboriginal Party under the Act. Such an investigation may show whether Taylors Creek has Aboriginal Archaeological Sites.

It recommends limiting use of maintenance tracks in areas of sensitivity, and no pruning or cutting down of indigenous trees prior to inspection by a person qualified to identify an Aboriginal Scar Tree.

Visual Character

This chapter recommends reducing visual intrusion impacts, improving the appearance of outfall drains, controlling vehicle access by fencing to minimize dumping, prompt removal of rubbish and prosecution of dumpers, limiting the number of creek crossings, encouraging the use of basalt rocks in landscaping basalt reaches of the Creek and the use indigenous plants, resisting the installation of artworks unless they feature or reflect the natural landscape of the corridor, prompt removal of graffiti, and prevention of encroachment by adjacent residents.

Biodiversity

This chapter recommends full application of the State Government's vegetation clearance controls, implementation of the Port Phillip and Westernport Native Vegetation Plan targets and actions, and advocating for the reservation of high priority ecological vegetation classes. Taylors Creek is identified as a municipal scale habitat corridor.

Geodiversity

This chapter recommends investigation for sites of geological or geomorphological significance, their inclusion in planning scheme controls, and their interpretation to the community. No sites are within the Taylors Creek Catchment, although Pretty Sally is on the edge.

Land Management

This chapter encourages best practise management of weeds and pest animals and implementation of the Port Phillip and Western Port Weed, Rabbit and Fox Action Plans.

Headwaters to Craigieburn Road East

This chapter encourages measures to return parts of Hernes Swamp (the old swamp Taylors Creek

flows through shown on Figure 17 to a more natural marshy herbfield condition, to protect significant flora and fauna, and to encourage private landowners to retain remnant vegetation and revegetate along waterways.

Stream Morphology, Drainage and Flood Management

This chapter identifies objectives consistent with the regional catchment strategy objecties WO2 and WO5 (see section 6.1.3 of this report). Further to targets already set in other documents, the strategy seeks that:

- Flood control works are aesthetically pleasing and capable of supporting a range of other uses especially recreation and habitat.
- Design of greenfields urban developments incorporates water-sensitive urban design features at allotment (e.g rainwater tanks & raingardens), streetscape (local bioretention swale systems in road reserve) and neighbourhood (local wetlands and/or swales, raingardens) scales to achieve optimum infiltration and minimise hydrologic changes
- Greenfields development takes into consideration the ephemeral nature of many of the waterways of the upper Merri catchment and the desirability of retaining the geomorphological character of these ephemeral streams.
- Infill urban development incorporates water-sensitive urban design measures to reduce runoff volumes and rates and improve water quality
- In existing residential areas measures are encouraged which reduce peak runoff, including water tanks, infiltration beds, porous surfaces etc.

Water Quality and Stream Health

This chapter recommends implementation of Water Sensitive Urban Design measures, restoration of Hernes Swamp &other swamps as a water quality improvement measure, and encourages Yarra Valley Water to assess and address impacts on waterways from the Wallan Sewage Treatment Plant.

Aquatic Flora, Fauna and Wetlands

Community Engagement

This chapter recommends promotion of facilities and open space areas along waterways by improved community information, and continuing to involve community in planning and design processes of local open space near waterways and to promote opportunities for further community involvement in restoration within creek corridors.

Recreation

This chapter recommends development of Council owned waterway open space for passive recreation (e.g. walking and observing and enjoying nature), and promoting these uses through community events, festivals, interpretation of natural and cultural features, and through recreation programs that utilise the waterway open space such as group excursions and activity days.

It recommends managing 'wild & informal' bush play without ruining the wild and creative aspects of what kids do already, but to keep the damage, and the risks, to acceptable levels.

It also recommends continuing to build linear parkland along major Merri Creek tributaries [such as Taylors Creek] by acquiring Creek frontage lands as opportunities arise, including properties which interrupt an otherwise continuous parkland corridor on both sides of the waterway.

6.1.14. Merri Creek Development Guidelines

The Development Guidelines for Merri Creek were published by Merri Creek Management Committee in 2004. The Guidelines are listed as a reference document to the Environment Significance Overlay applied to Merri Creek and some of its tributaries in other municipalities. The Guidelines do not formally apply to Taylors Creek as there is no ESO on Taylors Creek. However they are a suitable guide to appropriate development along waterways such as Taylors Creek.

6.1.15. Sites of Faunal and Habitat Significance in North East Melbourne

This report by Beardsell in 1997 surveyed areas east of the Hume Highway. Site MUVP-A2, Hernes Swamp (which is on the lower Taylors Creek east of the Hume Freeway) was considered to be of very high habitat significance, and of State faunal significance.

The report also identified that the rail corridor south of Hernes Swamp (the Beveridge Wallan Rail Reserve) was of high habitat significance and regional faunal significance, and recommended it as a habitat link. MCMC has developed a management plan for this reserve.

6.1.16. Sites of Biological Significance in the Merri Corridor

This study by Schulz and Webster in 1991 identified Hernes Swamp, on the lower Taylors Creek, as being of State biological significance (site S4 "Upper Merri Creek and Hernes Swamp").

The study also identified a site along Taylors Creek north of Taylors Lane as being of local biological significance (site L3 "Taylors Creek Wallan"). This is the area with mature native and exotic trees north of Duke Street. It is discussed further in section 10.5 of this report.

The area to the west of Wallan (west of Rowes Lane) was identified as an area of regional significance (site R2 "Old Sydney Road Spur"). This would be a destination for a habitat link along Strathaird Creek from the south end of Taylors Creek, as well as from Taylors Creek headwaters.

6.1.17. Biosites

Biosites mapping by the Department of Sustainability and Environment[13] shows only one biosite on Taylors Creek, site number 4854, Hernes Swamp which is identified as of National Significance (see Figure 11).

Also to be noted on the plan is the Bioregional Conservation Status of vegetation. This represents the significance of the vegetation type (Ecological Vegetation Class or EVC) within the bioregion which it occurs. Although the bioregional conservation status has been revised since 2005, the changes don't affect any of the vegetation shown on this plan. Endangered EVC's are shown in red along or near Taylors Creek in three locations:

1. On the railway corridor south of the sewage treatment plant. This site is known as the Beveridge-Wallan Railway Line site, and is in part a remnant of the Hernes Swamp vegetation.
2. Where Taylors Creek crosses the Northern Highway. This site is discussed more in section 8 of this report. It contains remnant wetland vegetation.
3. Along Taylors Creek north of Taylors Lane. This site is also discussed more in section 8 of this report. It contains planted trees and is in our opinion incorrectly identified as being of an endangered EVC.

No vulnerable vegetation is identified on the map, however depleted vegetation is identified in 2 locations:

1. Just to the south of William Street. This site was not identified in the present survey, and may have been destroyed since the biosites mapping.
2. Along one of the headwater tributaries of Taylors Creek. This site is discussed more in section 8 of this report.

[13] Biosites Maps and Reports For Aland & Water Management Agencies, Port Phillip Region Department of Sustainability and Environment January 2005.

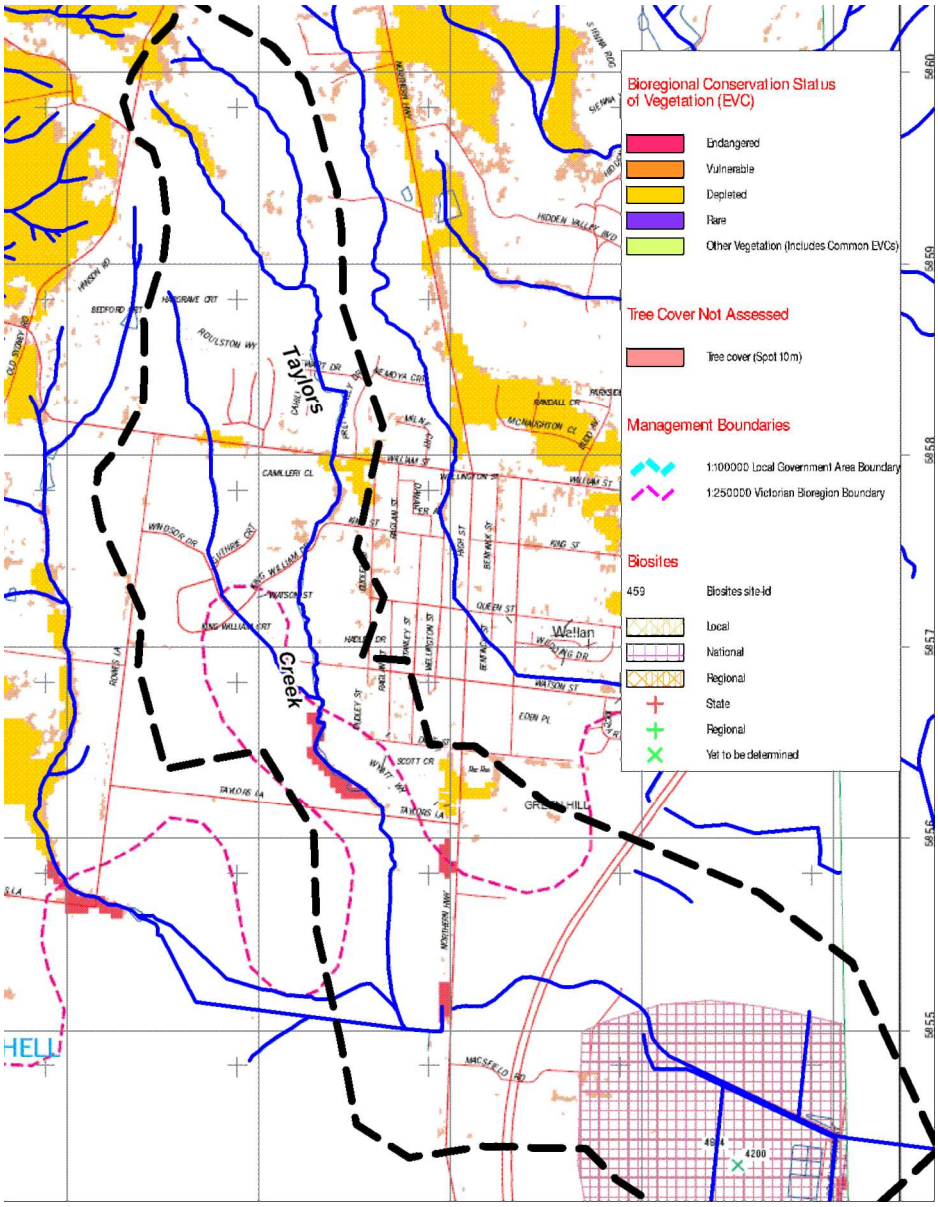


Figure 11 – Biosites
Mapping from Department of Sustainability and Environment (2005) with waterways and the Taylors Creek Catchment boundary overlaid. Note Hernes Swamp in the southeast.

6.1.18. Flora, Fauna & Habitat – Hectare Assessment: Wallan Structure Plan

This report was prepared by Meinhardt Infrastructure & Environment Pty Ltd for Mitchell Shire Council in April 2009. It mainly looks at Strathaird Creek, but includes a stretch of Taylors Creek from Taylors Lane 230m south (HZT01). The report describes this section of Taylors Creek as follows:

- Low gradient drainage line, poorly drained with much of the habitat zone likely to be seasonally inundated.
- Potential (degraded) wetland habitat for Growling Grass Frog (Litoria raniformis)
- Degraded understorye with a high proportion of high threat weeds, particularly Water Couch (**Paspalum distichum*) and Drain Flat-sedge (**Cyperus eragrostis*).
- Some areas have high indigenous species cover however diversity is low with Common Spike-rush (*Eleocharis acuta*) the main species presenet as well as Tall Sedge (*Carex appressa*) and *Juncus* spp.
- One large Swamp Gum (*Eucalyptus ovata*) should be retained for its habitat values.

- Consideration should be given to the location of WSUD stormwater treatments systems for the neighbouring suburb.

The report identifies the Ecological Vegetation Class present as Swampy Riparian Complex, which is endangered in the bioregion. It lists this section of Taylors Creek as being of high conservation significance[14]

It identifies as a management requirement the establishment of either a biolink or a habitat corridor along along Strathaird Creek, and including the identified section of Taylors Creek. Presumably a biolink or corridor would link downstream to the Hernes Swamp area and Merri Creek, and upstream to the corridor along Old Sydney Road and effectively across to Deep Creek. For a biolink the report identifies a preferred width of 200m each side of the waterway centreline, or for a habitat corridor a 60m buffer on each side of the remnant vegetation present, the outer 30m of which would be available for management and maintenance infrastructure, pedestrian access, utilities and a wildfire break.

6.2. Infrastructure needs

6.2.1. Yarra Valley Water

In correspondence to Council from Yarra Valley Water[15] servicing of Wallan to deal with current weaknesses and cope with expected development is described, including developments up to 2020.

Sewerage infrastructure will impact Taylors Creek significantly over that time (see Figure 12).

The Spring Ridge development in the upper Taylors Creek catchment north of Wallan will be serviced through new branch sewers (the Airfields West Branch Sewer and the Spring Ridge Branch Sewer mainly to the east of the Northern Highway, not affecting Taylors Creek.

Developments such as Duke Street, Duke Street South and Wallan-Darraweit Road (see Figure 15) are to be serviced through a new reticulation sewer extending along Taylors Creek from Taylors Lane north to King Street to be constructed in around 2008-2009. This will impact significantly on open space in this time. The Wallan Sewage Treatment Plant will have its capacity doubled around 2008/9. The sewage pumping station at Taylors Lane will be upgraded in 2010 and then decommissioned around 2015.

In around 2015 development to the south of Wallan is planned to be serviced through a new main from the Taylors Lane pumping station (allowing its decommissioning) to the Northern Highway, south to the south side of Taylors Creek and east to the Wallan Sewage Treatment Plant (STP). Around 2020 another upgrade of the Wallan STP will be needed to double its capacity again, At some stage further capacity increase of the Wallan STP will not be possible and a new main will be needed to take sewage south to a new treatment plant at YVW's Hazelwynde site halfway between Wallan and Beveridge, but the date of this will depend on the rate of growth in Wallan's south.

[14] Meinhardt Infrastructure & Environment (2009) Appendix E
[15] Dated 12 November 2007 titled Wallan Area Servicing Strategy.

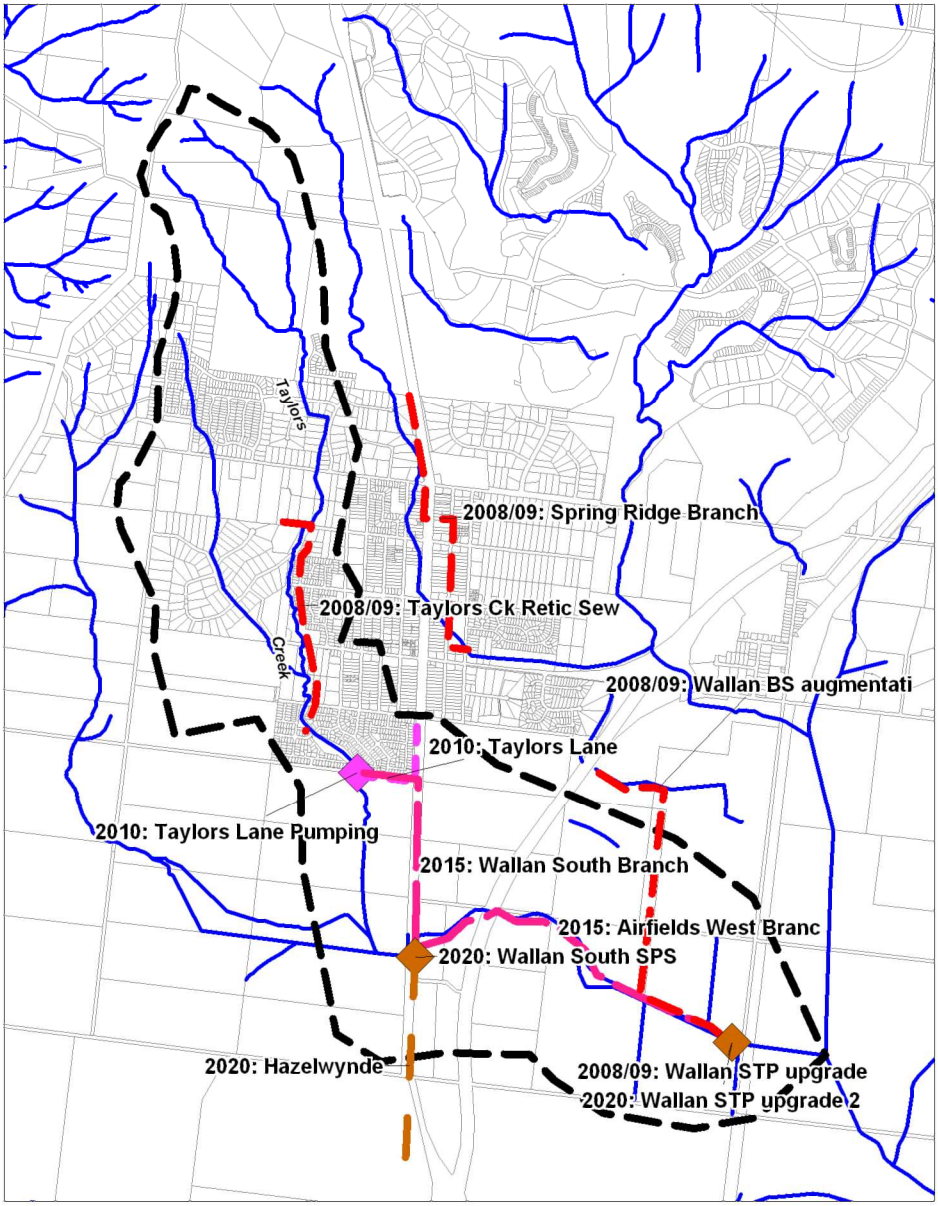


Figure 12 – Yarra Valley Water's proposed sewerage upgrades to 2020.
Based on Wallan Area Servicing Strategy. Existing Sewerage infrastructure not shown

6.3. Population analysis

Full census data are not yet available for the 2006 census, however some comparable statistics for 2001 and 2006 can be found on the Australian Bureau of Statistics Website. Census Quickstats for Wallan Urban Centre/Locality for 2001 and 2006 show the population of Wallan growing from 3958 persons in 2001 to 5410 in 2006, an increase of 1412 persons, or approximately 6.5% per annum.

This picture may be complicated by a change in the area considered to be Wallan. The Wallan Local Structure Plan identifies the 2001 population of Wallan as 4160, and in 2006 was 6641, but considers that due to changes of the area considered to be Wallan, the 2006 population should be adjusted down to 5411 persons, making the growth 1251 persons[16] or approx 5.4% per annum.

In 2006 the median age of residents in Wallan was 30 compared to a national median age of 37 – reflecting the higher than average proportion of children under 14 and adults 25-54 years characteristic of growing urban centres with lots of new families with children (see Figure 13).

[16] See page 11 of the Wallan Local Structure Plan

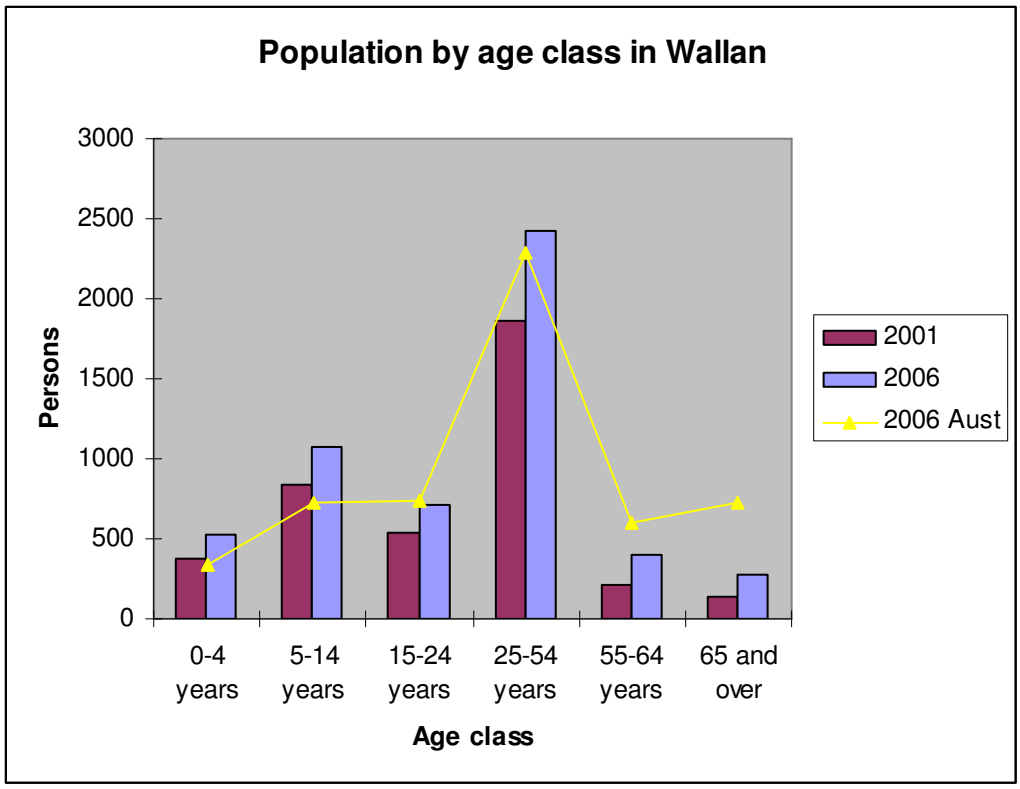


Figure 13 – Population by age class in Wallan Urban centre/locality
(from 2001 and 2006 (unadjusted) Census Quickstats information. The yellow line gives a guide to overall Australian figures.)

In 2006 a very high proportion of Wallan's population was born in Australia or some other English-speaking country, and 87.4% spoke only English at home, significantly higher than the national average of 78.5%, but a decrease from the figure for 2001 for Wallan of 92.3%.

With the large number of children in Wallan (a situation that is likely to continue as long as there is new land being developed) the provision of suitable facilities for children is an important part of the strategy.

6.4. Housing demand analysis

According to ABS Quickstats data between 2001 and 2006, the total number of occupied private dwellings in Wallan increased from 1,220 to 1,705, an increase of 485 occupied private dwellings. In 2006 occupancy rates of households in Wallan (3.02 people per household on average) were significantly higher than the national average (2.35). This probably reflects the higher proportion of young family households and lower proportion of older people in Wallan compared with Australia as a whole, but may also reflect the larger houses possible on larger lots in the low density residential areas.

According to Yarra Valley Water[17], developers are forecasting 300 new lots being developed per year in Wallan. Yarra Valley Water indicated that they thought this figure was optimistic pointing out that actual population growth between 2001 and 2006 was only 1400 persons according to census data, i.e. around 280 persons per year. The same census data (quoted above) indicates that the number of occupied private dwellings increased by only 97 per year on average between 2001 and 2006.

This more recent census figure is lower than the yearly average dwelling construction in Wallan between 1998 and 2003 of 123.3 dwellings per year constructed given in the Draft Wallan Structure Plan[18]. The Wallan Structure Plan forecasts between 160 and 200 new dwellings per year being required up till 2010, 191 to 250 required between 2010 and 2020, and 215 to 250 between 2020 and

[17] Yarra Valley Water letter to Ian Scholes, General Manager Engineering and Environment, Mitchell Shire Council, dated 12 November 2007.
[18] See table 4.1 on page 9 of the plan. The figures given are based on Building Commission of Victoria figures.

2030. This totals between 4100 and 5800 new dwellings by 2030. It forecasts that the existing residential zoned land will run out sometime between 2010 and 2020.

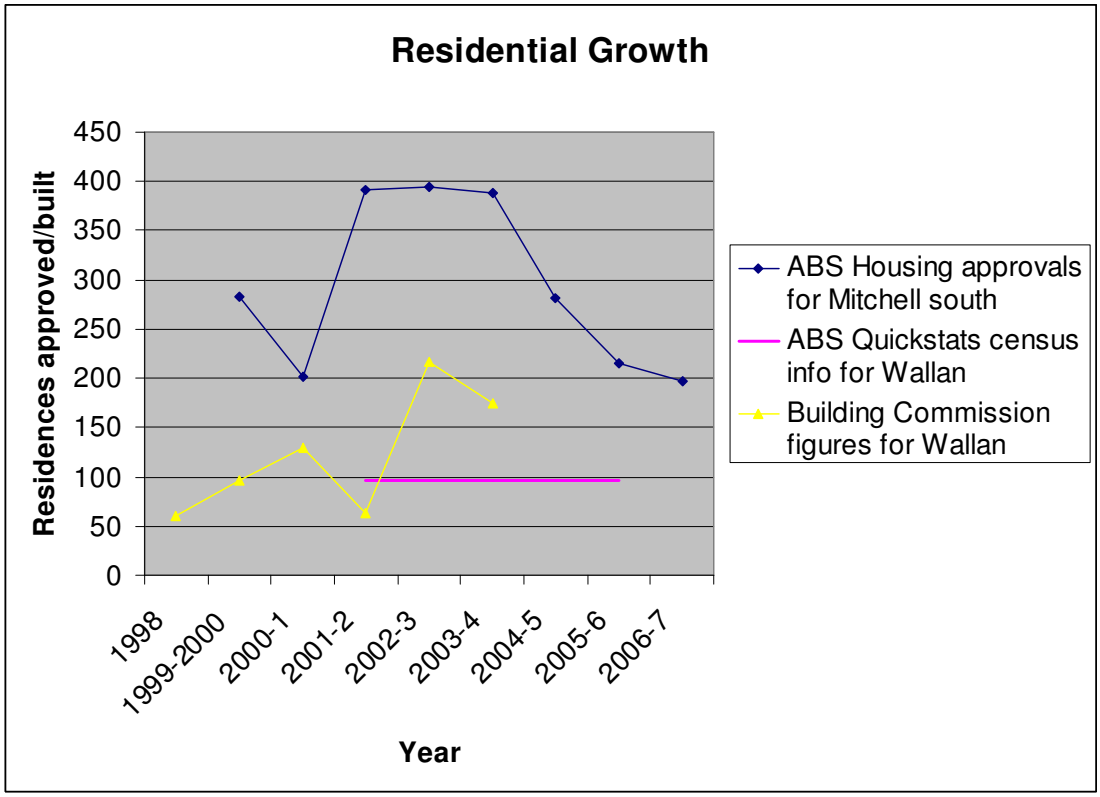


Figure 14 – Residential growth figures
(from Australian Bureau of Statistics, and the Building Commission of Victoria as quoted in the Wallan Structure Plan).

Figure 14 summarises available statistics for Wallan and Mitchell South. Unfortunately Building Commission figures for Wallan are no longer available, and the ABS cannot separate building approvals for the Wallan area from their Mitchell South area. The figures appear consistent with a lower rather than a higher growth rate for Wallan.

Areas where land developments are proposed are shown on Figure 15, a map compiled by Yarra Valley Water. Yarra Valley Water indicate that a total of around 8100 residential lots are proposed around Wallan. The Local Structure Plan proposes that these same areas be made available for development and it estimates that these areas would provide 6180 additional dwellings (considerably less than Yarra Valley Water estimates). The Local Structure Plan estimates that these areas would be sufficient to meet demand for housing at least until 2030 when it estimates the population of Wallan to be 18,477 (approx 5.25% growth per annum from 2006).

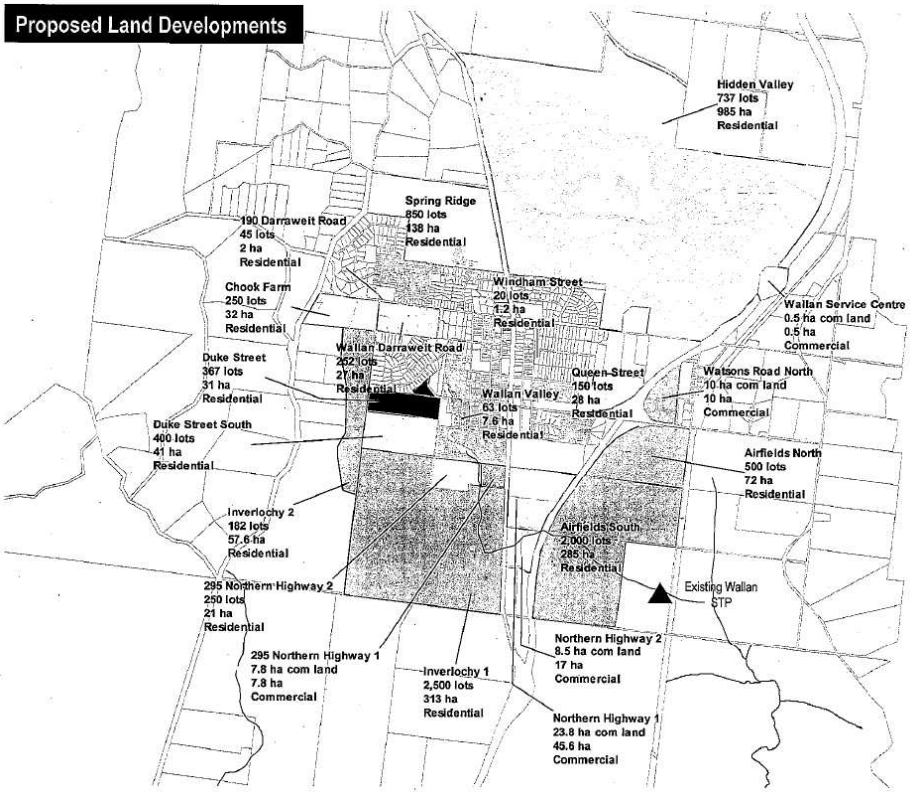


Figure 15 – Analysis of future potential growth in Wallan
From Yarra Valley Water who estimate that 8100 residential lots are already proposed for development.

It is unclear on what basis the lot yields have been calculated in Figure 15 and in the calculations underlying the Wallan Structure Plan, however lot yields may be reduced significantly in areas where there are extensive areas of land subject to inundation.

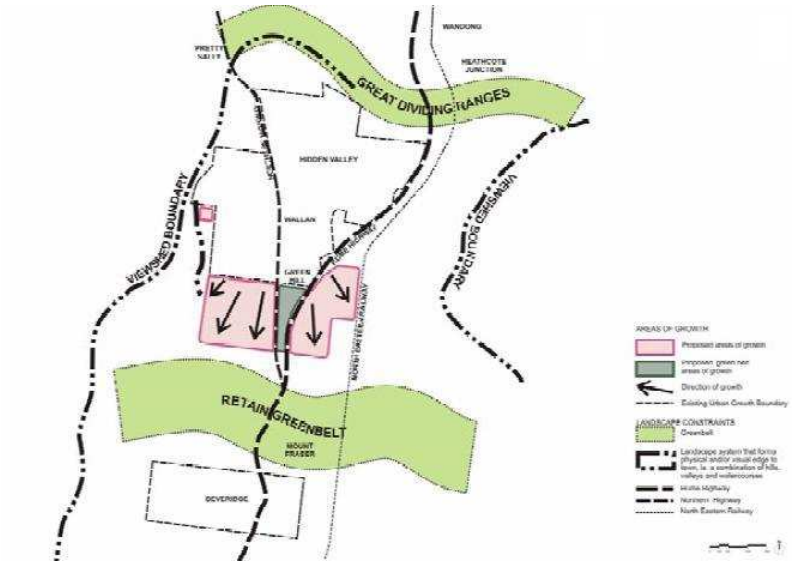


Figure 16 – Wallan Local Structure Plan Preferred Option for Growth Areas.
Depending on what growth rates eventuate, and lot yields achieved, it is likely that in the next three to four decades almost the entire length of Taylors Creek will flow through residential areas. Taylors Creek could provide residents of these areas with a high value linear park, a multi-purpose corridor that includes passive and active recreation opportunities, storm water retention, drainage lines, riparian vegetation, water features and habitat protection.

7. Strategic Objectives and Targets

Following are a set of objectives derived from the strategic background to this report. The strategic justification for each objective is given, along with relevant community feedback received. Targets and recommended actions which would help achieve the objective are then listed.

7.1. Drainage corridors

Objective:

O1	Retain natural drainage corridors with vegetated buffer zones at least 30m wide along waterways to maintain the natural drainage function, stream habitat and wildlife corridors and landscape values, to minimise erosion of stream banks and verges and to reduce polluted surface runoff from adjacent land uses.

Strategic Justification:

- Clause 15.01 of the planning scheme specifies that Council as planning authority should encourage this outcome.
- The Mitchell Shire Environment Strategy 2005 also encourages this outcome.
- The objective is also supported in the Merri Creek Development Guidelines Standard MC4.
- This objective is consistent with the Port Phillip and Western Port Regional Catchment Strategy objective WO5: Ensure the management of water resources minimizes risks to natural ecosystems, public land, private assets and public safety, and target WT9 to have no loss of hydraulic capacity and environmental values of floodplains.
- The objective is consistent with the Wallan Local Structure Plan which indicates in the Open Space Contributions section that "The land provided as open space is also to be usable for passive or active recreation purposes and is *in addition to land that is required for drainage, including watercourses, wetlands and associated riparian vegetation*".

Community views:

This objective is consistent with the outcomes of the community consultation which showed consistent support for the establishment of continuous corridor along both sides of Taylors Creek, and supported purchasing land if that was the best way to achieve it.

Targets:

Within urban areas at least 30m each side of Taylors Creek is reserved in public ownership.

In urban and rural areas the 30m buffer area is managed to meet the objective.

General Recommendations

All subdivisions require retention of natural drainage corridors with vegetated buffer zones at least 30m wide along Taylors Creek and its main tributaries (refer clause 15.01 of the planning scheme). In areas undergoing development where natural vegetation is not present, the buffer area should be revegetated as part of the landscape plan required under clause 56.05 of the planning scheme. This area should not be considered part of the open space contribution (refer Wallan Structure Plan).

Include the 30m buffer zone in an Environmental Significance Overlay covering the length of Taylors Creek to emphasise this objective on maps.

7.2. Floodplains

Objective:

O2 Preserve environmental values and hydraulic capacity of floodplains.

Strategic Justification:

The Port Phillip and Western Port Regional Catchment Strategy target WT9 is to have "no loss of hydraulic capacity and environmental values of floodplains". The wetlands shown on Figure 17 below form part of the floodplain, and this objective is consistent with the objective WO2 from the Regional Catchment Strategy: to protect and improve the environmental health and social and economic values of waterways and wetlands, and targets WT 15: No net loss in the extent and health of wetlands of each existing type and WT16 Progressively improve the overall health and social value of natural wetlands…

Clause 15.01 (Protection of catchments, waterways and groundwater) of the planning scheme requires that council as planning authority should encourage: "Measures, including the preservation of floodplain or other land for wetlands and retention basins, to filter sediment and wastes from stormwater prior to its discharge into waterways."

The stated objective of Planning Scheme Clause 15.02 (Floodplain Management) is "to assist the protection of:

- Life, property and community infrastructure from flood hazard.
- The natural flood carrying capacity of rivers, streams and floodways.
- The flood storage function of floodplains and waterways.
- Floodplain areas of environmental significance."

The Land Subject to Inundation Overlay in the planning scheme has as one of its purposes: "To ensure that development maintains the free passage and temporary storage of floodwaters, minimises flood damage, is compatible with the flood hazard and local drainage conditions and will not cause any significant rise in flood level or flow velocity." The overlay does not preclude residential development within the overlay area, but ensures most types of development requires a permit, and identifies Melbourne Water is a referral authority. The conditions under which such development can occur are described in Melbourne Water's Land Development Manual (Melbourne Water 2008).

Standard MC4 from the Merri Creek Development Guidelines states that "Subdivision and development should create a continuous strip of public open space along both sides of the creek that includes all land within:… the flood prone area (1 in 100 years)".

Retention of wetlands provides some benefit to developers in that the properties are not flooded, and floodwater from their development can be retained in the wetland, consistent with clause 56.07 of the planning scheme.

Community views:

Concern was expressed in the community meeting about a number of houses in Wallan which flood regularly. It can safely be assumed that the community would prefer to have their houses protected from flooding. There was strong support in the community meeting for creating a natural-looking creek, which is consistent with protection and enhancement of natural values of floodplains.

Targets

No loss of floodplain hydraulic capacity

No loss of environmental values of floodplains

No net loss in the extent and health of wetlands

Progressive improvement in the overall health and social value of wetlands.

General Recommendations:

The floodplain (which includes the Land Subject to Inundation Overlay in the planning scheme where this has been implemented, but may include other areas which have not undergone the necessary

assessment) should generally be excluded from the developable area, and provides an excellent opportunity for wetland re-establishment. Such wetland re-establishment should be designed to re-create conditions suitable for establishment and long term survival of the shallow wetland EVC's (Plains Grassy Wetland, Swampy Riparian Complex and Wet Verge Sedgeland) which are high priorities for re-establishment in the Native Vegetation Plan.

Avoid solutions which create deeper wetlands on a smaller area (so preserving the hydraulic capacity) as this would be likely to preclude re-establishment of the shallow wetland EVCs which were (and still are to some extent) present on the floodplains of Taylors Creek.

Council introduce an Environmental Significance Overlay along the entire length of Taylors Creek and its floodplain to identify its importance in the planning scheme. [The Regional River Health Strategy includes an action for which Councils are responsible to: "Develop, review and implement floodplain protection overlays to ensure protection of natural floodplain values". The purposes of the LSIO are not really to protect the environmental values of floodplains, and an ESO over these areas would help achieve their protection.]

7.3. Waterway condition

Objective:

O3 Prevent further damage and improve the environmental health of Taylors Creek

Strategic justification:

This objective is consistent with:

- Objective WO2 of the Port Phillip and Western Port Regional Catchment Strategy: "Protect and improve the health and social and economic values of waterways and wetlands" and also WO4: "Improve water quality in waterways, aquifers, wetlands, estuaries, bays and seas"
- The overall aim of the Mitchell Urban Stormwater Management Plan "to improve and then maintain the quality of urban stormwater run-off in the Shire of Mitchell…"

This objective goes further than the Regional River Health Strategy, which has the management objective for the Rural and Forested sections of Merri Creek as merely to prevent further damage.

Community views:

Community consultation for the strategy indicated strong support for daylighting[19] piped sections of the creek, revegetating its banks, including water-sensitive urban design measures in developments, and the creation of wetlands. These measures would improve waterway condition.

Targets

Stabilisation of all severely eroding parts of the Creek.

Improvement in water quality, aquatic life, habitat and stability and vegetation of Taylors Creek.

Increased proportion of private frontages to Taylors Creek fenced off and revegetated.

Water Sensitive Urban Design embedded in design of all new developments and is retrofitted into existing urban areas.

No further undergrounding of Taylors Creek.

Daylighting of the sections of Taylors Creek between Taylors Lane and Duke St, and in the vicinity of Pretty Sally Drive.

[19] Daylighting describes the process of deliberately exposing some or all of the flow of a previously covered river, creek, or stormwater drainage. Daylighting projects liberate waterways that were buried in culverts or pipes, covered by decks, or otherwise removed from view. Daylighting re-establishes a waterway in its old channel where feasible, or in a new channel threaded between the buildings, streets, parking lots, and playing fields present on the land. Some daylighting projects recreate wetlands, ponds, or estuaries. From Pinkham (2000)

General Recommendations:

Incorporate these objectives and targets into subdivision design and open space design and management.

Investigate feasibility of daylighting (re-creating a natural channel along) the undergrounded sections of Taylors Creek.

Encourage private landowners to fence off and revegetate the banks of Taylors Creek where it passes through their property.

7.4. Wetlands

Objective:

O4 Protect wetland remnants from development and reinstate wetland communities.

Strategic justification:

This objective is consistent with:

- The Port Phillip and Western Port Regional Catchment Strategy, objective WO2: "Protect and improve the environmental health and social and economic values of waterways and wetlands", and with targets WT 15: "No net loss in the extent and health of wetlands of each existing type" and WT16 "Progressively improve the overall health and social value of natural wetlands…"
- The high priority these wetland EVCs have for revegetation in the Native Vegetation Plan.
- Clause 15.01 of the planning scheme.
- The Mitchell Shire Environment Strategy water aims which include: "Creation of wetlands where possible, to encourage natural flow systems improve stormwater management and encourage and increase native biodiversity".

Hernes Swamp in the lower Taylors Creek catchment was rated by Beardsell in the NEROC report as being of Very High habitat significance, and State faunal significance[20]. Schulz & Webster also identified Hernes Swamp as being of State significance. The most recent work, DSE's 2005 Biosites report classifies it as being of National Significance.

Community views:

Tentative support for wetlands was expressed at the community workshop. Wetlands were among the low scoring options in the prioritisation exercise. Some comments were made at the workshop that wetlands would probably happen anyway and didn't need Council funding, so the low score might not reflect a low absolute priority, just a low priority for Council funding.

Targets:

No removal or destruction of wetlands

Restoration of significant proportions of the historical natural ephemeral wetlands within the land subject to inundation area.

General Recommendations:

Commission further research to document the extent, condition and hydrology of wetlands in the areas of the swamps marked on the Parish Plan, and within areas subject to inundation. Use the Index of Wetland Condition method referred to in action WA28 from the Regional Catchment Strategy. The study should also investigate future options for management of stormwater drainage and retention needs, and reinstatement of ecologically functioning wetlands. Studies should also include the preparation of the conservation management strategy for Hernes Swamp as recommended in the NEROC report, including options for restoration of the flooding regime.

As part of planning for any subdivision in these areas Council should require explicit documentation

[20] Page 20 of the print version of Volume 2 on the CD; full title of the report is Sites of Faunal and Habitat Significance in North East Melbourne by Cam Beardsell for the North East Regional Organisation of Councils.

by an ecologist of the extent of the wetlands, and their condition, and treat them as remnant patches subject to offsetting under the native vegetation controls.

7.5. Continuity of public open space

Objective:

O5	Develop a continuous network of open space along both sides of Taylors Creek, linking to other nearby areas of open space, to be used for recreation and conservation of natural and cultural values

Strategic justification:

This objective is derived from clause 15.10 of the planning scheme (see section 6.1.2 of this report), and is consistent with clause 12.05 of the scheme.

The Mitchell Shire Open Space Strategy (2005) identified "River/Creek" as the top priority for open space improvement identified by household survey respondents (see p 18 of that report).

The Wallan Structure Plan proposes linear open space networks based on existing creeklines with accessibility to the existing urban areas…(p39). It also specifies that the land provided as open space by developers is also to be usable for passive or active recreation purposes and is *in addition to land that is required for drainage, including watercourses, wetlands and associated riparian vegetation*. In terms of development practices it recommends: "Larger public open space areas, developed as multi-purpose corridors that include passive and active recreation opportunities, storm water retention, drainage lines, riparian vegetation, water features and habitat protection."

The Port Phillip and Western Port Regional Catchment Strategy includes objective LO5: "Provide a high-quality network of parks and open space across urban and rural areas managed for community and environmental benefit"

One of the key actions under the heading "Encourage walking and cycling" in the Mitchell Shire Open Space Strategy is to "Secure the routes along the main waterways to provide off-road trails".

Community views:

In the community meeting there was strong support for creating continuous public open space linkage along both sides of Taylors Creek, and land purchase if necessary to create the continuity.

Targets:

Subdivision and development should create a continuous strip of public open space along both sides of the creek that includes all land within the flood prone area (1 in 100 years) and 30 m of the bank of the creek (consistent with The Merri Creek Development Guidelines standard MC4 - Continuous open space).

Gaps in public open space along Taylors Creek between Duke St and Lisa Place filled through plans of subdivision.

Gaps in public open space along Taylors Creek between King St and William St filled through plans of subdivision as they are considered by Council and approved.

Gaps in public open space between along Taylors Creek between William Street and Australis Drive as opportunities allow.

General Recommendations:

Council should require development plans to be consistent with the recommendations for provision of open space in this report.

Consider land acquisition to achieve this corridor where existing lots are unlikely to be subdivided. Such purchase would also reduce the risk of flooding (and the likely cost of later legal liability) for those properties involved. Land purchase to consolidate the corridor was popular in the community consultation.

7.6. Interface with development

Objective:

O6	Development adjacent to Taylors Creek provides a positive, visually attractive and safe interface with open space along the Creek.

Strategic justification:

Clause 15.10 of the planning scheme states that "Planning and responsible authorities should ensure that land use and development adjoining regional open space networks, national parks and conservation reserves complements the open space in terms of visual and noise impacts…"

Standard C13 in Clause 56 of the planning scheme requires that land supplied for public open space "should be related to the street and lot layout in a manner that promotes personal safety and surveillance of users of the public open space from streets along public open space boundaries".

Community views:

Participants in the community workshop were interested in improving the interface between housing and the Creek and saw back fences facing the creek as a bad outcome and houses facing the reserves as a desirable outcome. There was also strong support for creating a natural looking creek and revegetation.

Targets:

All new subdivisions incorporate measures to ensure that housing faces the open space along Taylors Creek

Landscaping of the open space allows for passive surveillance of open space usage

Landscaping creates a natural-looking Creek.

General Recommendations:

Council prepare a landscape plan for open space along Taylors Creek with more detailed designs for reaches of the Creek that would achieve the above objectives.

The Environmental Significance Overlay include objectives which would help achieve the targets above.

7.7. Access

Objective:

O7	To provide good and safe access to open space along Taylors Creek from surrounding residential areas, but prevent unauthorised vehicular access.

Strategic justification:

Consistent with clause 12.05 and standard C13 in clause 56 of the planning scheme,

Merri Creek Development Guidelines Access Objective and Standard MC6 are consistent with this objective

Melbourne Water guidelines for approval of constructed paths (Melbourne Water 2002) seek to ensure path user safety in flood conditions; the preferred path location is above the 1 in 10 year flood line.

Community views:

Participants in the community workshop were interested in a continuous trail along Taylors Creek, linking to key local features such as the Wallan Primary School, Wallan town centre, to the Northern Highway at Taylors Lane, and with bridges to allow crossing of the creek.

Targets:

Open space along Taylors Creek is fenced to exclude unauthorised vehicle access.

Bollarded entry points are provided with walking or shared pathway links to the Taylors Creek trail.

Public access entry points to parkland along Taylors Creek are spaced no more than 300m apart.

Footbridges are provided across the Creek where this would significantly improve access.

Linkages are provided to major destinations such as the Wallan Primary School, and Wallan Recreation Reserve.

Paths are located above the 1 in 10 year flood line.

Small Local and Large Local parks are strategically located along the corridor but outside the 30m buffer area and outside the floodway overlay. Spacing of these parks along the waterway meets as far as possible Standard C13 of the planning scheme – ideally small local parks would be spaced no more than 300m apart, and large local parks no more than 500m apart. This might be most efficiently achieved by alternating a small local park and a large local park every 250m along the waterway. Ideally these would be located to be easily accessible from residential areas on both sides of the Creek to maximise the number of residences served by the parks' 300m and 500m walking distance catchments.

The Planning Scheme gives little guidance as to what constitutes a Large Local Park or a Small Local Park, except that a Large Local Park is larger than 1 hectare. The Mitchell Shire Open Space Strategy recommendation 'ensure there is a social family recreation space or playground within 500 metres of each household in urban centres and in each village or rural hamlet' perhaps equates to a Large Local Park in the planning scheme.

The Wallan Local Structure Plan specifies that developers are expected to provide 12% open space, that the land provided as open space is also to be usable for passive or active recreation purposes and is *in addition to land that is required for drainage, including watercourses, wetlands and associated riparian vegetation*.

For the purpose of this strategy a Small Local Park should include at least 0.25ha of open space outside but abutting the 30m waterway buffer, adding up to at least 0.5ha contiguous open space undivided by roads or the Creek (unless the Creek is bridged). A small local park will include at least seating and a through path. Landscaping should use indigenous species, excepting turf areas, which should be outside the 30m buffer.

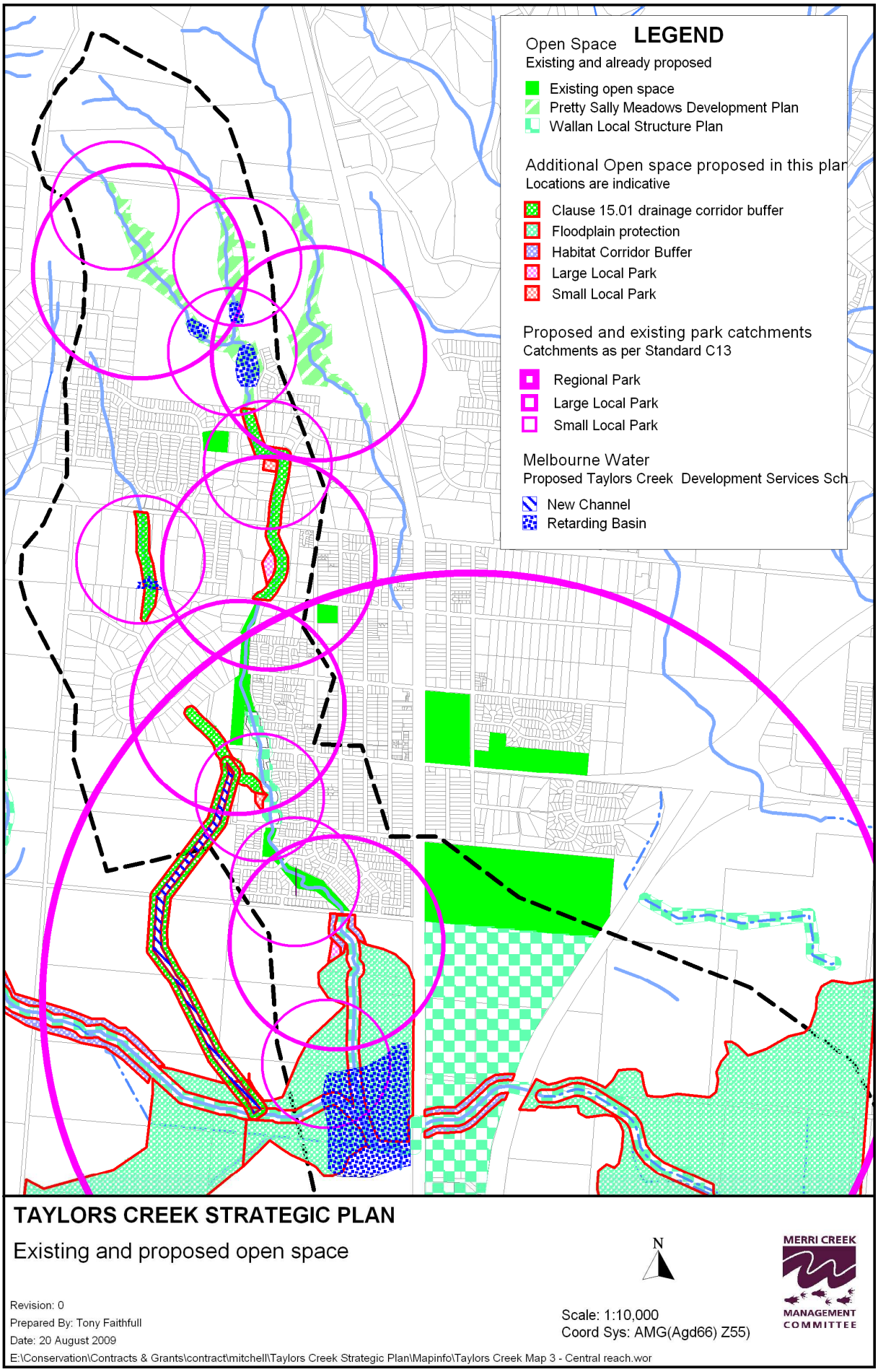
For the purposes of this strategy a Large Local Park should include at least 0.5ha of open space outside but abutting the 30m waterway buffer area, adding up to at least 1.0 ha contiguous open space undivided by roads or the Creek (unless the Creek is bridged). A Large Local Park will have a social family recreation space or playground with seating and shelter, linked by paths upstream and downstream, and to both sides of the Creek. Landscaping should use indigenous species, excepting turf areas which should be located outside the 30m buffer.

The Wallan Structure Plan identifies the area between the Hume Freeway and the Northern Highway south of Green Hill as the location of a major new open space which would qualify as a Regional Park under Standard C13 of the Planning Scheme.

General Recommendations:

The objective and targets for access be incorporated into open space planning for Taylors Creek.

Small local and large local parks are located along Taylors Creek to provide at least the coverage indicated on Map 1 below.



Map 1 – Existing and Proposed Open Space

The circles represent approximate catchments for small local parks, large local parks and regional parks as defined in Standard C13 in Clause 56 of the planning scheme.

7.8. Recreation

Objective:

O8 To provide for recreation and play, informal sport, social interaction and peace and solitude, uninterrupted by formal sporting facilities, and to link these opportunities with walking and recreational cycle trails.

Strategic justification:

The range of recreation types is consistent with clause 12.05 of the planning scheme.

Linkage with walking and cycle trails is consistent with clause 15-10 of the planning scheme.

One of the key actions in the Mitchell Shire Open Space Strategy is to encourage walking and cycling.

These recreational uses are consistent with the Wallan Local Structure Plan

Community views:

Participants in the consultation workshop supported walking and cycling pathways along the creek, rest and picnic areas, although the prioritization exercise indicated more support for spending on shared pathways than for playgrounds or picnic facilities.

Targets:

A Taylors Creek trail follows the entire length of the publicly owned parts of Taylors Creek.

A diverse range of recreation opportunities are provided by Taylors Creek, but any active sporting areas are outside the 30m buffer area. Opportunities (drawn from the Mitchell Shire Open Space Strategy) include:

- Family recreation space or playground in each large local park (one of which should be within 500m of each residentially zoned household in Wallan).
- Opportunities for adolescents (especially females) to be active as well as just "hang out", in safe, observable open spaces.
- BMX dirt jumps located outside the 30m buffer in areas where they will not impact on safety, conservation values and amenity
- Open space designed to appeal to older adults, and to allow them to feel they belong, without being concerned about their safety.
- Additional facilities such as seating and particularly at hubs, toilets.
- Disabled access for at least part of the Taylors Creek trail.

General Recommendations:

Incorporate objectives and targets for recreation into open space planning for Taylors Creek.

7.9. Native Flora and Fauna

Objective:

O9 Protect and enhance flora and fauna and habitat values

Strategic justification:

This objective is consistent with:

- Planning Scheme Objective 15.01-1 "To assist the protection and, where possible, restoration of catchments, waterways, water bodies, groundwater, and the marine environment". The

clause includes "encouraging the retention of vegetated buffer zones at least 30m wide along waterways to maintain …stream habitat and wildlife corridors…"

- Standard C12 in clause 56 of the planning scheme which states that landscape designs should "protect and enhance any significant natural and cultural features"
- Clause 52.17 of the planning scheme (Native Vegetation).
- Port Phillip and Western Port Regional Catchment Strategy objective BO1: "Achieve a net gain in the quantity and quality of indigenous vegetation".
- Port Phillip and Westernport Native Vegetation Plan strategic directions 1 to 4.
- Mitchell Shire Environment Strategy Land Aims and actions including 1.28 and 1.30.

Community Views:

Participants in the consultation workshop indicated support for lots of revegetation along Taylors Creek. The prioritization exercise listed revegetation amongst the four high scoring areas for spending.

Targets:

A net gain in quality and quantity of indigenous vegetation along Taylors Creek.

Native vegetation extends at least 30m either side of Taylors Creek where possible.

Landscapes in adjoining properties use indigenous species.

Faunal habitats are protected and enhanced.

General Recommendations:

Implement this objective and targets as part of subdivision and open space planning.

Studies are needed to improve understanding of faunal occurrence in the area.

7.10. Habitat corridors

Objective:

O10 Establish Taylors Creek as part of a habitat corridor network around Wallan

Strategic justification:

This objective is consistent with:

- The Port Phillip and Western Port Regional Catchment Strategy objective BO4 is to improve the connectivity and long-term security of indigenous habitats and species.
- Standard C12 of the planning scheme which states that landscape designs should "Protect and link areas of significant local habitat where appropriate"

Community views:

This was not directly assessed in the community workshop. Support was shown by some participants in having continuous revegetation along Taylors Creek, others simply for revegetation (without it necessarily being continuous). .

Targets:

Habitat becomes continuous along Taylors Creek and links at the top of the catchment to Old Sydney Road and at the bottom of the catchment to Hernes Swamp, as well as along Strathaird Creek.

Open space reservation and revegetation north of Australis Drive along both branches of Taylors Creek link north-west to the habitat corridor along Old Sydney Road.

Road crossings of the creeks are minimised, and where there are crossings, culverts are suitable for wildlife movement.

General Recommendations

Establish revegetation strategy for the Creek as part of the recommended landscape plan to achieve this objective as well as the native flora and fauna objective.

7.11. Weeds

Objective:

O11 Weeds are controlled to enhance indigenous vegetation, habitat and landscape values.

Strategic justification:

This objective is consistent with:

- The Catchment and Land Protection Act requirements of landowners (section 26)
- The Port Phillip and Western Port Regional Catchment Strategy Objective LO2 "Protect and improve the health of the land" and Target LT4 "No establishment of 'new and emerging' weed species, and no further spread of 'high-priority established' weeds."
- The Mitchell Shire Council Plan "To strive to be a leader in environmental practice and a custodian of our local natural resources that is committed to preserving and enhancing the Shire's natural and built environmental assets through: … continuing to promote sustainable land use through best practice and environmental standards, …protect and rehabilitate Councils environment and bushland reserves.

Community views:

Weed control did not rate highly as a specific activity, but was treated as a fundamental component of creating a more natural creek and revegetation, both of which were strongly supported in the community workshop.

Targets:

No establishment of 'new and emerging' weed species.

No further spread of 'high-priority established' weeds.

Off-target damage during weed control <1%

General Recommendations:

Council use best practice in control of weeds.

7.12. Visual character

Objective:

O12 Taylors Creek should be an attractive landscape based on the use of local native (i.e. indigenous) plant species and incorporating and protecting natural features.

Strategic justification:

This objective is consistent with:

- Standard C12 in clause 56 of the planning scheme which states that landscape plans should amongst other things
    - Create attractive landscapes that visually emphasise streets and public open spaces.
    - Promote the use of drought tolerant and low maintenance plants and avoid species that are likely to spread into the surrounding environment.
- Objective BO1 of the Port Phillip and Western Port Regional Catchment Strategy: "Achieve a net gain in the quantity and quality of indigenous vegetation"
- Action 1.28 from the Mitchell Shire Environment Strategy: "Use indigenous flora species for

revegetation works"

- One of the main actions in the Mitchell Shire Open Space Strategy which is to "Protect natural features".

Community views:

Participants in the community meeting expressed strong support for a landscape based on revegetation with local species. Two of the four high-scoring areas for spending were "Creating a natural looking Creek" and "Revegetation".

Targets:

See targets for Flora and Fauna, and Interface with Development.

Litter and graffiti are promptly removed.

General Recommendations:

Implement this objective and targets as part of subdivision and open space planning.

7.13. Development practices

Objective:

O13 Improve development practices to protect and enhance Taylors Creek

Strategic Justification:

This objective is consistent with:

- The Mitchell Shire Council Plan "To strive to be a leader in environmental practice and a custodian of our local natural resources that is committed to preserving and enhancing the Shire's natural and built environmental assets through:…continuing to promote sustainable land use through best practice and environmental standards"
- The Mitchell Shire Urban Stormwater Management Plan 2002 which identifies as a key threat: "Residential development (i.e. subdivision works) and Building site runoff (lot scale) pose a high threat, particularly due to poor site management practices, sedimentation and littering, such as appears in the south of the town [i.e. Wallan]."
- Many clauses of the planning scheme (see section 6.1.2 of this report).
- The Mitchell Shire Environment Strategy land and water aims and actions (see section 6.1.9 of this report)

Community views:

No specific questions were asked of participants at the community meeting about development practices, however concern about erosion was expressed, and a desire to see litter traps, and curb and channel water sensitive urban design used.

Targets:

Standards C12 and C25 of the planning scheme is met,

EPA guideline No. 275 'Construction Techniques for Sediment Pollution Control' is adhered to,

Litter is controlled during development,

Water-sensitive urban design is incorporated in all new subdivisions,

Fill dumping is monitored and laws enforced.

General Recommendations:

Council improve its monitoring and enforcement of developers' practices.

7.14. Community ownership

Objective:

O14	Increase the capacity and participation of people and organisations in management of Taylors Creek

Strategic justification

This objective is derived from objective PO2 from the Port Phillip and Western Port Regional Catchment Strategy.

It is consistent with:

- The Mitchell Shire Council Plan "To strive to be a leader in environmental practice…through:…continuing to support Landcare, Friends of, Environment Groups and Committees of Management".
- The Mitchell Shire Environment Strategy community aims "Increased community involvement and consultation in regard to programs and strategies concerning the natural environment" and "Increased awareness and involvement in environmental management of the Shire's landholders, residents, workers, local business and industry and visitors"

Community views:

Interest was expressed at the community meeting in the formation of a friends group for Taylors Creek, or expansion of the scope of the Friends of Wallan Creek to cover Taylors Creek also.

Targets:

An identified community group is an advocate for Taylors Creek.

Regular activities involve the community in parkland development.

Concept planning for Taylors Creek includes community consultation.

General Recommendations:

Encourage the formation of a Friends of Taylors Creek group, or extension of an existing group to cover Taylors Creek.

Encourage and support the Wallan Primary School and any other relevant community group to adopt Taylors Creek.

Council facilitate planting and other activity days with community groups and the wider community.

7.15. Aboriginal Heritage

Objective:

O15 Protect Aboriginal Cultural Heritage

Strategic justification

No information was located to indicate the presence of Aboriginal Cultural Heritage sites along Taylors Creek. However the Aboriginal Heritage Act 2006 and Aboriginal Heritage Regulations 2007 require that land within 200m of a waterway be treated as areas of cultural heritage sensitivity unless they have been subjected to significant ground disturbance. Taylors Creek is not shown on published maps of Aboriginal heritage sensitivity[21], however these note that:

> "Users should note that the information represented is derived from sources at map scales ranging from 1:250 000 (eg for geological features) to 1:100 000 or better (eg for streams). The precision with which areas of cultural heritage sensitivity are mapped will vary according to the available data source. Any critical decision about the likely cultural heritage sensitivity of an area should not rely solely on the mapped information, but should be made following reference to the Aboriginal Heritage Regulations 2007"

The Act prescribes in regulations the circumstances in which a Cultural Heritage Management Plan will be required for certain types of development or activities in areas of cultural heritage sensitivity.

Community views:

No views were expressed or sought on this matter at the community meeting.

Targets:

All developments within 200m of Taylors Creek include a Cultural Heritage Management Plan unless a detailed look at the Act and Regulations indicate that none is required.

General Recommendations:

Include Aboriginal Cultural Heritage Protection as an objective of an Environmental Significance Overlay on Taylors Creek.

7.16. Geodiversity

Objective:

O16 Protect areas of geological and/or geomorphological significance

Strategic justification

No information was located to indicate the presence of sites of geological or geomorphological (geodiversity) significance along Taylors Creek, however little or no study has been carried out. The three eruption points adjacent to Taylors Creek (Pretty Sally, Springs Hill and Green Hill) are potential sites of geodiversity significance at least locally, and one (Sprints Hill) is recognised as being of Regional significance (MCMC 2009).

Community views:

No views were expressed or sought on this matter at the community meeting.

Targets:

All streams in areas of new or potential development are assessed for their geodiversity value.

General Recommendations:

Include Geodiversity protection as an objective of an Environmental Significance Overlay on Taylors Creek.

[21] http://www.aboriginalaffairs.vic.gov.au/web7/rwpgslib.nsf/GraphicFiles/t7823/$file/t7823.pdf viewed 18/8/2009.

8. Current conditions and management

The current study included a general investigation of native vegetation values present along Taylors Creek, but did not include investigation of the extent or condition of wetlands, water quality, bank stability, or hydrology of the Creek. Melbourne Water may have investigated these matters as part of its drainage strategies. However, from a casual inspection of the Taylors Creek it is clear that it is in very poor condition. Serious erosion is evident in the upper and middle reaches. Pollution is visible where water pools, and some of the residential development in the vicinity of Pretty Sally Drive suggests that sufficient attention has not been paid to maintaining the hydraulic capacity of the Creek.

Certainly the native vegetation of Taylors Creek has been extensively damaged, with only small patches remaining. Destruction has resulted from clearing, grazing, draining of wetlands, erosion, and then in some areas by urban development.

8.1. Native Vegetation

8.1.1. Survey method

Vegetation cover in the catchment was inspected on three dates in 2007: 10th October, 5th December and 13th December. Approximately 3km of the creek was able to be inspected directly, 1km was inspected from outside boundary and Google Earth and 2 km inspected only on Google Earth. The approach for each of these areas is described in Table 1 below.

Survey class	Approach
Sites where access is permitted	1. Where vegetation quality appears to exceed 10% indigenous vegetation, map area and provide a species list and an indigenous cover estimate, in particular identifying if the vegetation constitutes 'Scattered trees', 'remnant patch' (understorey greater than 25% native or, where groups of trees are present, greater than 20%), or 'degraded treeless vegetation' according to DSE (2007) *Native Vegetation Guide for assessment of referred planning permit applications.* 2. The smallest mappable unit will generally be 10mx10m. 3. Highlight presence of species with official significance categories. 4. Where vegetation is less than 10% indigenous, identify indigenous species present and indicate extent on map using property boundaries etc. Identify predominant vegetation species noting planted species where these are likely to lead to confusion with indigenous species.
Sites where permission not given but where visual assessment is possible from public land	1. Where possible, assess presence/absence of indigenous vegetation, estimate a cover percentage. 2. Identify dominant species (exotic or indigenous). In particular identify indigenous tree species.
Sites where access is denied and visual assessment is not possible from public land	1. Use Google earth aerial photographs and attempt to identify main vegetation types 2. Attempt to estimate the vegetation type based on accessible examples with similar aerial photographic characteristics.

Table 1: Approach used for vegetation survey

Indigenous and exotic species within the areas surveyed were recorded, along with prevalence and priority for removal (for weed species). A summary of indigenous species present at sites is included as Appendix 2 to this report. A summary of non-indigenous plant species present arranged by priority for control as weeds is included as Appendix 3. Maps of the sites inspected and detailed records for each site are included as Appendix 4.

Existing Ecological Vegetation Class mapping prepared by Department of Sustainability and Environment (DSE 2005) (including remnant vegetation mapping and the broad reconstruction of 1750 EVCs across the region) was examined. The surveyed indigenous vegetation and geological mapping were used to create a revised reconstruction of 1750 EVCs (see Map 2).

8.1.2. Vegetation survey results

Seventy-four species of indigenous plants were recorded. Of these, nine were only present as planted specimens and may not match the site's original Ecological Vegetation Class. The provenance of the planted trees (except for recent revegetation) is unlikely to be local. At least two distinct provenances of *Eucalyptus viminalis* (one having a rough bark and the other smooth bark) appear to be present at site TC7 (see section 1.1.1 below). Two of the Victorian native tree species in this list, *Eucalyptus tricarpa* and *Eucalyptus botryoides,* are not indigenous to the study area.

Eighty-nine species of introduced plants were recorded. This includes six species of Australian native plants not found naturally in Victoria and a number of planted tree and shrub species. Not all of these species exhibit a weedy habit, however some are high priority weeds. The priority for control of weedy species is indicated in section 12.2.2 of this report.

Areas subject to vegetation clearance controls

In Victoria native vegetation clearance is managed under the Planning and Environment Act 1987 and municipal planning schemes. In the Particular Provisions, Clause 52.17 requires a planning permit for the removal of native vegetation in a wide range of circumstances and includes decision guidelines. Clause 65 requires that all planning permit and subdivision permit applications consider native vegetation including those not specifically triggered by a permit to remove native vegetation e.g. subdivisions. In the planning scheme, native vegetation is defined as "Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses".

It was not in the scope of this project to map all plants in the study area indigenous to Victoria, but to provide a general overview of the vegetation.

DSE's internal guide to assessing permit applications which include removal of native vegetation[22] specifies that the quality and condition of the native vegetation present on a site must be considered. A significant step in considering the quality is to categorise the vegetation as scattered trees, remnant patch or degraded treeless vegetation. These terms are defined as follows:

> **Scattered trees-** canopy trees within an area where at least 75% of the total understorey plant cover is weeds or non-native plants and the overall canopy cover for a group (ie. Three or more) of trees is less than 20%
>
> **Remnant patch** is:
> - an area of vegetation, with or without trees, where less than 75% of the total understorey plant cover is weeds or non-native plants (bare ground is not included). That is at least 25% of the understorey cover is native, or
> - a group(i.e. three or more) of trees where the tree canopy cover is at least 20%.
> - a wetland.
>
> Vegetation that is not a remnant patch or scattered trees, nor a wetland should be treated as **degraded treeless vegetation.**

The final paragraph in this section of the DSE guide (3.3.1) is of particular relevance to much of the remaining open space along the Taylors Creek that is still grazed:

> "DSE may also treat a site as degraded treeless vegetation if it meets the cover threshold to qualify as a patch but is now dominated by species that are unlikely to have originally dominated the site. This may include such situations as former grasslands that have had a history of cropping, and now have extremely modified cover consisting of a few opportunistic, primary colonising native grass species generally amongst exotic species, with little other indigenous diversity."

During the survey, identification of all areas of vegetation greater than 100m2 which met the above criteria for remnant patch or scattered trees were identified and these are mapped in section 1.1.1 of this report. Only a very small proportion of the areas investigated qualified as either remnant patch or scattered trees. Three small remnant patches and a couple of patches of scattered trees were located

[22] *Native Vegetation Guide for assessment of referred planning permit applications* (Department of Sustainability and Environment, 2007)

north of Wallan (see Map 3). No remnant patches and three small scattered tree patches were located in the middle reach (see Map 4). Only one small remnant patch was located in the lower reach, adjacent to the Northern Highway (see Map 5). Other patches may have been located if access was provided to more properties.

Individual plants that are listed under the Victorian Flora and Fauna Guarantee Act and the Australian Environmental Protection and Biodiversity Conservation Act are also supposed to be protected from removal. No such species were identified during this survey.

Vegetation on the Taylors Creek which qualifies as 'treeless degraded vegetation' may still have native vegetation present. A permit would still be required to clear native vegetation in these areas and the classification does not mean that the area is without value as habitat for fauna. Other attributes to be considered as part of DSE's assessment process[23] include low density indigenous vegetation, revegetation, single indigenous trees and plantings of mature, non-indigenous trees.

For this survey the following attributes of the 'Degraded treeless vegetation' were noted, details for individual sites are included with the site data sheets in section 12.2.5 below and the sites are mapped in section 1.1.1.

- Indigenous colonising grasses on the upper slopes of the catchment (TC 2 & TC 13) are providing protection from sheet erosion and habitat for open country wildlife species such as birds of prey, macropods and parrots.
- grazed paddocks that are dominated by wallaby grasses (*Austrodanthonia)* such as those in TC 2 and TC 13 have been associated with Golden Sun-moths, an EPBC-listed species, at a number of other similar sites in the catchment.
- Indigenous rushes in the creekline and drainage lines are providing effective erosion control and habitat.
- Single remnant indigenous trees (present in TC 20, TC 21 and TC 12) may contribute to habitat corridor function providing stepping-stones in flyways and also hollows for nesting open country fauna such as parrots and kingfishers.
- Mature non-indigenous planted trees in the middle section of the creek (TC 7, TC 8) are providing structural habitat for a wide range of indigenous wildlife as well as visual amenity and shading.
- Recent revegetation carried out in 2007 (TC 19) will rapidly provide substantial habitat and erosion control.

8.1.3. Present vegetation condition

It was not part of the scope of this project to survey vegetation condition, although in most of the catchment native vegetation is clearly in very poor condition. Vegetation condition can be analysed using habitat hectare analysis, or mapped using a more subjective, visually assessed vegetation quality. To some extent the classification of areas as remnant patch, scattered trees or degraded treeless vegetation gives an idea about vegetation condition, and perusal of the detailed site by site species occurrence tables (see section 12.2.5) gives an idea of vegetation condition.

For the purposes of subdivision a much more detailed survey is required, which if the removal of native vegetation is likely will require habitat hectare analysis as an input to a native vegetation removal permit and offsetting calculations.

8.1.4. Ecological Vegetation Classes

Future management of Taylors Creek should include a major revegetation effort. Revegetation should be designed where possible based on an understanding of what the original vegetation was. In Victoria, vegetation types are classified using Ecological Vegetation Classes or EVCs. As part of this project an attempt has been made to map what the original (i.e. pre-1750's) vegetation was, as a guide to revegetation efforts. Design of revegetation works is discussed in more detail in section 8.1.5 below.

[23] *Native Vegetation Guide for assessment of referred planning permit applications* pp. 6-15, Department of Sustainability and Environment (2007)

Existing mapping

In DSE's 1:25,000 mapping of pre-1750s Ecological Vegetation Classes (DSE 2005), two EVCs are mapped for the Taylors Creek catchment; Herb-rich Foothill Forest (EVC 23) in the upper reaches of the catchment and Swampy Riparian Complex (EVC 126) in the lower reaches with a junction zone at roughly the 310-320 m ESL contour line. This boundary also corresponds with that separating the Victorian Volcanic Plains Bioregion and the Central Victorian Uplands Bioregion as mapped by DNRE.

Revised mapping

A revised map of 1750's EVCs was prepared based on remnant vegetation found, geological and soils information and early historical mapping. Further information on the processes used can be found in section 12.2.3 of this report. The revised mapping for the Taylors Creek catchment is shown on Map 2 below.

Bioregional Conservation Significance

The Bioregional Conservation Significance of Ecological Vegetation Classes in the Port Phillip and Western Port Catchment was reviewed in 2007 (PPWCMA 2008). For each of the EVC's which it is thought likely once occurred in the Taylors Creek Catchment, the bioregional conservation status is listed in Table 2. Wet Verge Sedgeland apparently had not yet been rated, but is likely to be endangered like the other wetland EVCs, and should be treated as such until a formal rating is published.

EVC No	EVC name	2007 Bioregional Conservation Status	
		Victorian Volcanic Plain bioregion	Central Victorian Uplands bioregion
22	Grassy Dry Forest	Depleted	Depleted
23	Herb-Rich Foothill Forest	Vulnerable	Depleted
55	Plains Grassy Woodland	Endangered	Endangered
125	Plains Grassy Wetland	Endangered	Endangered
126	Swampy Riparian Complex	Endangered	Endangered
164	Creekline Herb-rich Woodland	Endangered	Vulnerable
932	Wet Verge Sedgeland	Not yet rated	Not yet rated

Table 2 - Bioregional Conservation Status of Ecological Vegetation Classes

The location of the boundary between the Victorian Volcanic Plain Bioregion and the Central Victorian Uplands Bioregion has been mapped by DSE and is shown on Figure 11 above. This boundary was mapped at a scale of 1:250,000. For use at the much finer scale which is appropriate for examination of the Taylors Creek Catchment the boundary probably needs re-interpretation. Arguably the Victorian Volcanic Plain Bioregion should extend up the tongue of volcanic geology which was formed by lava flows south from Pretty Sally.

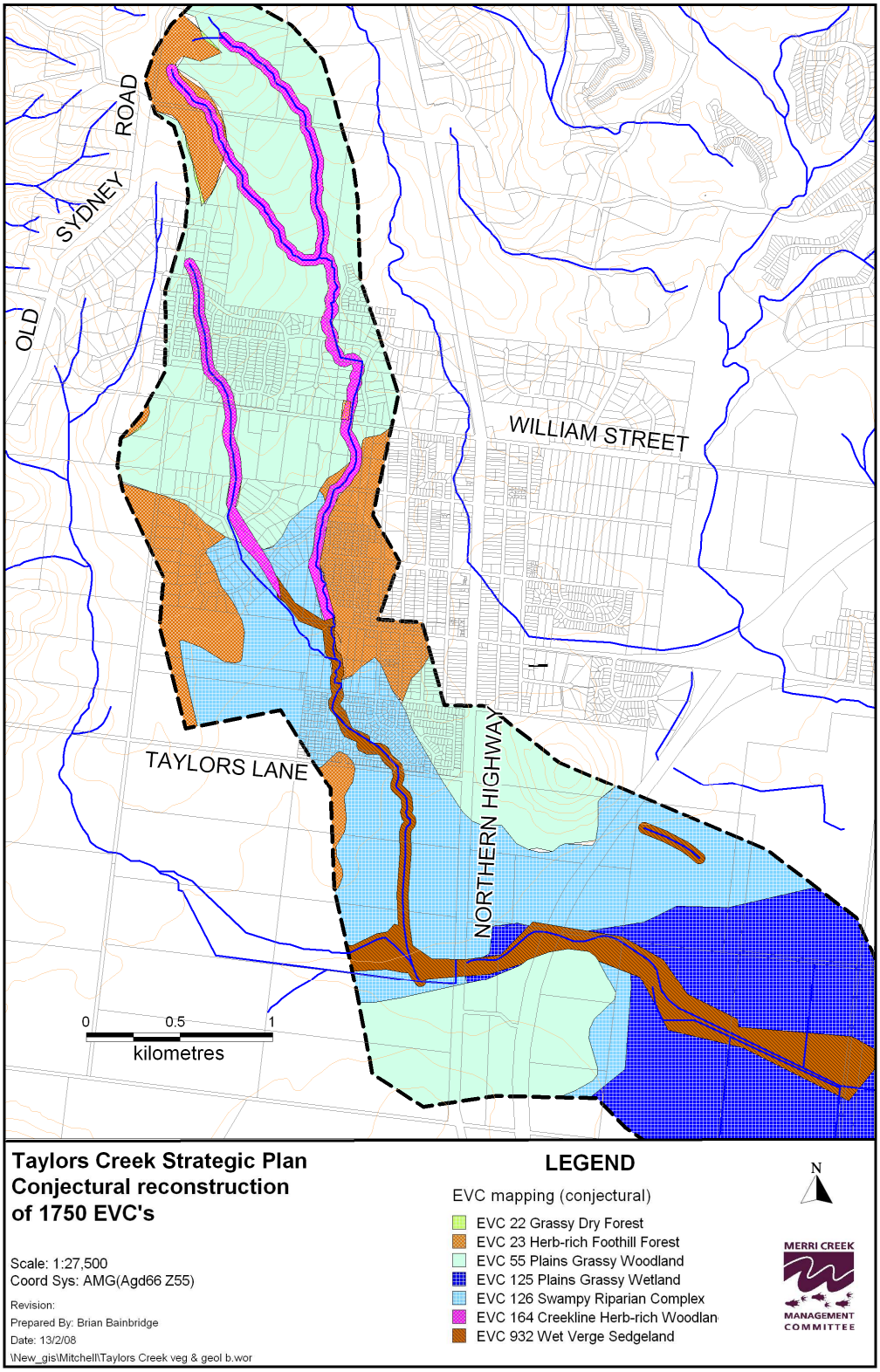
8.1.5. Revegetation options in areas with changed drainage

Objectives 1,2,9.10 and 12 in this plan require significant areas of Taylors Creek to be revegetated. Revegetation efforts should use plants which are indigenous species grown from seed or cutting material of local provenance, and should seek to establish viable communities modeled in part on the original vegetation thought to occur, but modified to suit changed conditions.

Much of the lower part of Taylors Creek has had extensive changes to its drainage regime due to channelisation of the creek and drainage of swamps. In the less developed reaches these changes may be partly reversible with carefully designed restoration projects. Such projects are likely to involve earthworks to re-establish regular wetting of swamps or to retard flows in stream channels. Without these works or in areas where for practical purposes the changes are irreversible, species selection should not attempt to automatically re-establish pre-1750s EVC vegetation. Species selection should be mediated by experience with current day conditions in areas where re-establishment of former drainage conditions cannot occur.

The process for compiling species lists for revegetation in the Taylors Creek open space should include:

- Locate and identify the most intact remnants in the Taylors Creek vicinity. Observe and utilise indigenous species that are persisting in the current conditions. Consider whether the remnant has survived the widespread changes leading to current conditions or is occupying a remnant of the previous conditions (eg. the ditches along the Northern Highway retain species that were probably widespread in the surrounding landscape that would not survive in the current drained conditions). The species lists generated as a part of this report provide a beginning.
- Using Map 2 below tempered by actual species occurrence at the site, choose an EVC likely to have originally occurred at the site.
- Identify and select from the more dry-adaptable species from the relevant EVC benchmarks to provide replacements for species where wetter conditions cannot be re-established and for the increasing frequency of drought conditions and likely drying resulting from global warming.
- Attempt to re-establish the original EVC but for species that have become unsuitable substitute species of similar life form (eg. substitute *Themeda triandra* for dry-sensitive *Poa labillardierei*)
- Select and plant species from different EVCs from the local area that are likely to survive in the current drainage conditions and which would be in keeping with the landscape character of the former EVC. Eg. benchmarks for Plains Grassy Woodland EVC may be a goal to follow in areas formerly holding Swampy Riparian Woodland.



Map 2 – 1750's Vegetation
(Conjectural reconstruction of 1750 Ecological Vegetation Classes)

8.2. Wetlands

The Parish of Merriang Plan (see Figure 17), Plan 376(a) held in the State Library of Victoria shows the courses of the creeks, and the extent of wetlands shortly after settlement. Taylors Creek joined Merri Creek in Hernes Swamp, east of the present day Hume Freeway. Between the Freeway and the Northern Highway (called "Main Sydney Road" on the plan) was a smaller swamp called here McAde's Swamp after the first purchaser of the land according to the parish map. Remnants of McAde's Swamp remain within the east side of the Northern Highway road reserve, and possibly in private land further east. A third swamp was fed primarily by Strathaird Creek prior to Strathaird Creek's confluence with Taylor's Creek. It is called here Hanna's Swamp after the first purchaser of the land (according to the parish map). The small remnant of McAde's Swamp within the Northern Highway Road Reserve (see Photo 1) gives a good idea of what the three swamps might have looked like prior to being grazed and drained.

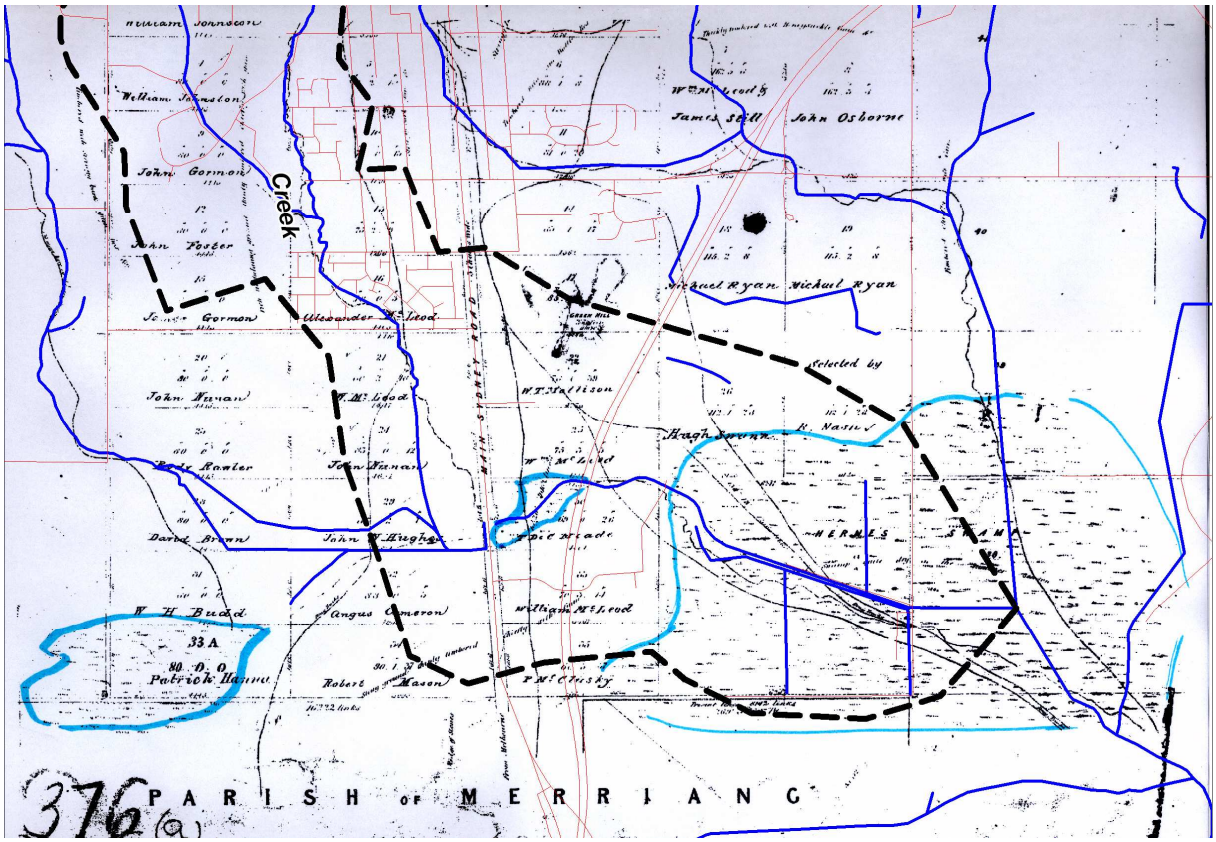


Figure 17 – Parish Plan of Merriang
Note locations of swamps (highlighted in pale blue). Plan is not dated, but is likely to date from soon after European settlement, probably before 1856. Present day roads are overlaid in red, and present day creeklines in dark blue. Taylors Creek Catchment boundary shown dashed in black.

The Australian Environment Protection and Biodiversity Protection Act defines wetlands as in the RAMSAR Convention definition of wetlands as:

"areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres"

The boundaries of the wetlands as they exist today were not investigated in this study, and as permission to access the private land was not received. It is important to note that the dryness which has characterised the swamp lands over the last few decades does not of itself disqualify them from being considered wetlands, as accepted definitions include temporary areas of water. That the area of the old swamps is largely covered by Land Subject to Inundation Overlays in the planning scheme identifies them as being flood prone and strongly suggests that they still function as wetlands.

Photo 1. A remnant of the former McAdes Swamp east of the Northern Highway on Taylors Creek
The main species visible is Tall Sedge (*Carex appressa*). Vegetation here matches the recently described EVC Wet Verge Sedgeland.

8.3. Weeds

Weeds and their priority for control are listed in the table in section 12.2.2 of this report. Weed control should be undertaken in a way which minimises the damage to remnant or planted vegetation, and is effective (see the next section on Gorse control). Appropriate specifications and specialized staff are required to do this well.

8.3.1. Gorse control

During the course of fieldwork for the project many observations were made of recent gorse control work. A non-selective herbicide (probably Roundup) had been used to spray gorse plants, apparently using a high pressure hose from a rig. This approach to Gorse control has a number of disadvantages:

The non-selective herbicide also kills any indigenous vegetation present (and there were signs of damage to remnant native grasses, particularly *Microlaena stipoides* see Photo 2)

By killing all vegetation in the vicinity of the gorse plants, a bare seedbed for gorse seed germination was prepared, rather than other vegetation preventing seedling growth and competing with any gorse seedlings (and there were clear signs of enhanced gorse seedling growth in the bared patches see Photo 3)

Other weed species which germinate best in bare ground (e.g. thistles, but a wide range of other weeds) will be advantaged by the creation of the bare patches.

Where extensive sections of creek bank have been sprayed (and this was the case north of Watson Street, where the Creek banks are currently in relatively good condition see Photo 4 and Photo 5), the bared soil will be significantly more prone to erosion. Bank erosion is already a severe problem on the Creek, and the reason this section has not eroded so far may be the presence of tough indigenous reedy vegetation.

Photo 2. Recent Gorse control has killed off indigenous grasses.

Photo 3. Recent Gorse control has created bare patches in which new Gorse seedlings are establishing well.

Photo 4. Recent Gorse control has killed off all riparian vegetation, indigenous rushes as well as other weeds.

Photo 5. Recent Gorse control

A preferred alternative to use selective herbicides for Gorse control possibly:

Garlon 600 (triclopyr 600g/L present as the butoxethyl ester) at 1:625 where there is no chance of spray getting into the waterway, preferably using a backpack where infestations are not too extensive or

Esteem WDG (Metsulfuron Methyl 600g/kg) at 0.75g/5L, preferably using a backpack where infestations are not too extensive and especially where spraying close to water.

Care must always be taken to ensure spray does not drift or leach into the waterway.

9. Community Consultation

Community consultation included a community meeting held in Wallan on 20 November 2007 to gauge community views. Outcomes of the meeting are detailed in section 12.1 below of this report. Other methods of community consultation included local paper articles, written invitations to community groups to provide input and the provision of feedback forms, but these resulted in no further input.

The results of the exercises at the community meeting indicate a very strong interest in creating a continuous and linked open space corridor along Taylors Creek, a corridor which includes shared pathways, and a revegetated, natural-looking Creek. This interest extended to spending significant funcing on land purchase to consolidate the corridor. A differential rate for Wallan was not explored as a way of paying for this, however Council advised that it should be possible to obtain most of the required creek frontage as part of future developments and rezoning.

Water-sensitive urban design was supported, especially the trapping of litter. Wetlands were suggested in various locations, providing they didn't cost Council much – it was expected that they would be constructed anyway as a result of the Taylors Creek Drainage Strategy. Similarly it was expected that the erosion would be fixed by others (developers and Melbourne Water) and so expenditure on erosion control was a lesser priority, but no-one wanted money spent on piping the Creek. In fact there was strong support for "daylighting" the sections of Creek in pipes (i.e. digging up the pipes and creating a natural-looking creek line). The process of daylighting could also meet one participant's concern that one of these sections had too little capacity to carry floodwater.

Participants were interested in improving the interface between housing and the Creek and saw back fences facing the Creek as a bad outcome, with houses facing the reserves as desirable outcome.

Weed control didn't rate highly as a specific activity, but was treated as a fundamental component of creating a more natural creek and revegetation, which were both strongly supported.

Other things that some participants supported included playgrounds, park lighting, educational/interpretive signage and picnic facilities.

Other outcomes indicated as desirable by participants were identification of significant fauna and flora, identification of management zones, and the creation of an environment significance overlay over the entire length of the Creek.

10. Strategic actions and options

10.1. Reach 1: Headwaters

This reach shown on Map 3 below is north of the government road reserve on the northern boundary of the Spring Ridge Development.

It is currently zoned Farming Zone with a Salinity Management Overlay.

The current land use is grazing, and the Wallan Structure Plan indicates this area is to remain rural.

In this reach management of the 2 main tributaries to Taylors Creek are the landowners responsibility. It is Council's responsibility to monitor their role in the drainage system and to work with the landowner, as the catchment area is less than 60ha. The channels of the tributaries are relatively natural (i.e. not straightened, channelised or piped, although farm dams are present), with few signs of erosion.

Native vegetation adjacent to the Old Sydney Road extends some distance down the western tributary (see photo).

No public access is available and no facilities present.

Recommendations:

1. Apply an environmental significance overlay to include:
   - A minimum 30m buffer extending each side of the waterway (consistent with clause 15.01 of the planning scheme)
   - Areas of scattered trees and remnant patches of native vegetation shown on Map 3
   - Habitat links from the top of the 2 major tributaries to the habitat corridor along Old Sydney Road.
2. Encourage the landowners to fence off the remnant vegetation and waterway buffers and revegetate along the waterways.
3. If at some future date the headwaters area is considered for development, ensure that both tributaries to Taylors Creek are retained and enhanced with a 30m buffer as natural drainage corridors and that they link as habitat corridors to the Old Sydney Road.

10.2. Reach 2: Spring Ridge

This reach includes the land shown on Map 3 south from the Government Road to the boundary of the existing urban area. It includes the area known both as the Spring Ridge Development and the Pretty Sally Meadows Development.

The reach is zoned Residential 1 Zone and has a Development Plan Overlay 1. A development plan (the Pretty Sally Meadows Development Plan) has been approved. The development plan is overlaid into Map 3.

Current land-use is rural, although development has commenced moving north from Pretty Sally Drive. Roads have been constructed, and blocks are for sale but housing construction has not yet commenced.

Management of the two tributaries to Taylors Creek will become Council responsibility when the developer hands over responsibility. From the confluence of the tributaries downstream Taylors Creek becomes Melbourne Water's responsibility. The channels are relatively natural (i.e. no straightening, channelisation or pipes, but farm dams are present), although significant erosion is taking place in

parts.

Three areas of native vegetation were located – two remnant patches and one area of scattered trees – all on the western tributary. The channels are moderately to heavily weed invaded.

No public access facilities along Taylors Creek or its tributaries have been provided at this stage, although they are shown on the Pretty Sally Meadows Development Plan. On the plan a path extends from just north of the existing housing at the south of the reach almost to the northern boundary of reach along the eastern tributary, and roughly halfway along the western tributary.

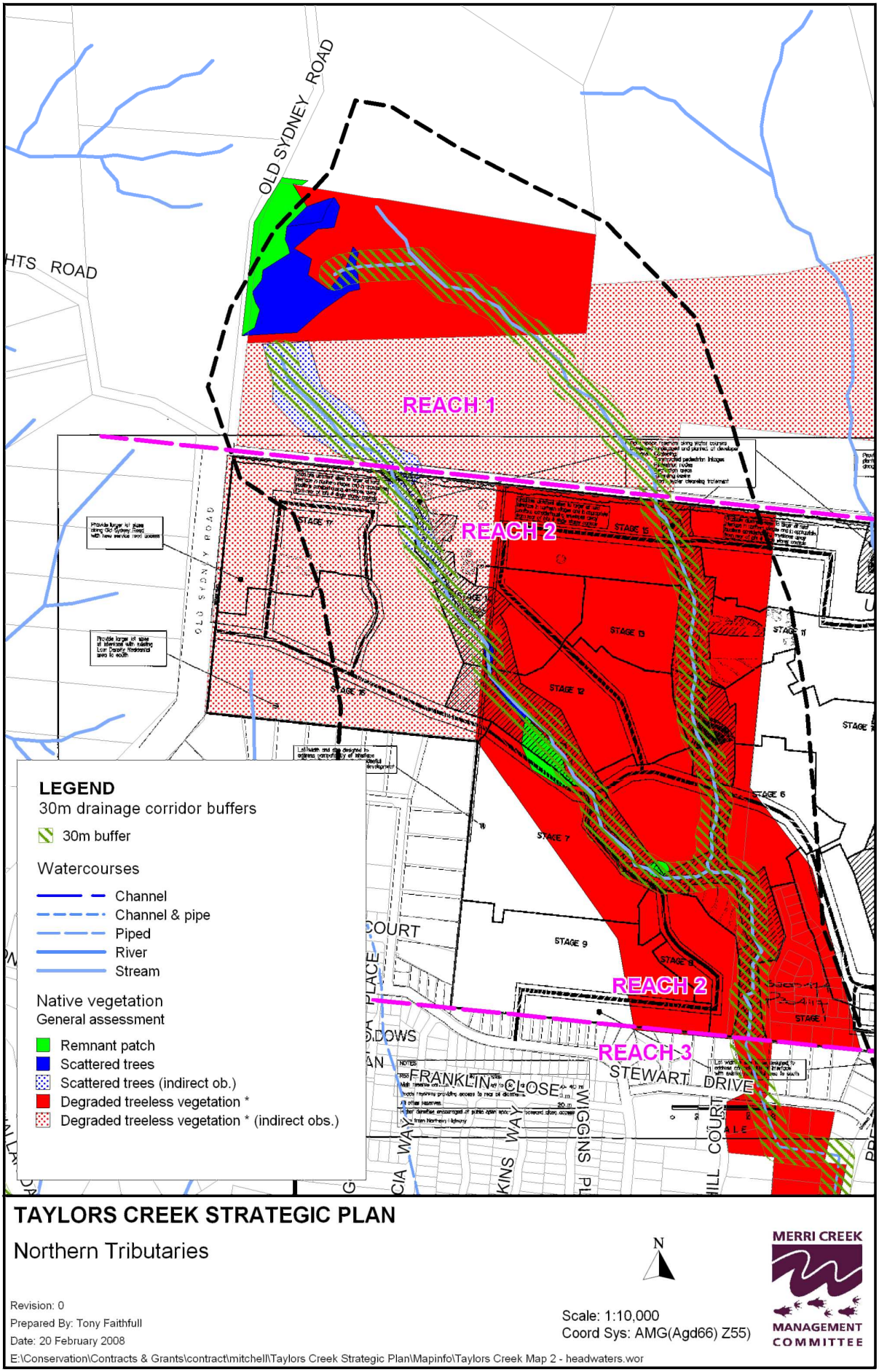
The generally good correspondence between the areas identified for open space on the development plan (which are shown with a black diagonal hatching) and the 30m waterway buffer areas can be seen on Map 3. Some areas of native vegetation identified during field work for this project appear not to be contained within proposed reserves, and would be removed by the works required as part of the subdivision (specifically the road between stages 7 and 12 of the proposed development). It should be noted that the 'degraded treeless vegetation' shown on Map 3 may contain native vegetation sufficient to trigger the native vegetation provisions of the planning scheme. The 'scattered trees' and 'remnant patches' certainly do.

The landscaping guidelines which form part of the development plan were not made available and so were not assessed as to their use of indigenous species and ability to meet the objectives O1, O10, O11 and O12 in this plan.

Two areas to be developed as recreation areas are shown on the Pretty Sally Meadows Development Plan, one just south of the junction of the two tributaries, and one halfway up the eastern tributary. They would qualify as small or large local parks as per Standard C13 in Clause 56 of the Planning Scheme. These are represented by circles on Map 1. No areas to be developed for recreation are shown further along the western tributary.

Recommendations:

1. Work with the developer to avoid destruction of the vegetation, or to minimize its destruction. It is probably in the developer's interest to prepare a property vegetation plan under Clause 52.17-4 of the planning scheme as this would provide the greatest freedom for locating offsets.
2. Encourage the developer to landscape with indigenous species from the appropriate EVC as described in section 8 of this report, and to create a continuous habitat corridor along at least one side (preferably both sides) of the waterways linking towards the Old Sydney Road. Paths and other recreational facilities should be designed to avoid significant interruption to habitat values.
3. As soon as possible apply an environmental significance overlay to the waterways, and zone the parkland PPRZ.
4. Encourage the developer to develop additional small and large local parks along the western tributary roughly in the locations indicated on Map 1.



Map 3 – Taylors Creek northern tributaries
Shows reaches, native vegetation areas, 30m buffer area and the development plan for Spring Ridge.

10.3. Reach 3: Pretty Sally Drive vicinity

This reach extends south from the Spring Ridge development to William Street. It is zoned R1Z and has a Floodway Overlay following Taylors Creek.

The land is already subdivided into largish allotments (around 0.4 ha) and housing built.

Taylors Creek itself has been piped roughly following its original course. No clear overland flow channel has been established and if sufficient rainfall fell to generate flows exceeding the capacity of the pipe, it seems likely that significant property damage may result.

No native vegetation was identified, although access was not available.

No public open space, path or other public recreational facilities are present in this reach.

This reach of the Creek is least consistent with the objectives identified for the strategy (it does not contribute to meeting any of them), and is the most problematic. How it is dealt with depends to a large extent on Melbourne Water and the Taylors Creek Drainage Scheme which is in preparation.

Recommendations

Option 1: Daylight the creek in public open space

1. Council together with Melbourne Water clarify the risk, identify a practical and least-cost location for a re-created open channel for Taylors Creek, together with a 30m buffer either side to be revegetated and managed to "maintain the natural drainage function, stream habitat and wildlife corridors and landscape values, to minimise erosion of stream banks and verges and to reduce polluted surface runoff from adjacent land uses". Council Officers advise that in their opinion Option 1 will not be supported by Council.
2. Identify land which would need to be acquired in order to achieve this end, and apply a Public Acquisition Overlay and a Floodway Overlay in the planning scheme. This is likely to affect approximately 17 properties and would be an expensive and unpopular exercise unless it was done following major flood damage.
3. Eventually zone the acquired land PPRZ (Public Park and Recreation Zone) with an environmental significance overlay.

Option 2: Maintain clear overland flow path

4. After clarifying the risk of flood damage to properties, notify landowners of the risk.
5. Without purchasing the land, work with the landowners to keep obstructions from the route of possible floodwaters.
6. Some earthworks might be required to better define an overland flow channel.
7. Encourage the landowners to work together to plant a habitat corridor using indigenous plant species through their properties. Such a habitat corridor would not necessarily need to follow the alignment of the pipe.
8. Apply an Environmental Significance Overlay to flag the location of the habitat corridor, and ensure the Floodway Overlay accurately identifies the likely path of floodwaters.

10.4. Reach 4: William Street to King Street

This reach extending downstream from William Street to King Street is privately owned in four blocks of around 1.5 ha each.

It is zoned R1Z with a Floodway Overlay following Taylors Creek. Land use is small hobby farms verging on low density residential.

The channel in this reach, while privately owned is Melbourne Water's responsibility.

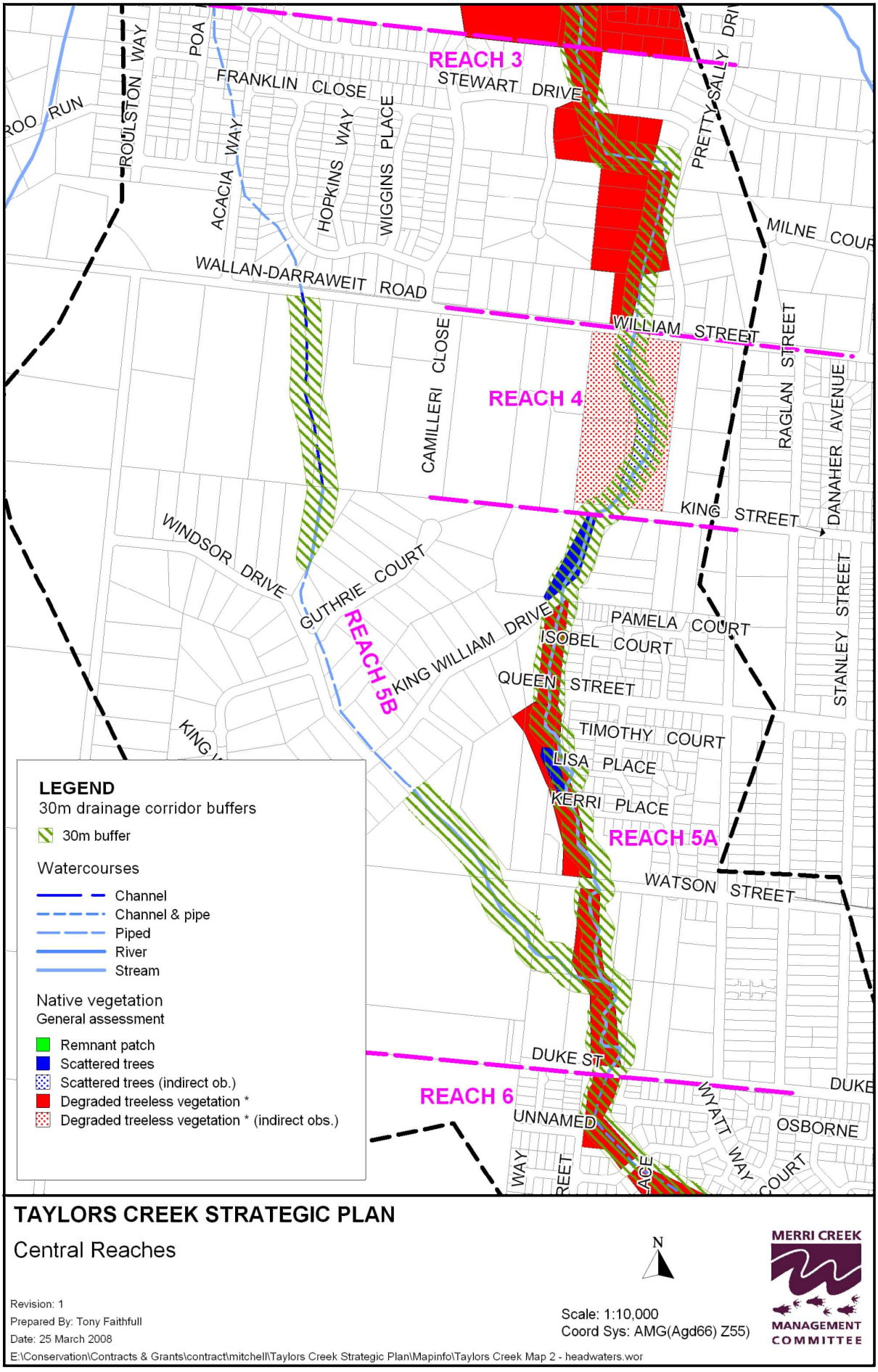
A distinct floodway with many natural features is present. Along it is a vegetated buffer around 5 metres from the Creek. The presence of native vegetation was not able to be assessed because access was not granted, but some of the vegetation along the Creek appears to be native from an examination of Google Earth. It is possible that this section retains the best remnant vegetation along the middle section of Taylors Creek.

Being privately owned this reach has no public access, paths or other public recreation facilities.

It is likely that over the next decades the 4 blocks will be subdivided, but probably at different times by different owners. Creating a coordinated corridor through these blocks will be difficult given the varying proportions of the properties that would be required to be set aside as open space.

Recommendations:

1. Apply an environmental significance overlay to cover the waterway and its 30m buffer to flag the need to protect the Creek, and to ensure that works require a permit.
2. Work with the landowners to encourage them to control weeds sensitively, to retain native vegetation and to revegetate the Creek corridor using indigenous species from the appropriate EVC (see section 8 of this report).
3. Ensure a coordinated corridor of public open space is created along the Creek as subdivision proceeds.



Map 4 – Taylors Creek Central Reach

10.5. Reach 5A: King Street to Duke St (Taylors Creek)

This reach of Taylors Creek shown on Map 4 extends downstream from King Street to Duke Street.

The land is zoned mostly R1Z, with a large area of LDRZ (Low Density Residential Zone) on the west side of the Creek between King Street and Watson Street. Some parkland owned by Council is appropriately zoned PPRZ (Public Park and Recreation Zone) and some, apparently yet to be acquired by Council from the developer is anomalously zoned PCRZ (Public Conservation and Resource Zone).

The reach is undergoing rapid development, with a mixture of recently built houses, semi-constructed subdivisions and rural uses.

The channel in this reach is owned by Council downstream from King Street almost to Kerri Place, but the balance is owned by the developer. Melbourne Water is responsible for this reach of Taylors Creek. It has severe erosion problems with associated safety and water quality issues.

Mature exotic and native trees present in this reach were planted before closer settlement, and although not indigenous should be retained where possible to stabilise the soil and for their landscape value. Some are thought to be dangerously undercut and may have to be removed. Two areas of scattered trees were identified in the surveys and are shown on Map 4. Some small areas of native grassland understorey and reed-beds were present but were too small to qualify as a remnant patch.

In the section just downstream of King William Drive, Willow control has been carried out funded by Melbourne Water in 2007, followed up by a community planting day held on National Tree Planting Day. Species selection and placement in the creek profile could be improved. Further work is planned by Melbourne Water (see section 6.1.6 of this report) including rock beaching around the King William Drive culvert, further Willow control, installation of rock riffles, bank revegetation work and protection of existing vegetation.

A well-formed gravel path follows the east bank of Taylors Creek from King William Drive south to Watson Street. The path is not well-linked to Kerri Place, Lisa Place or Queen Street on the east bank, and only linked via King William Drive to residential areas to the west. Downstream of Watson Street development is not complete and there is no path (at least at this stage).

A playground is located on the east bank of Taylors Creek between Lisa Place and Queen Street. The playground and path together probably count as a local park in terms of Standard C13 Clause 56 of the planning scheme, although the playground is within the 30m buffer mentioned in Clause 15.01 of the planning scheme. One of the circles on Map 1 represents this area as a local park.

Feedback from the community meeting indicated that kids enjoy playing in and around the 'wild' eroded section of Creek amongst the tall trees north of Duke Street.

Recommendations:

1. Ensure the Floodway Overlay on Taylors Creek actually follows the floodway.
2. As development plans are lodged, and subdivisions planned, ensure that at least the 30m buffer from Taylors Creek is identified as parkland and transferred to Council and/or Melbourne Water ownership, is zoned PPRZ and an ESO applied.
3. The PCRZ land should be rezoned PPRZ.
4. During the development plan process open space should also be set aside adjacent to Taylors Creek for small and large local parks consistent with Standard C13 in Clause 56 of the Planning Scheme, and with Map 1 in this report.
5. Ensure the construction of a path in the section between Duke Street and Watson Street, connecting to the existing path north of Watson Street, and which links to new residential areas to the west as well as existing residential areas to the south of Duke Street.
6. Retain Taylors Creek as an open channel, but address the erosion issues along it. Retain as many of the mature trees as possible, but where revegetation is needed, use indigenous species. In the

longer term as the Australian native and exotic trees die, replace them with indigenous trees.

10.6. Reach 5B: 'Windsor Drive Tributary'

This reach includes the length of the tributary named in this report the 'Windsor Drive Tributary' because it flows for part of its length in pipes adjacent to Windsor Drive. It has its headwaters in the north-west of Wallan around Hargrave Court, and meets Taylors Creek some 180m south of Watson Street.

The entire length of this tributary is residentially zoned, either R1Z or LDRZ. Downstream from Silvertop Close a Floodway Overlay follows the tributary (except where it appears to divert from the tributary to follow the Watson Street road reserve).

Land use in the headwaters of this reach is residential (with lots around 800m^2), then between Wallan-Darraweit Road and Windsor Drive small hobby farms, then low density residential (lot sizes around 0.4 ha), and then rural in the lower reaches.

The residential headwaters are piped, however downstream of Wallan-Darraweit Road the tributary flows through the hobby farms in an open channel downstream to the point where it re-enters a pipe to flow through the low-density residential area along Windsor Drive.

The location of the Windsor Drive tributary below the point where it leaves Windsor Drive is confusing. The stream is intermittent and its apparent confluence with Taylors Creek, which is marked by a deeply eroded gully, does not correspond to the location of the Floodway Overlay. The location on Map 4 has been drawn from mapping from Melbourne Water of their assets, but the Floodway overlay is located along the Watson Street road reserve (which is mostly unmade). Google earth shows greener areas in both places (see image to right), suggesting each may be separate tributaries of Taylors Creek.

It would appear that the house south of the southern end of Windsor Drive may be in danger of overland flow from Windsor Drive, which is identified as a floodway through the Floodway Overlay.

Apart from road reserves, land along this tributary is entirely privately owned. Above the point where the tributary first meets Windsor Drive the tributary is the responsibility of Council. Below that point it is the responsibility of Melbourne Water. Melbourne Water's Proposed Taylors Creek Development Scheme proposes to divert the flow of the Windsor Drive Tributary along a new artificial channel south to join Strathaird Creek. According to Melbourne Water, the channel would be contstructed to look 'natural' and be revegetated with indigenous species.

No vegetation survey was carried out along this tributary, or along the proposed route of the new channel, however it appears from an examination of photography available on Google Earth that all native overstorey vegetation has been removed from along the tributary. Native understorey may be present.

The Windsor Drive Tributary has no public open space along it nor any path or recreational facilities. It does not provide high potential as an open space or habitat linkage.

Recommendations:

Downstream of Windsor Drive

1. Investigate the most appropriate location(s) for an open space reserve and floodway on the Windsor Drive Tributary, and if necessary change the Floodway Overlay to reflect this.

2. As development plans are lodged, and subdivisions planned, ensure that at least the 30m buffer from on either side of the tributary is identified as parkland and transferred to Council and/or Melbourne Water ownership, and that it is zoned PPRZ and an ESO applied.
3. Where possible locate other open space adjacent to the route of the proposed new channel to provide enhanced opportunities for linkage, and to provide for additional space for the eventual construction of a shared pathway along the new channel.

Between Windsor Drive and Wallan-Darraweit Road

4. Given the lack of open space linkage, the setting aside of open space along this section of the tributary is a lesser priority, however a reserve should be set aside for drainage.
5. Consistent with the Wallan Local Structure Plan and its support for multi-purpose corridors, and the Standard C13 in Clause 56 of the Planning Scheme requirement for small local and large local parks, at least a small local park should be located adjacent to the drainage line in this reach. (see Map 1)

10.7. Reach 6: Duke Street to Taylors Lane

This reach shown on Map 5 extends downstream from Duke Street to Taylors Lane.

The whole reach is zoned R1Z, with a 25m wide Floodway Overlay following the original course of the Creek (not the present floodway channel).

Land-use is residential with lot sizes around 0.1 ha. Some lots are not yet developed.

In this reach the creek has been piped, with a constructed overland flow channel above the pipe. In places the fill over the pipe has collapsed creating dangerous sink holes. The open space along the Creek is owned by Council, however Melbourne Water is responsible for the pipe and the channel. The view was expressed at the community meeting that the channel was under-capacity in this reach.

Landscaping is with Australian Native trees, few of which are indigenous, but there are some indigenous species growing of their own accord. Some small areas of indigenous understorey are present, however Gorse spraying is killing the indigenous grass species present and removing groundcover making the ground more susceptible to erosion.

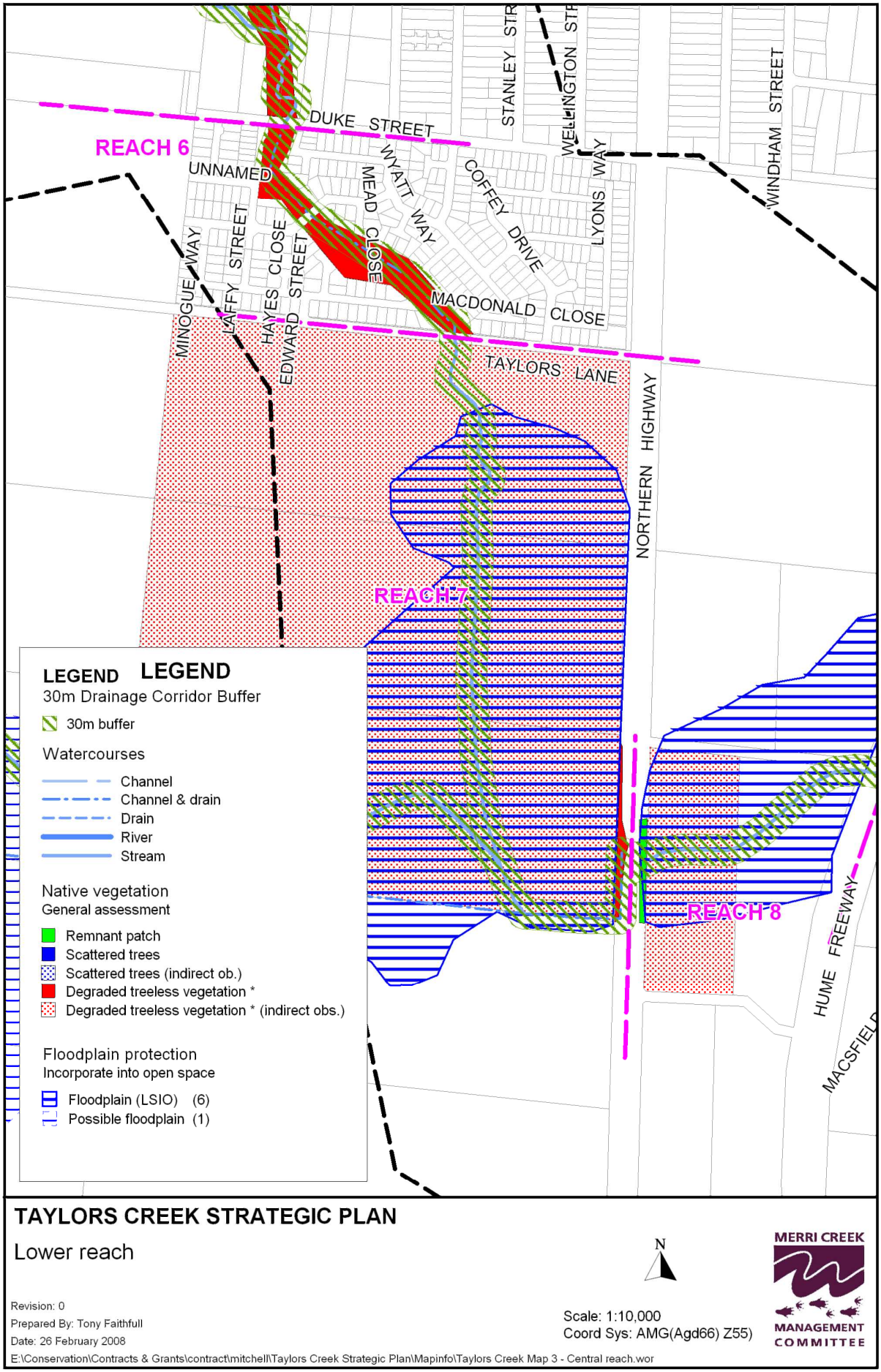
The drainage corridor set aside along Taylors Creek is narrower in places than the 30m buffer described in Clause 15.01 of the planning scheme, but substantially retained.

Feedback from the community meeting was strongly in favour of daylighting this section of Creek – that is digging up the pipe and re-creating a naturalistic channel.

A gravelled track approx 1.5m wide follows the corridor from Almond Avenue to Taylors Lane.

Recommendations:

1. Zone all of the Creek corridor parkland PPRZ. Apply an ESO to the corridor and realign the FO to follow the actual flow channel.
2. Design and cost works to daylight the Creek in this section, increase its capacity if this is needed, and including major revegetation works to stabilise the new channel.
3. If daylighting the Creek is not to be carried out, the sink-holes need to made safe.
4. Upgrade the existing gravelled track, and extend it north from Almond Place to connect to a path to the north of Duke Street.
5. Manage the slightly wider section of the corridor near Parsons Place as a Small Local Park (as per Standard C13 of the Planning Scheme).



Map 5 – Taylors Creek Lower Reach

10.8. Reach 7: Taylors Lane to Northern Highway

This reach extends south east from Taylors Lane to the Northern Highway. It is zoned Farming Zone but is within a growth area identified in the Wallan Local Structure Plan, and so is expected to be rezoned to a residential zoning to enable the new development. The whole area has a Salinity Management Overlay, and the slopes to the west of Taylors Creek have an Erosion Management Overlay. Taylors Creek itself has a Floodway Overlay, and there are extensive areas identified as being part of the floodplain by the Land Subject to Inundation Overlay.

The current land use is rural, with the land used for grazing.

Parts of the channel nearest to Taylors Lane appear to be the original course of the Creek, however an artificial channel diverts water west of the original channel to meet Strathaird Creek further west than it would have originally. A rough idea of the original course can be gained from the Parish Plan shown in Figure 17 above. The course of Strathaird Creek has also been highly modified, to channel water away from Hanna's Swamp.

Taylors Creek is privately owned in this reach but its management is Melbourne Water's responsibility.

Some remnant vegetation is present along Taylors Creek, however landowners permission was not obtained for entry, and was not examined on the ground in this project. Meinhardt Infrastructure and Environment (2009) identified the 230m south from Taylors Lane as Swampy Riparian Complex, endangered in the Victorian Volcanic Plains bioregion. The Northern Highway road reserve (western side) was examined; some wetland plant species are present although not at a density sufficient to warrant being called a remnant patch. From Taylors Lane severe gorse infestation of the Creek banks is visible (see the photo)

Being privately owned, there is no public access, paths or public recreation facilities.

Recommendations:

1. Treat the areas within the Land Subject to Inundation Overlay as wetlands until a detailed on-ground survey is done to document existing wetland vegetation and delineate wetland boundaries. The study should also consider the feasibility of restoration of wetland vegetation given the importance placed on wetlands in the Regional Catchment Strategy and other strategic documents.
2. Apply an Environmental Significance Overlay along Taylors Creek including the 30m drainage corridor buffer and wetland areas.
3. This reach of Taylors Creek should be treated as a habitat corridor as discussed in Meinhardt Infrastructure & Environment (2009), which identifies the need for a 30m buffer on either side of the drainage corridor buffer, to provide for management and maintenance infrastrucutre, pedestrian access, utilities and a wildfire break.
4. Any development plan for the area should identify at least the 30m drainage corridor buffer, the further 30m buffer and wetland areas as open space. Retarding basins (areas designed to capture peak stormwater flow and release it more slowly) should be designed both to retard water as well as to restore the shallow intermittent wetland EVC's identified in this report. Consistent with the Wallan Local Structure Plan, open space for recreation should be in addition to these areas, but where possible abut them. Desireable minimal areas for recreational open space are shown on Map 1 – Existing and Proposed Open Space.
5. The development plan should also show shared pathways linking to the north along Taylors Creek, west along Strathaird Creek, east along Taylors Lane to open space on the east side of the Northern Highway, and east along Taylors Creek to cross the Northern Highway also.

6. The development plan should include habitat corridors linking to the north along Taylors Creek, west along Strathaird Creek, and east along Taylors Creek.
7. Any roadworks along the Northern Highway should aim to preserve or enhance wildlife movement through the culverts underneath the highway and avoid damage to the wetland remnants on the east and west side of the road within the road reserve.
8. VicRoads should be encouraged to manage wetland remnants within the Northern Highway road reserve to control weeds and other exotic species and nurture the indigenous species present.

10.9. Reach 8: Northern Highway to Hume Freeway

This reach extends downstream from the Northern Highway to the Hume Freeway was a swamp ('McAde's Swamp')at settlement (see Figure 17).

The land is zoned Farming Zone. The Creek has a Floodway Overlay, and the general area has a Salinity Management Overlay. The Wallan Local Structure Plan identifies this entire area as 'Greenbelt' for community uses, services and recreation.

Current land use is rural (grazing).

A formed channel now guides water through the swamp area, however the original swamp area is within the Land Subject to Inundation Overlay, and remnants of the swamp vegetation occur at least in the Northern Highway road reserve. The presence of remnant wetland vegetation in the private land was unable to be assessed because access was not granted.

Land in this reach is privately owned, but the Creek bed and banks is Melbourne Water's responsibility.

There is no public access currently, no path or other recreation facilities.

Recommendations:

1. Treat the areas within the Land Subject to Inundation Overlay as wetlands until a detailed on-ground survey is done to document existing wetland vegetation and delineate wetland boundaries. The study should also consider the feasibility of restoration of wetland vegetation given the importance placed on wetlands in the Regional Catchment Strategy and other strategic documents.
2. Apply an Environmental Significance Overlay along Taylors Creek including the 30m drainage corridor buffer and on the area which used to be McAde's Swamp. Manage this area to restore wetland function and wetland vegetation, excluding it from active recreation, services and community infrastructure.
3. This reach of Taylors Creek should be treated as a habitat corridor as discussed in Meinhardt Infrastructure & Environment (2009), which identifies the need for a 30m buffer on either side of the drainage corridor buffer, to provide for management and maintenance infrastrucutre, pedestrian access, utilities and a wildfire break.
4. Locate areas for passive recreation in a naturalistic setting adjacent to the swamp area, with shared trails linking east and west generally along the northern side of Taylors Creek and the wetlands, and also linking north to Green Hill.
5. Establish vegetation suitable for a habitat corridor linking east-west along Taylors Creek, and aim to keep culverts under the Northern Highway and Hume Freeway as suitable as possible for animal movement.

10.10. Reach 9: Hume Freeway to Merri Creek

This reach is the bottom end of Taylors Creek extending downstream from the Hume Freeway to Taylors Creek's confluence with Merri Creek. At the time of settlement this area was part of Herne's Swamp (see Figure 17).

West of the East Station Street the creek and swamp is within the growth area for Wallan identified in the Wallan Local Structure Plan. It is zoned Mixed Use Zone except for the Wallan Sewage Treatment Plant (STP) which is zoned Public Use Zone. Both areas are covered by a Development Plan Overlay and a Salinity Management Overlay. Most of the old Hernes Swamp area is covered by a Land Subject to Inundation Overlay, and Taylors Creek itself has a floodway overlay.

Ecology Partners (2009) identifies the channel of Taylors Creek for approximately 600m east of the Hume Freeway as being of moderate to poor vegetation condition (see Figure 10 from that report) and the rest of the channel as far as Merri Creek as being of poor or low floristic value. Notably, the railway reserve on either side of Taylors Creek is identified as being of Good-Moderate vegetation condition. This land could provide propagules for natural recolonisation of any re-established wetland in the immediate area.

East of South Station Street land is zoned Farming Zone and is outside the growth area. The land has a Salinity Overlay, parts have a land subject to inundation overlay, and a Floodway Overlay follows Taylors and Merri Creeks.

Land use in this reach is rural (grazing) with the exception of the Sewage Treatment Plant which Taylors Creek flows through the middle of.

A modified and straightened channel guides low flows through the old Hernes Swamp area. The Parish Plan (see Figure 17 above) shows Taylors Creek and Merri Creek meeting much further southeast, which raises the possibility of relocating Taylors Creek to the south of the sewage treatment plant in a more natural (albeit reconstructed) channel with better environmental values.

Hernes Swamp still functions to some extent as a wetland (as is evidenced by the Land Subject to Inundation Overlay) and retains some wetland vegetation particularly along the railway line, but possibly within private land also. The NEROC report[24] identified Hernes Swamp as being of very high habitat significance, and state faunal significance. It recommended that the area be designated a Critical Conservation Area for grassy wetland habitat in North-East Melbourne. It also recommended the preparation of a conservation management plan including return of a more natural flooding regime and vegetation management. The Biosites Mapping by DSE (2005) indicates Hernes Swamp is of National significance.

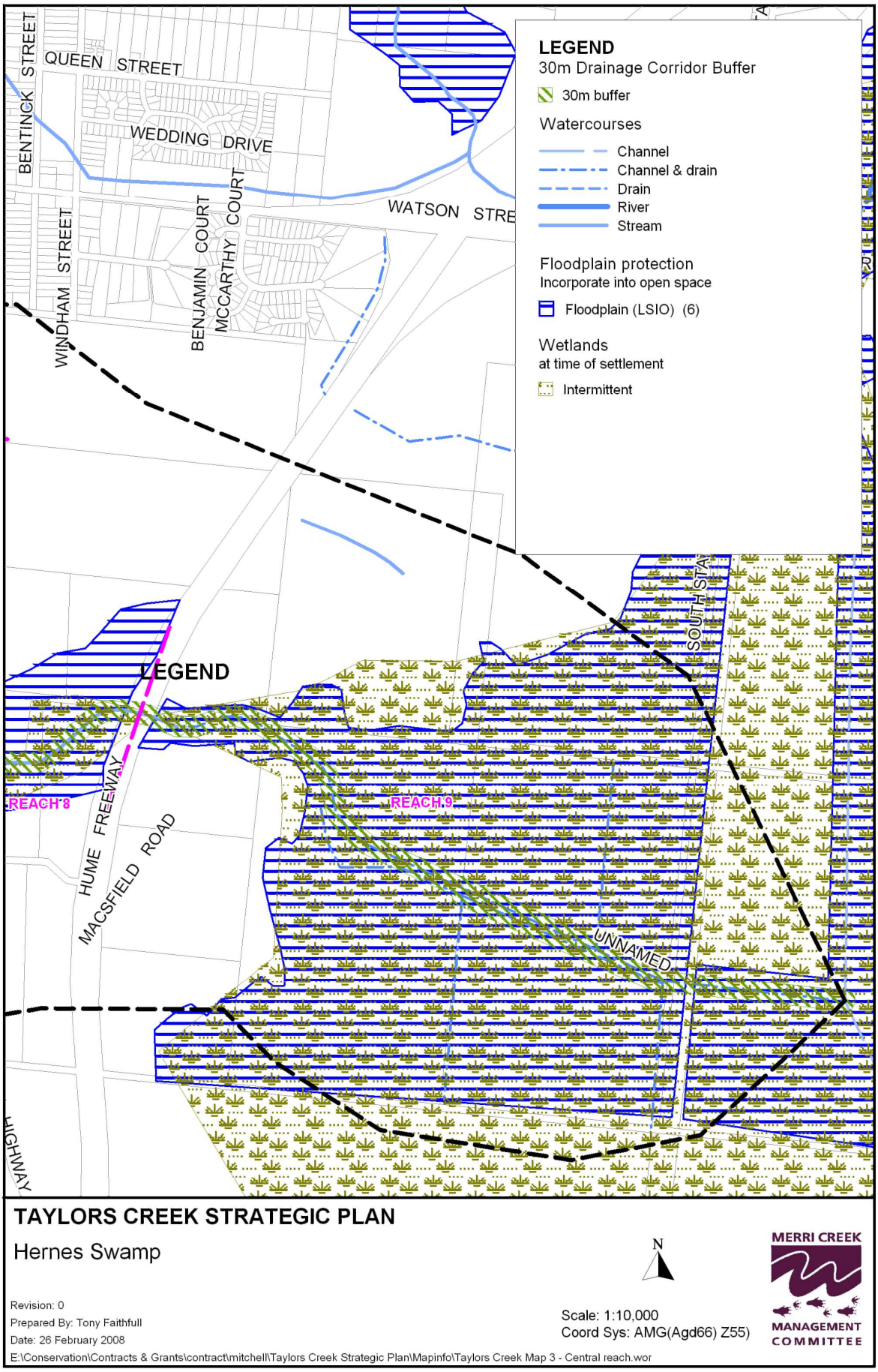
Recommendations:

1. Treat the areas within the Land Subject to Inundation Overlay as wetlands until a detailed on-ground survey is done to document existing wetland vegetation and delineate wetland boundaries. The study should also consider the feasibility of restoration of wetland vegetation given the importance placed on wetlands in the Regional Catchment Strategy and other strategic documents. This study should include the preparation of the conservation management strategy for Hernes Swamp as recommended in the NEROC report, including options for restoration of the flooding regime. It should also investigate creating an artificial channel (constructed to maximise natural values) to take Taylors Creek around the southern side of the sewage treatment plant and join to Merri Creek closer to the original confluence.
2. Apply an Environmental Significance Overlay over all the land identified in the survey as wetland or which could be restored as wetland.
3. Make every effort to exclude development from the area which comprised Hernes Swamp, but to retain the maximum area as a wetland and floodplain, and flood retention area. Any work to

[24] Beardsell (1997) vol 2 pp 20-26 (print version on CD)

create flood retention basins should seek to maximise areas suitable for the shallow wetland EVC's identified in this report.

4. Given Hernes Swamp's National Significance, it should be acquired as a Crown Land Reserve for conservation purposes. Council should be proactive in advocating this outcome. It may be possible to achieve this as part of development approvals issued for the southern end of the Wallan Airfield mixed use zone estate.



Map 6 - Taylors Creek Hernes Swamp
Showing the original extent of Hernes Swamp and Land Subject to Inundation. No vegetation survey was carried out in this reach.

11. Planning Scheme Controls

11.1. Environmental Significance Overlay

An Environmental Significance Overlay should be prepared, covering Taylors Creek from its headwaters to Merri Creek and including as a minimum the 30m buffer on each side of the Creek identified in Clause 15.01 of the Planning Scheme, as well as the areas which were originally part of Hernes Swamp and McAdes Swamp and wetland areas identified to the west of the Northern Highway.

The statement of significance should include mention of:

- The value of the wetlands as they exist and their potential for restoration.
- The potential role of Taylors Creek as a habitat corridor.
- The role and potential of Taylors Creek as valuable linear parkland.
- The importance of the linkage of values that the Creek provides (or has the potential to provide).

Objectives should be based on the objectives developed for this strategy.

Permit requirement exemptions could be based on the Merri Creek ESO1 in the Moreland Planning Scheme.

The schedule should incorporate standards derived from the Merri Creek Development Guidelines, which have been re-written as a step towards their inclusion in the Merri Creek ESO in other councils schemes.

Decision guidelines should include this strategy, the Merri Creek and Environs Strategy, the views of the Merri Creek Management Committee, as well as criteria relating to each of the objectives.

11.2. Floodway Overlay

The location of this overlay appears to be inaccurate in a number of places along the Creek, and its standard width suggests that it is not based on the surveyed location of the floodway. In some places the existing channel may not be the most appropriate location for the Floodway Overlay as the channel may not follow the low-point in the landscape which would take the floodwaters if the channel overflowed. A review of the overlay may form part of Melbourne Water's Taylors Creek Drainage Strategy, but if not a review should be undertaken by Council.

11.3. Development Plan Overlay

Any new DPO created adjacent to Taylors Creek (e.g for the reach between Taylors Lane and the Northern Highway or east of the Northern Railway), should include requirements for any development plan to be consistent with this plan.

11.4. Land Subject to Inundation Overlay

There appears to be some inconsistencies in the LSIO as follows:

- The LSIO along Strathaird Creek just west of Taylors Creek ends abruptly in a straight line suggestive of a modeling boundary rather than a natural boundary. Investigation of this problem is urgent if development in Wallan is to extend into this area as is recommended in the Wallan Local Structure Plan.
- The section of Hernes Swamp east of the Northern Railway and north of Taylors Creek is excluded from the LSIO when it appears that it should be included. It is understood however that this area (being in the farming zone) has not been fully mapped to establish LSIO boundaries. This should be undertaken at an appropriate time in the future when detailed work for this area is undertaken.

12. Appendices

12.1. Outcomes of community surveys and consultation with key stakeholders

12.1.1. Community Workshop

A community meeting was held in Wallan at 7pm on Tuesday 20 November at the Wallan Neighbourhood House. The workshop involved the nine participants in 3 exercises.

"What do you know" exercise

In the first exercise participants were encouraged to write or draw on a map of the Taylors Creek Catchment what **they knew** about Taylors Creek that they thought was important for the consultants to know. Information provided on these maps by participants included:

- The Spring Ridge subdivision plan, north of Pretty Sally Drive which has had a plan approved by Council, and which is partly started,
- The location of Strath Aird Farm (the owner of which cast doubt on the name of the creek west of Rowes Lane being Strathaird Creek)
- The pipe outlets onto farmland north of Watson Street of the western tributary of Taylors Creek which rises at Hargrave Court and flows into a pipe near Windsor Drive
- The location of an old structure in Taylors Creek between Lisa place and Queen St.
- The location of bluestone infrastructure amongst the bed and bank near mature pine trees between Watson Street and Duke Street.
- The location of an approved subdivision on the east side of the Creek between Watson Street and Duke Street.
- The location of a planned subdivision on the **west** side of Taylors Creek between Watson Street and Duke Street (plans are with Council).
- An area where willows were removed earlier in 2007 as part of Melbourne Water Community Grants (just downstream of King William Drive), which in July 2007 was planted with community help. Discussion during the exercise revealed that Melbourne Water was planning to commence work to improve the bed and banks of Taylors Creek and install a wetland downstream of this area.
- The location of an existing playground on the east bank of Taylors Creek between Lisa place and Queen St.
- Areas where gorse was sprayed for approx 5 years by Council (between Watson St and approx Lisa Place) and by the developer (between Lisa Place and Duke St)
- The location of an existing granitic sand path (along Taylors Creek between King William Drive and Watson Street) and a future path between Watson and Duke Sts.
- That the un-piped section of Taylors Creek north of Duke St is where children prefer to play than the piped section downstream of Duke St.
- The recreational value of the land adjacent to the creek on the west side between Watson Street and Duke Street.
- Stormwater erosion issues upstream of Duke Street
- Gorse infestations downstream of Taylors Lane
- The location of densely subdivided sections of Wallan where there are lots of kids (between Watson Street and King William Drive on the east side of Taylors Creek, and between Duke Street and Taylors Lane on both sides of Taylors Creek).
- The orientation of back fences towards the Creek between Duke Street and almond Ave

- The location of a pipe bridge at Almond Ave
- The location of underground fresh water south of Taylors Lane, west of Taylors Creek.

Other discussion during this exercise revealed that works on the Creek by the developer of the subdivision on the east side of the Creek between Watson Street and Duke Street were imminent, but waited on approval of plans by Melbourne Water.

"What do you want" exercise

In the second exercise participants were asked to write or draw on another map what they would **like to see happen** along Taylors Creek. There was one map per table and 3-4 participants per table. Desired features/outcomes drawn onto the maps by participants included:

- Public open space linkage along both sides of the Creek. One plan showed this stretching from the headwaters continuously downstream to the Sewage Treatment Plant, emphasising that it should be a wide public open space link. This plan also indicated that larger open spaces along the way were needed as rest areas/picnic areas. Another plan showed open space from the headwaters to the northern Highway. The third plan showed open space linkage between King St and the confluence of Starthaird Creek, but emphasised the need for linking in adjoining developments and their open space to Taylors Creek. The importance of working with Council in park planning was emphasised on one plan.
- Land purchase. Purchasing land for the open space link (or investigating purchase) north of King Street was indicated on two of the three plans. Purchase of the isolated property north of Watson Street west of Taylors Creek was also indicated on one of the plans.
- A large park in the headwaters between the two branches of Taylors Creek (2 plans out of 3 showed this, one annotating it as a "Regional Park").
- A shared trail along one side of Taylors Creek. One plan showed this following the Creek from the STP upstream to the headwaters, branching to follow the 2 branches of the Creek in the headwaters. A link through parkland south of Taylors Lane was also shown. Another plan showed a trail following Taylors Lane west from Northern Highway, then following the Creek north to King Street, where it diverted east to residential streets, rejoining Taylors Creek north of pretty Sally Drive, where it looped around the two northern branches of the Creek and possibly linked to Old Sydney Road, along with a possible future link south from Taylors Lane along the Creek to the Northern Highway and beyond. Annotations indicated that the path should be a shared bike and walking track, that it should link into Wallan township, and that it should form a circuit. One plan highlighted the need to improve linkage between Taylors Creek and the Wallan Primary School. The third plan was simply annotated "Continuous linking trails along entire length".
- Bridges over the Creek. One plan showed path bridges at Australis Drive, and at the Northern Highway. Another showed a bridge between King St and Wallan-Darraweit Road, with bridges implied at the fork of the creek in the headwaters and at Northern Highway. The third plan was annotated "strategically placed foot bridges" between Duke Street and Watson Street.
- Returning piped sections of the Creek to natural Creek by removing the drain ("daylighting"). All three plans indicated this between Taylors Lane and Duke Street, and one plan indicated this north from Wallan-Darraweit Road.
- Revegetation along the Creek. One plan showed continuous revegetation on both sides of the whole Creek and both sides of the northern tributaries. Another indicated "lots of reveg with indigenous species" without specifying exactly where. The third plan indicted that the priority for planting was immediately north of Watson Street and immediately south of Duke St.
- A positive interface between housing and the Creek. One plan put it "All new housing adjoining the creek reserve faces the Creek not back onto the Creek". Another said simply "houses facing reserves". The third said "Not back fences".
- Parkland link to Wallan Recreation Reserve. One plan showed a band of parkland along the south side of Taylors Lane from Taylors Creek to the Northern Highway and two plans

showed trail linkage through here towards Green Hill or future sports grounds south of Wallan Recreation Reserve.

- Water Sensitive Urban Design. One plan indicated litter traps at major stormwater outlets. Another indicated litter traps, curb and channel WSUD as well as wetlands.
- Wetlands. One plan indicated wetlands downstream of King William Drive (in the area where Melbourne Water is planning to construct a wetland in 2007). Another showed wetlands in the headwaters, without being very specific about where. The third plan mentioned wetlands as part of water-sensitive urban design.
- Open Space Strategy. One plan recommended that when the open space strategy is revised it should reflect the importance of Taylors Creek as an open space link.
- Weed control. One plan indicated continued weed/gorse/willow/blackberry control in several locations along the Creek.
- Erosion Control. One plan indicated erosion control needed south of Taylors Lane. Another showed "fixing the Creek Banks" in the vicinity of Watson Street. Discussion made it clear that fixing erosion by piping the creek was not a satisfactory solution.
- Playgrounds. One plan indicated a possible future playground in a neighbourhood park in a wider section of the desired creek reserve south of Taylors Lane. Another indicated a playground in the vicinity of Casey Court.
- Increasing flow capacity. This was indicated as desirable on one plan, between Duke Street and Taylors Lane.
- Park lighting was indicated as desireable by one plan in the section between Duke Street and Taylors Lane
- Educational/interpretive signage. One plan mentioned the need for more educational/interpretive signage.
- Survey. One plan indicated that identification of significant vegetation and fauna, as well as management zones was important, presumably as an outcome of this strategy. It suggested an environmental significance overlay should be placed over the entire length of the Creek.

Prioritization exercise

The third exercise was designed to give a general idea of where participants would like to see money spent on Taylors Creek. Each participant was given ten pretend bank notes and asked to spend the notes by putting them into labelled buckets, spending more on the activity they felt was more important. Participants could specify spending money on something else by labelling an envelope with what they wanted to spend the money on, putting their money in the envelope and putting the envelope in an "other" bucket.

The outcomes were (each pretend bank note was counted as a vote):

- Buy Land for more open space 24 votes
- Shared Pathways 23 votes
- Create a natural looking creek 20 votes
- Revegetation 19 votes
- Fix Erosion (no pipes) 9 votes
- Improve water quality 6 votes
- Landscaping 4 votes
- Wetlands for habitat & Flood Protection 2 votes
- Other (Playgrounds) 2 votes
- Picnic facilities 1 vote

Feedback forms

Feedback forms were made available at end of the Community Meeting and via Council Officers. No feedback forms were received.

Analysis

The results of the exercises indicate a very strong interest in creating a continuous and linked open space corridor along Taylors Creek, a corridor which includes shared pathways, and a revegetated, natural-looking Creek. This interest extended to spending a significant proportion of the available budget on land purchase to consolidate the corridor.

Water-sensitive urban design was supported, especially the trapping of litter. Wetlands were suggested in various locations, providing they didn't cost Council much – it was expected that they would be constructed anyway as a result of the Taylors Creek Drainage Strategy. Similarly it was expected that the erosion would be fixed by others (developers and Melbourne Water) and so expenditure on erosion control was a lesser priority, but no-one wanted money spent on piping the Creek. In fact there was strong support for "daylighting" the sections of Creek in pipes (i.e. digging up the pipes and creating a natural-looking creek line). The process of daylighting could also meet one participant's concern that one of these sections had too little capacity to carry floodwater.

Participants were interested in improving the interface between housing and the Creek and saw back fences facing the Creek as a bad outcome, with houses facing the reserves as desirable outcome.

Weed control didn't rate highly as a specific activity, but was treated as a fundamental component of creating a more natural creek and revegetation, which were both strongly supported.

Other things that some participants supported included playgrounds, park lighting, educational/interpretive signage and picnic facilities.

Other outcomes indicated as desirable by participants were identification of significant fauna and flora, identification of management zones, and the creation of an environment significance overlay over the entire length of the Creek.

12.1.2. Community Group input

Community groups, including Friends of Wallan Creek, Friends of Merri Creek, BEAM – Mitchell Environment Group and government agencies such as Melbourne Water, Port Phillip and Westernport Catchment Management Authority and the Merri Creek Management Committee were invited to make written input to the strategy. No written submissions were received prior to preparation of this draft.

12.1.3. Key Agency input

Melbourne Water has a key role in waterway planning, river health, drainage schemes and flood protection. Identification of flood-prone land and the likely location of future flood retardation and water quality treatment areas, in relation to potential open space areas on Taylors Creek is important for the development of the strategic plan.

Contact was made with Melbourne Water's Michael Hobbs and James Hodgens.

Michael indicated that Melbourne Water had serious concerns about the need to manage floodwaters and to restrict development to areas which can reasonably be protected from flooding, without destroying waterway values.

Michael indicated that Melbourne Water was keen that the Taylors Creek Strategic Plan

- clarified management responsibilities (Melbourne Water has responsibility for bed and banks and within 20m of the top of bank, for waterways with catchments of more than 60ha, but prefers Councils to manage the areas above the top of bank under a maintenance agreement)
- indicated that Melbourne Water can give advice for areas outside their area of direct responsibility – Keith Boniface and Kate Kinsella in Developer Services are good starting points;
- should aim to mesh with the requirements of the Drainage Scheme(s) so that there can be complementary management of open space;
- should include recommended revegetation treatments;

Michael noted that the Land Subject to Inundation Overlay has not been requested on rural lands expected to remain rural, and that this explains the abrupt termination of the overlay at the lower end

of Strathaird Creek and the south-west corner of Hernes Swamp.

James Hodgens gave updates on the progress of the Taylors Creek Drainage Strategy but to date has been unable to provide either a draft of the strategy or any of its contents to inform this Taylors Creek Strategic Plan.

The Department of Sustainability and Environment has a key interest in protection of native vegetation and flora and fauna, and the establishment/protection of habitat corridors. It is anticipated that DSE will be involved through commenting on a draft of this plan.

Yarra Valley Water has a key role in servicing properties in Wallan. The location of infrastructure can influence the location of open space. Yarra Valley Water's Sam Yuen was helpful in directing enquiries to Chris Brace, Assistant Manager Treatment Plant Operations, who in turn passed enquiries onto Wayne Wood. Wayne described future works planned around Wallan and referred to a letter from Yarra Valley Water to Council's Ian Scholes dated 12/11/07 which described these works in more detail. A copy of the letter was obtained from Council and is summarised in section 6.2.1 of this report.

12.2. Vegetation assessment

12.2.1. Indigenous Plant species list

Scientific Name	**Common name**	**TC1**	**TC2**	**TC3**	**TC4**	**TC5**	**TC6**	**TC7**	**TC8**	**TC9**	**TC10**	**TC11**	**TC12**	**TC13**	**TC14**	**TC15**	**TC16**	**TC17**	**TC18**	**TC19**	**TC20**	**TC21**	**TC22**	**TC23**	**TC24**	**TC25**	**TC26**	**TC27**
Acacia dealbata	Silver Wattle									x										P								
Acacia mearnsii	Black Wattle				x	x		x	x	x		x			x			x		P			x			x		
Acacia melanoxylon	Blackwood					x			x	x		x								P						x		
Acacia pycnantha	Golden Wattle							P												P								
Acaena novae-zelandiae	Bidgee-widgee			x		x					x									P								
Acaena ovina	Australian Sheep's Burr		x		x	x								x		x			x								x	x
Allocasuarina verticillata	Drooping Sheoke							P												P								
Amphibromus nervosus	Veined Swamp Wallaby-grass			x					x		x	x																
Amyema pendulum	Drooping Mistletoe								x	x																		
Asperula conferta	Common Woodruff											x																
Austrodanthonia auriculata	Lobed Wallaby-grass			x	x	x								x														
Austrodanthonia caespitosa	Common Wallaby-grass			x				x	x	x	x	x																
Austrodanthonia duttoniana	Brown-back Wallaby-grass				x			x						x														
Austrodanthonia geniculata	Kneed Wallaby-grass			x		x																						
Austrodanthonia penicillata	Slender Wallaby-grass		x						x										x								x	x
Austrodanthonia racemosa	Branched Wallaby-grass			x	x	x		x	x					x	x	x				P								
Austrodanthonia setacea	Bristly Wallaby-grass			x		x		x	x							x												
Austrostipa oligostachya	Fine-head Spear-grass							x																				
Austrostipa rudis	Veined Spear-grass							x		x																		
Carex appressa	Tall Sedge				x				x	x	x	x			x					P								
Carex inversa	Common Sedge					x																						
Cassinia arcuata	Drooping Cassinia								x			x								P								
Cyperus spp.	Sedge various			x																								
Dichondra repens	Kidney-weed			x		x																						
Eleocharis acuta	Common Spike-sedge			x	x					x		x			x											x		
Elymus scaber	Common Wheat-grass			x	x	x			x	x				x		x												
Epilobium hirtigerum	Hairy Willow-herb									x	x	x																
Eucalyptus botryoides	Bangalay								x			x																
Eucalyptus camaldulensis	River Red Gum							P																				
Eucalyptus goniocalyx s.s.	Long-leaf Box			x																								
Eucalyptus macrorhyncha	Red Stringybark						x																					
Eucalyptus melliodora	Yellow Box							P	x																			
Eucalyptus microcarpa	Grey Box								x																			
Eucalyptus obliqua	Messmate			x	x										x			x										
Eucalyptus ovata	Swamp Gum									x			x							P	x	x				x		
Eucalyptus polyanthemos	Red Box							P																				
Eucalyptus radiata sensu lato	Narrow-leaf Peppermint	x		x	x	x		P		x					x			x										
Eucalyptus rubida	Candlebark							x	x																			
Eucalyptus tricarpa	Red Ironbark							P																				
Eucalyptus viminalis	Manna Gum	x			x	x	x	P							x					P								
Euchiton involucratum	Star Cudweed											x																
Geranium solanderi sensu lato	Austral Crane's-bill								x		x	x														x		
Glyceria australis	Australian Sweet-grass								x	x	x																	
Gonocarpus tetragynus	Common Raspwort					x																						
Goodenia ovata	Hop Goodenia																											
Haloragis heterophylla	Varied Raspwort											x																
Hardenbergia violacea	Purple Coral-pea							P																				
Isolepis inundata	Swamp Club-rush								x																			
Juncus australis	Austral Rush		x	x	x					x		x			x				x					x		x	x	x
Juncus bufonius	Toad Rush			x																								
Juncus pallidus	Pale Rush			x							x	x																
Juncus subsecundus	Finger Rush			x		x																						
Juncus sp Sect Septati	Rush								x		x																	
Lachnagrostis aemula	Blown-grass										x	x																
Lagenifera stipitata	Common Lagenifera					x																						
Lomandra filiformis	Wattle Mat-lily		x			x		x											x								x	x
Lomandra longifolia	Spiny-headed Mat-lily							P												P								
Lythrum hyssopifolia	Small Loosestrife			x	x							x			x													
Microlaena stipoides	Weeping Grass			x	x	x		x	x	x	x			x	x													
Myriophyllum crispatum	Upright Milfoil										x																	
Oxalis perennans	Grassland Wood-sorrel				x	x								x		x												
Persicaria prostrata	Creeping Knotweed				x							x			x													
Pimelea curviflora ssp. gracilis	Curved Rice-flower					x																						
Pimelea humilis	Common Rice-flower					x																						
Poa labillardierei	Common Tussock-grass											x	x							P	x	x						
Poa sieberiana	Grey Tussock-grass			x																								
Rhagodia parabolica	Fragrant Saltbush							P																				

Scientific Name	Common name	TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	TC10	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC18	TC19	TC20	TC21	TC22	TC23	TC24	TC25	TC26	TC27
Rumex brownii	Slender Dock		x	x		x													x								x	x
Senecio glomeratus	Annual Fireweed										x																	
Senecio quadridentatus sensu lato	Cotton Fireweed								x			x																
Solanum laciniatum	Large Kangaroo Apple													x						P								
Solenogyne dominii	Solenogyne					x																						
Tricoryne elatior	Yellow Rush-lily																x											
Veronica gracilis	Slender Speedwell					x																						

x = present, P = planted

12.2.2. Non-indigenous species recorded, in order of priority for weed control

		TC1	TC2	TC3	TC4	TC5	TC6	TC7	TC8	TC9	TC10	TC11	TC12	TC13	TC14	TC15	TC16	TC17	TC18	TC19	TC20	TC21	TC22	TC23	TC24	TC25	TC26	TC27	Controlled?	Threat	Controllability	Total Score	Priority
Crataegus monogyna	Hawthorn									x	x	x																	Regionally Controlled	High	High	6	**Priority 1, High threat weeds with a good chance of eradication. Aslo regionally controlled**
	Montpellier Broom				x	x			x			x			x											x			Regionally Controlled	High	High	6	
Lycium ferocissimum	African Box-thorn			x																									Regionally Controlled	High	High	6	
Nassella neesiana	Chilean Needle-grass											x																	Regionally Restricted	High	High	6	
Rosa rubiginosa	Sweet Briar				x						x				x														Regionally Controlled	High	High	6	
Rubus anglocandicans	Blackberry				x										x														Regionally Controlled	High	High	6	
Salix cinerea	Grey Sallow																									x			Regionally controlled	High	High	6	
Salix spp.	Willow										x	x																	Regionally Restricted	High	High	6	
Ulex europaeus	Furze							x			x	x														x			Regionally Controlled	High	High	6	
Cirsium vulgare	Spear Thistle				x	x					x	x		x															Regionally Controlled	Moderate	High	5	
Convolvulus arvensis	Common Bindweed										x																			High	High	5	
Echium plantagineum	Paterson's Curse									x																			Regionally Controlled	High	Low	5	
Fraxinus spp.	Ash										P																			High	High	5	
Galenia pubescens	Galenia							x																						High	High	5	
Hedera helix	Ivy																													High	High	5	
Hypericum perforatum	St. John's Wort					x																							Regionally Controlled	High	Low	5	
Ligustrum japonicum	Japanese Privet						x																							High	High	5	
Prunus cerasifera	Cherry-plum									x	x																			High	High	5	
Prunus spp.	Prunus												x								x	x								High	High	5	
Ulmus procera	Elm					x					x																			High	High	5	
Alisma lanceolata	Water Plantain										x																			High	Low	4	**Priority 2,**
Casuarina cunninghamii	River Sheoak							x																						Moderate	High	4	
Cichorium intybus	Chicory												x								x	x								Moderate	High	4	
Cupressus macrocarpa	Monterey Cypress								x																					Moderate	High	4	
Cyperus eragrostis	Drain Flat-sedge									x	x	x																		High	Low	4	
Dactylis glomerata	Cocksfoot			x	x	x		x			x	x		x	x															High	Low	4	
Eucalyptus cladocalyx	Sugar Gum					x			P			P																		Moderate	High	4	
Gaudinia fragilis	Fragile Oat			x	x										x															High	Low	4	
Malus domestica (hybrid)	Domestic Apple										x	x																		Moderate	High	4	
Nasturtium officionale	Two-row Bitter-cress								x		x																			High	Low	4	
Paspalum distichum	Water Couch										x																			High	Low	4	
Phalaris aquatica	Toowoomba Canary-grass										x															x				High	Low	4	
Pinus radiata	Monterey Pine					x			x																					Moderate	High	4	
Populus alba	White Poplar										x		x								x	x								High	Low	4	
Populus nigra	Lombardy Poplar							x																						Moderate	High	4	
Rumex crispus	Curled Dock				x					x	x	x			x															High	Low	4	
Rumex obtusifolius	Broad-leaf Dock									x																				Moderate	High	4	
Silybum marianum	Variegated Thistle				x										x														Regionally Controlled	Moderate	Low	4	
Vinca major	Blue Periwinkle											x																		High	Low	4	
Viola odorata	Sweet Violet																									x				Moderate	High	4	
Acetosella vulgaris	Sheep Sorrel			x	x	x					x	x		x																Moderate	Low	3	
Agrostis capillaris	Brown-top Bent				x	x		x	x	x	x	x		x																High	None	3	
Anthoxanthum odoratum	Sweet Vernal-grass			x	x	x						x		x																High	None	3	
Arctotheca calendula	Cape Weed		x		x	x													x								x	x		High	Low	3	
Bromus catharticus	Prairie Grass											x																		High	None	3	
Bromus diandrus	Great Brome			x		x					x	x																		Moderate	Low	3	
Conyza bonariensis	Tall Fleabane											x																		Moderate	Low	3	

Cynodon dactylon	Couch									x		x																High	None	3	
Helminthotheca echioides	Ox-tongue					x				x	x	x																High	None	3	
Holcus lanatus	Yorkshire Fog			x		x				x		x																High	None	3	
Lotus uliginosus	Greater Bird's-foot Trefoil				x										x													Moderate	Low	3	
Paspalum dilatatum	Paspalum											x																High	None	3	
Phalaris minor	Lesser Canary-grass										x																	Moderate	Low	3	
Plantago lanceolata	Ribwort					x					x	x																High	None	3	
Potentilla reptans	Creeping Cinquefoil			x																								Low	High	3	
Prunella vulgaris	Self-heal										x	x																Moderate	Low	3	
Rumex conglomeratus	Clustered Dock				x						x				x													Moderate	Low	3	
Tragopogon porrifolius	Salsify										x	x																Moderate	Low	3	
Briza minor	Lesser Quaking-grass					x																						Moderate	None	2	
Bromus hordaceus	Soft Brome		x	x	x	x								x					x							x	x	Moderate	None	2	
Callitriche stagnalis	Water Starwort			x						x																		Moderate	None	2	
Cynosurus echinatus	Rough Dog's-tail		x	x	x	x								x	x				x							x	x	Moderate	None	2	
Hordeum murinum	Barley-grass					x																						Low	Low	2	
Hordeum murinum	Barley-grass					x																						Moderate	None	2	
Hypochoeris radicata	Cat's Ear			x	x	x					x	x		x	x													Moderate	None	2	
Juncus articulatus	Jointed Rush			x																								Moderate	None	2	
Lactuca serriola	Prickly Lettuce										x	x																Moderate	None	2	
Lolium rigidum	Wimmera Rye-grass		x	x	x	x								x	x				x							x	x	Moderate	None	2	
Modiola caroliniana	Carolina Mallow					x																						Moderate	None	2	
Romulea rosea	Common Onion-grass											x																Moderate	None	2	
Sisyrinchium iridifolium	Striped Rush-leaf											x																Low	Low	2	
Sonchus asper	Rough Sow-thistle											x																Moderate	None	2	
Sonchus oleraceus	Milk Thistle				x						x				x													Moderate	None	2	
Trifolium dubium	Suckling Clover					x						x																Moderate	None	2	
Trifolium fragiferum	Strawberry Clover											x																Moderate	None	2	
Trifolium striatum	Knotted Clover																											Moderate	None	2	
Trifolium subterraneum	Subterraneum Clover		x	x	x	x									x				x							x	x	Moderate	None	2	
Vicia sativa ssp. nigra	Narrow-leaf Vetch											x																Moderate	None	2	
Vulpia bromoides	Squirrel-tail Fescue			x		x					x		x									x	x					Moderate	None	2	
Aira cupaniana	Hair-grass				x	x								x														Low	None	1	
Aphanes arvensis	Parsley Piert			x																								Low	None	1	
Arctotheca calendula	Cape Weed		x		x	x													x							x	x	Low	None	1	
Cyperus tenellus	Tiny Flat-sedge			x																								Low	None	1	
Moenchia erecta	Erect Chickweed			x																								Low	None	1	
Petrorhagia velutina	Hairy Pink											x																Low	None	1	

Priority 3,

Eucalyptus astringens	Brown Mallet							P	P																			Low	High	4	
Melaleuca armillaris	Bracelet Paperbark					P																						Moderate	High	4	
Eucalyptus cornuta	Yate								P																			Low	High	3	
Eucalyptus neglecta	Omeo Gum								P																			Low	High	3	
Eucalyptus sp.	Eucalyptus sp.								P																			Low	High	3	
Pinus canariensis	Canary Islands Pine								P																			Low	Low	3	

Planted non-indigeno

12.2.3. Notes on suggested changes to 1750 EVCs

Correspondence with existing EVC mapping

The remnants in the uppermost reaches of Taylors Creek, correspond well with the descriptions for Herb Rich Foothill Forest (EVC 23) (DSE 2007, Oates and Taranto 2001). Remnants around the Northern Highway appear consistent with the pre-1750s mapping (DSE 2005) designation of Swampy Riparian Complex (EVC 126) in the lowest elevations of the Taylors Creek. However, the three and a half kilometre stretch between these sites where the presumed boundary between EVCs should occur has been intensively disturbed to the extent that very little indigenous vegetation remains apart from widespread colonisers of disturbed sites such as wallaby grasses (*Austrodanthonia* spp.) and native rushes (*Juncus* spp.). Some remnant trees closely associated with the creekline are possibly remnants of a distinct EVC that occupied the riparian zone. Creekline Herb-rich Woodland (EVC 164) shares some of the indicator species and environmental conditions with these remnants and is consistent with the position in the landscape.

Geological mapping of the site (see Figure 8 above) shows that the Herb-rich Foothill Forest remnants are associated with areas mapped as being of sedimentary geology. Basalt-derived soils (the result of lava flows from Pretty Sally) underlie much of the ground where indigenous vegetation has been eliminated. This appears to be a case where the most productive land with fertile soils has been the most extensively modified. As different geologies are frequently associated with different EVCs it seems possible that the slopes of the middle Taylors Creek catchment may have a different EVC from the Herb-rich Foothill Forest indicated by pre 1750s EVC mapping (DSE 2005). A few old scattered *Eucalyptus viminalis* are the sole indigenous tree observed on these hillsides.

EVC mapping proposed re-designation and fine scale stratification

It is conjectured that the areas of volcanic soils on hillsides identified by DSE's pre-1750 EVC mapping as Herb-rich Foothills Forest are likely to have carried Plains Grassy Woodland (as mapped by DSE for nearby volcanic surfaces at Spring Hill to the south). However it is emphasised that remnants observed were too relictual to make confident conclusions. Some other circumstantial evidence for making this re-designation is presented below.

The Swampy Riparian Complex mapped for the lower catchment is made up of a series of EVCs differentiated at a fine spatial scale. A combination of changes to drainage combined with intensive agriculture is probably responsible for the elimination of indigenous plant cover in the floodplain area. Species in the remnants adjoining the Northern Highway (TC 10 & 11 are consistent with the species composition of the recently described EVC 932, 'Wet Verge Sedgeland' (DSE 2007). This probably resembles the vegetation community present in the wettest part of the floodplain which has survived due to frequent inundation and freedom from grazing associated with ditches alongside the Northern Highway. Swampy Riparian Woodland (EVC 83) and Plains Grassy Wetland (EVC 125) are two other EVCs that might have been occurred in this area.

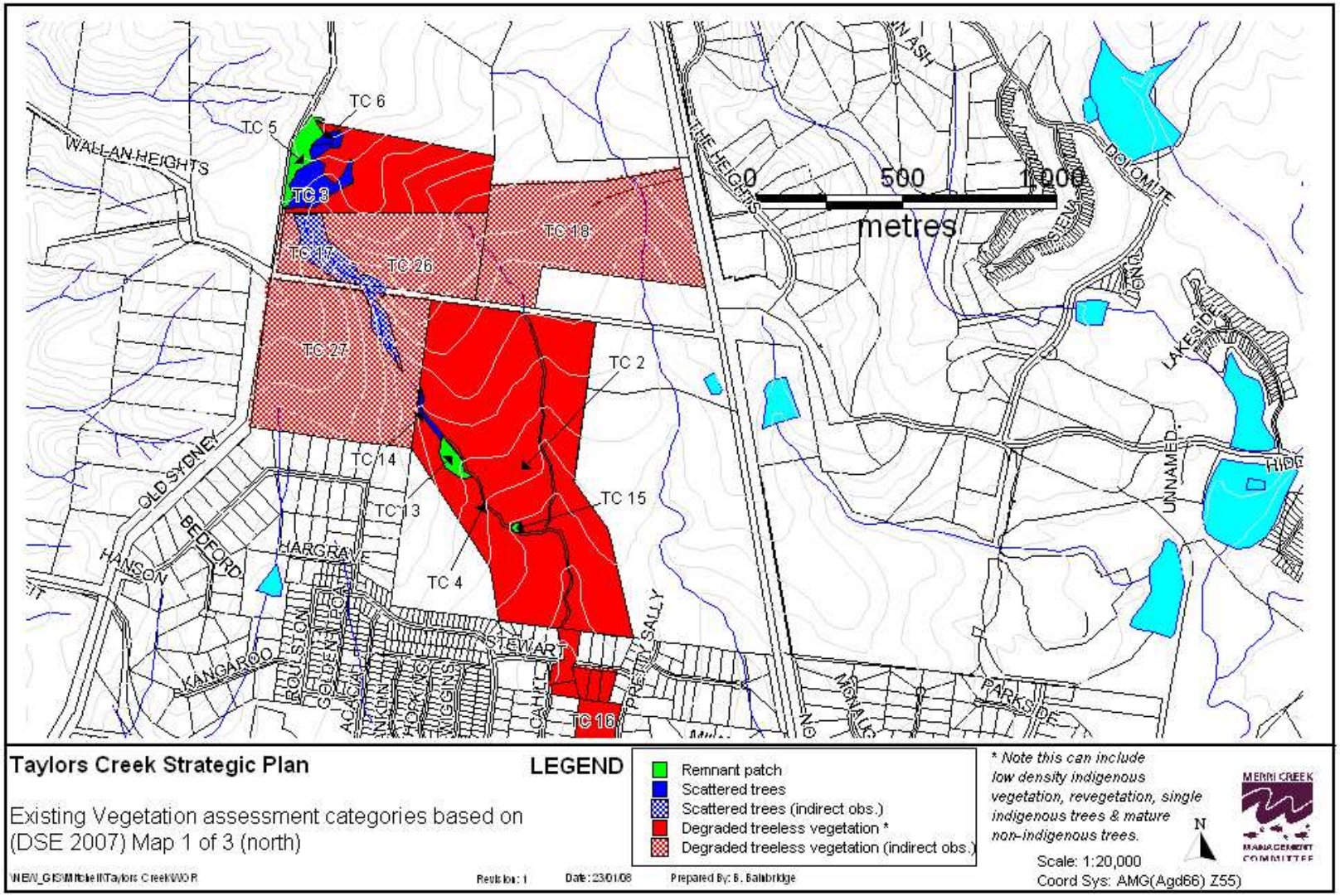
A conjectural reconstruction of EVCs as they might have been in 1750 is included as Map 4. It follows the EVC mapping provided by DSE (2005) with the following exceptions:

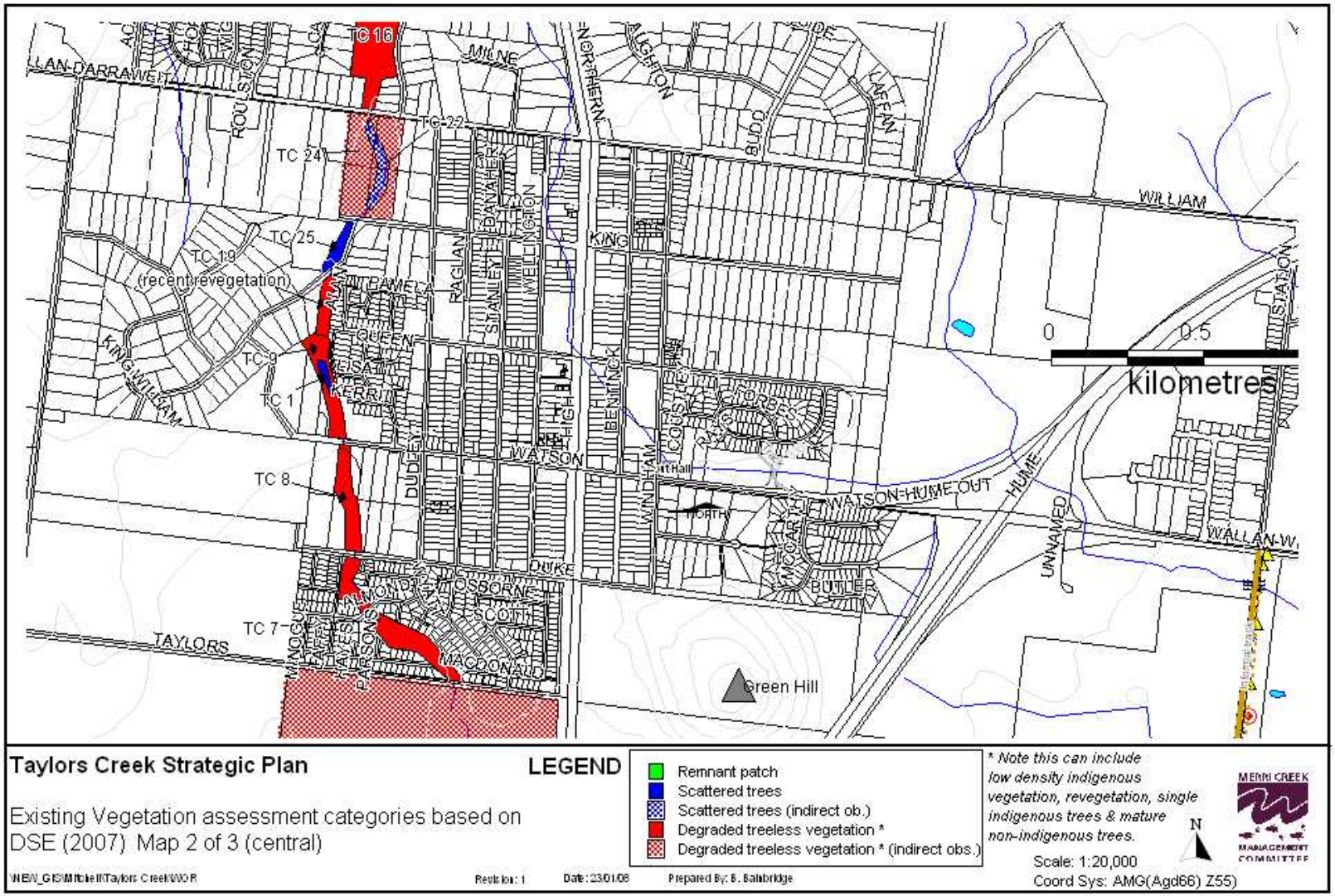
- All area mapped by DSE as Herb-rich Foothill Forest that overlie soils of a volcanic origin have been replaced with Plains Grassy Woodland - following the conjecture above.
- Creeklines and alluvial lined gullies on the foothills have been identified as Creekline Herb-rich Woodland, based on scanty remnants observed and benchmark descriptions of this EVC.
- Low gradient creeklines and drainage channels in the lowest parts of the landscape have been designated as 'Wet verge Sedgeland' based on remnant species observed on the Northern Highway and patterns of natural and artificial drainage.
- The extent of the Hernes Swamp (derived from Parish Plans) has been indicated as Plains Grassy Wetland, based on the remnants present in other parts of this former swamp.

Supporting evidence for this extrapolation has been drawn from;

- The remnants within the Wallan Cemetery at Queens Street where many species characteristic of Plains Grassland/Grassy Woodland persist adjacent to a paddock dominated by Herb-rich Foothill Forest overstorey.
- The suggestion that the volcanic derived soils held a different vegetation community from Herb-rich Foothill forest can be drawn from a parish map (from the 1800's) that includes a note in the area of the volcanic soils in the upper Taylors Creek catchment as being "Rich undulating ground thinly timbered chiefly with Gum". This contrasts with the top of the Mittagong Creek catchment to the east of the Northern Highway which is annotated "Stringybark" (two species of stringybark persist in the Herb Rich Foothill Forest remnant on Silurian sedimentary soils at the top of the catchment) and with the hills west of the Taylors Creek Catchment also on sedimentary soils which are annotated "Timbered with stringy bark gum box &c".

12.2.4. Maps of sites and the method of assessment





Taylors Creek Strategic Plan

LEGEND

- Remnant patch
- Scattered trees
- Scattered trees (indirect ob.)
- Degraded treeless vegetation *
- Degraded treeless vegetation * (indirect obs.)

** Note this can include low density indigenous vegetation, revegetation, single indigenous trees & mature non-indigenous trees.*

Existing Vegetation assessment categories based on DSE (2007) Map 2 of 3 (central)

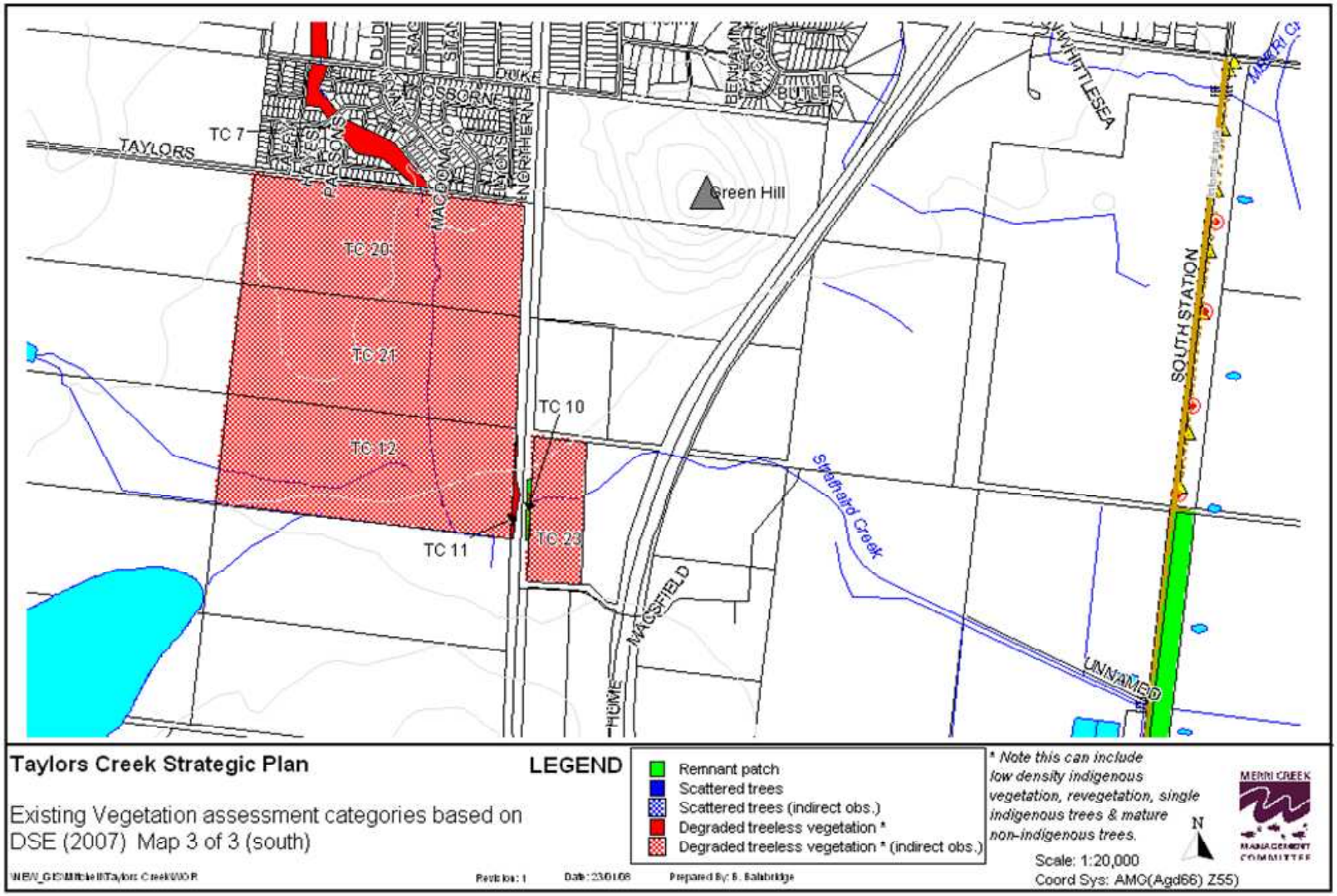
MERRI CREEK MANAGEMENT COMMITTEE

\\NEW_GIS\Mtbell\Taylors Creek\MXD\R

Revision: 1 Date: 23/01/08 Prepared By: B. Baldridge

Scale: 1:20,000

Coord Sys: AMG(Agd66) Z55)


TAYLORS
TC 7
TC 20
TC 21
TC 12
TC 10
TC 11
TC 23
Green Hill
DUKE
OSBORNE
MACDONALD
INGRAM
BENJAMIN
MAGAR
BUTLER
WHITTLESEA
SOUTH STATION
MERRI CK
Shepherd Creek
HUME
MACSFIELD
UNNAMED
Taylors Creek Strategic Plan
LEGEND
Existing Vegetation assessment categories based on DSE (2007) Map 3 of 3 (south)
Remnant patch
Scattered trees
Scattered trees (indirect obs.)
Degraded treeless vegetation *
Degraded treeless vegetation * (indirect obs.)
* Note this can include low density indigenous vegetation, revegetation, single indigenous trees & mature non-indigenous trees.
N
MERRI CREEK MANAGEMENT COMMITTEE
Scale: 1:20,000
Coord Sys: AMG(Agd66) Z55)
Revision: 1
Date: 23/01/08
Prepared By: S. Balabridge

12.2.5. Sites assessed directly

TC1 Lisa St				
ZONE ID	TC1	ALTITUDE:	EVC	164 Creekline Herb-rich Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	0.4
COLLECTOR:	BB, MW	LONGITUDE:	Veg category	Scattered trees
NOTES	The trees are mature and have hollows. The understorey was not assessed further but will generally share the same species as TC 9			

	Name	Common name	Prevalence	Weed priority
1.	*Eucalyptus radiata*	Narrow-leaf Peppermint	4	NA
2.	*Eucalyptus viminalis*	Manna Gum	2	NA

TC 2 Pretty Sally slope- Slopes				
ZONE ID	TC 2	ALTITUDE:	EVC	55 Plains Grassy Woodland
DATE:	5/12/07	LATITUDE:	Area (ha)	49.1
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Disturbed treeless vegetation
NOTES	Remarkably low in vegetation quality for a local grazing landscape. Suggestive of intense denudation of the vegetation cover, possibly erosion during a drought event or boradscale herbicide application.			

	Name	Common name	Prevalence	Weed prioity
*	*Arctotheca calendula*	Cape Weed	1000s	3
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
1.	*Acaena ovina*	Australian Sheep's Burr	10s	NA
2.	*Austrodanthonia penicillata*	Slender Wallaby-grass	100s	NA
3.	*Juncus australis*	Austral Rush	100s	NA
4.	*Lomandra filiformis*	Wattle Mat-lily	10s	NA
5.	*Rumex brownii*	Slender Dock	100s	NA

TC3 1840 Old Sydney Road – scattered trees				
QUADRATNO		ALTITUDE:	EVC	23 Herb-rich Foothill Forest
DATE:	5/12/07	LATITUDE:	Area (ha)	2.3
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Scattered trees
NOTES				

	Name	Common name	Prevalence	Weed prioity
*	*Acetosella vulgaris*	Sheep Sorrel	1000s	2
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	1000s	2
*	*Aphanes arvensis*	Parsley Piert	10s	3
*	*Bromus diandrus*	Great Brome	1000s	2
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Callitriche stagnalis*	Water Starwort	10s	3
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Cyperus tenellus*	Tiny Flat-sedge	10s	3
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Gaudinia fragilis*	Fragile Oat	10s	2
*	*Holcus lanatus*	Yorkshire Fog	1000s	2
*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Juncus articulatus*	Jointed Rush	10s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Lycium ferocissimum*	African Box-thorn	10s	1
*	*Moenchia erecta*	Erect Chickweed	10s	3
*	*Potentilla reptans*	Creeping Cinquefoil	10s	2
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
*	*Vulpia bromoides*	Squirrel-tail Fescue	1000s	3
1.	*Acaena novae-zelandiae*	Bidgee-widgee	100s	NA
2.	*Amphibromus nervosus*	Veined Swamp Wallaby-grass	10s	NA
3.	*Austrodanthonia auriculata*	Lobed Wallaby-grass	10s	NA
4.	*Austrodanthonia caespitosa*	Common Wallaby-grass	1000s	NA
5.	*Austrodanthonia geniculata*	Kneed Wallaby-grass	100s	NA

6.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
7.	*Austrodanthonia setacea*	Bristly Wallaby-grass	1000s	NA
8.	*Cyperus spp.*	Sedge various	10s	NA
9.	*Dichondra repens*	Kidney-weed	10s	NA
10.	*Eleocharis acuta*	Common Spike-sedge	10s	NA
11.	*Elymus scaber*	Common Wheat-grass	1000s	NA
12.	*Eucalyptus goniocalyx s.s.*	Long-leaf Box	10s	NA
13.	*Eucalyptus obliqua*	Messmate	10s	NA
14.	*Eucalyptus radiata sensu lato*	Narrow-leaf Peppermint	10s	NA
15.	*Juncus australis*	Austral Rush	10s	NA
16.	*Juncus bufonius*	Toad Rush	100s	NA
17.	*Juncus pallidus*	Pale Rush	10s	NA
18.	*Juncus subsecundus*	Finger Rush	10s	NA
19.	*Lythrum hyssopifolia*	Small Loosestrife	100s	NA
20.	*Microlaena stipoides*	Weeping Grass	1000s	NA
21.	*Poa sieberiana*	Grey Tussock-grass	10s	NA
22.	*Rumex brownii*	Slender Dock	100s	NA

TC4 Pretty Sally slope- Gullylines

ZONE NO	TC4	ALTITUDE:	EVC	164 Creekline Herb-rich Woodland
DATE:	5/12/07	LATITUDE:	Area (ha)	1.3
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Seriously degraded and eroding. Vegetation relicutal over the great majority of the gulies.			

	Name	Common name	Prevalence	Weed prioity
*	*Acetosella vulgaris*	Sheep Sorrel	1000s	2
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*	*Aira cupaniana*	Hair-grass	1000s	3
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	1000s	2
*	*Arctotheca calendula*	Cape Weed	1000s	2
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Cirsium vulgare*	Spear Thistle	1000s	1
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Gaudinia fragilis*	Fragile Oat	1000s	2
*	*Genista monspessulana*	Montpellier Broom	1000s	1
*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Lotus uliginosus*	Greater Bird's-foot Trefoil	100s	2
*	*Rosa rubiginosa*	Sweet Briar	10s	1
*	*Rubus anglocandicans*	Blackberry	10s	1
*	*Rumex conglomeratus*	Clustered Dock	100s	2
*	*Rumex crispus*	Curled Dock	10s	2
*	*Silybum marianum*	Variegated Thistle	10s	2
*	*Sonchus oleraceus*	Milk Thistle	1000s	3
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
1.	*Acaena ovina*	Australian Sheep's Burr	10s	NA
2.	*Austrodanthonia auriculata*	Lobed Wallaby-grass	100s	NA
3.	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass	100s	NA
4.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
5.	*Carex appressa*	Tall Sedge	10s	NA
6.	*Eleocharis acuta*	Common Spike-sedge	10s	NA
7.	*Elymus scaber*	Common Wheat-grass	1000s	NA
8.	*Eucalyptus viminalis*	Manna Gum	1	NA
9.	*Juncus australis*	Austral Rush	1000s	NA
10.	*Lythrum hyssopifolia*	Small Loosestrife	1000s	NA
11.	*Microlaena stipoides*	Weeping Grass	1000s	NA
12.	*Oxalis perennans*	Grassland Wood-sorrel	100s	NA
13.	*Persicaria prostrata*	Creeping Knotweed	10s	NA

TC5 1840 Old Sydney Road – habitat

QUADRATNO	TC5	ALTITUDE:	ECV	23 Herb-rich Foothill Forest
DATE:	5/12/07	LATITUDE:	Area (ha)	1.4
COLLECTOR:	WPI IS	LONGITUDE:	Veg category	Habitat patch
NOTES	Indigenous is approximately 50% of the groundcover. *Acetosella vulgaris and Austrodanthonia spp. are predominant. Trees with hollows, Striated Pardalotes, Crimson Rosellas, Brown Thornbills observed.			

	Possible Peregrine Falcon flying overhead. A Wombat hole on adjacent roadside.			
	Name	Common name	Prevalence (est.)	Weed prioity
*	*Acetosella vulgaris*	Sheep Sorrel	1000s	2
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*	*Aira cupaniana*	Hair-grass	1000s	3
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	1000s	2
*	*Arctotheca calendula*	Cape Weed	1000s	2
*	*Briza minor*	Lesser Quaking-grass	1000s	3
*	*Bromus diandrus*	Great Brome	1000s	2
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Cirsium vulgare*	Spear Thistle	10s	1
*	*Hordeum murinum*	Barley-grass	1000s	3
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Eucalyptus cladocalyx*	Sugar Gum	<10	2
*	*Genista monspessulana*	Montpellier Broom	10s	1
*	*Helminthotheca echioides*	Ox-tongue	100s	2
*	*Holcus lanatus*	Yorkshire Fog	100s	2
*	*Hordeum murinum*	Barley-grass	1000s	3
*	*Hypericum perforatum*	St. John's Wort	100s	1
*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Melaleuca armillaris*	Bracelet Paperbark	<10	NA
*	*Modiola caroliniana*	Carolina Mallow	100s	3
*	*Pinus radiata*	Monterey Pine	10s	2
*	*Plantago lanceolata*	Ribwort	1000s	2
*	*Trifolium dubium*	Suckling Clover	1000s	3
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
*	*Ulmus procera*	Elm	<10	1
*	*Vulpia bromoides*	Squirrel-tail Fescue	1000s	3
1.	*Acacia mearnsii*	Black Wattle	<10	NA
2.	*Acacia melanoxylon*	Blackwood	<10	NA
3.	*Acaena novae-zelandiae*	Bidgee-widgee	100s	NA
4.	*Acaena ovina*	Australian Sheep's Burr	100s	NA
5.	*Austrodanthonia auriculata*	Lobed Wallaby-grass	<10	NA
6.	*Austrodanthonia geniculata*	Kneed Wallaby-grass	100s	NA
7.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
8.	*Austrodanthonia setacea*	Bristly Wallaby-grass	1000s	NA
9.	*Carex inversa*	Common Sedge	<10	NA
10.	*Dichondra repens*	Kidney-weed	100s	NA
11.	*Elymus scaber*	Common Wheat-grass	1000s	NA
12.	*Eucalyptus goniocalyx s.s.*	Long-leaf Box	10s	NA
13.	*Eucalyptus macrorhyncha*	Red Stringybark	<10	NA
14.	*Eucalyptus radiata sensu lato*	Narrow-leaf Peppermint	<10	NA
15.	*Eucalyptus viminalis*	Manna Gum	<10	NA
16.	*Gonocarpus tetragynus*	Common Raspwort	100s	NA
17.	*Juncus subsecundus*	Finger Rush	100s	NA
18.	*Lagenifera stipitata*	Common Lagenifera	<10	NA
19.	*Lomandra filiformis*	Wattle Mat-lily	<10	NA
20.	*Microlaena stipoides*	Weeping Grass	1000s	NA
21.	*Oxalis perennans*	Grassland Wood-sorrel	10s	NA
22.	*Pimelea curviflora ssp. gracilis*	Curved Rice-flower	<10	NA
23.	*Pimelea humilis*	Common Rice-flower	10s	NA
24.	*Rumex brownii*	Slender Dock	10s	NA
25.	*Solenogyne dominii*	Solenogyne	<10	NA
26.	*Veronica gracilis*	Slender Speedwell	10s	NA

TC6 1840 Old Sydney Road - garden

QUADRATNO	TC6	ALTITUDE:	EVC	23 Herb-rich Foothill Forest
DATE:	13/12/07	LATITUDE:	Area (ha)	0.2
COLLECTOR:	BB MW	LONGITUDE:	Veg Category	Scattered trees
NOTES				

	Name	Common name	Prevalence (est.)	Weed prioity
*	*Ligustrum japonicum*	Japanese Privet	1	1
1.	*Eucalyptus macrorhyncha*	Red Stringybark	3	NA

2.	*Eucalyptus viminalis*	Manna Gum	1	NA

TC7 Taylors to Duke

ZONE NO	TC7	ALTITUDE:	EVC	932 Wet verge Sedgeland & 126 Swampy Riparian Complex
DATE:	13/12/07	LATITUDE:	Area (ha)	3.1
COLLECTOR:	BB MW	LONGITUDE:	Veg Category	Degraded treeless vegetation
NOTES	Includes mature plantings of non-indigenous native trees as well as some apparently planted indigenous trees of unknown provenance. Recent plantings of roughly indigenous species has also occurred here. The creek here is barrel drained. Two patches of higher density remnant grasses associated with tree haloes are present on the west bank north of Alexander St and the east bank north of Wyatt St. These are predominantly indigenous but almost exclusively colonising grasses.			

	Name	Common name	Prevalence (est.)	Weed prioity
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*P	*Casuarina cunninghamii*	River Sheoak	<10	2
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Eucalyptus astringens*	Brown Mallet	10s	NA
*	*Galenia pubescens*	Galenia	10s	1
*	*Populus nigra*	Lombardy Poplar	<10	2
*	*Ulex europaeus*	Furze	10s	1
1.	*Acacia mearnsii*	Black Wattle	10s	NA
2. P	*Acacia pycnantha*	Golden Wattle	10s	NA
3. P	*Allocasuarina verticillata*	Drooping Sheoke	10s	NA
4.	*Austrodanthonia caespitosa*	Common Wallaby-grass	1000s	NA
5.	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass	1000s	NA
6.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
7.	*Austrodanthonia setacea*	Bristly Wallaby-grass	1000s	NA
8.	*Austrostipa oligostachya*	Fine-head Spear-grass	10s	NA
9.	*Austrostipa rudis*	Veined Spear-grass	10s	NA
10. P	*Eucalyptus camaldulensis*	River Red Gum	10s	NA
11. P	*Eucalyptus melliodora*	Yellow Box	<10	NA
12. P	*Eucalyptus polyanthemos*	Red Box	10s	NA
13. P	*Eucalyptus radiata sensu lato*	Narrow-leaf Peppermint	10s	NA
14. P	*Eucalyptus rubida*	Candlebark	10s	NA
15. P	*Eucalyptus tricarpa*	Red Ironbark	10s	NA
16. P	*Eucalyptus viminalis*	Manna Gum	10s	NA
17. P	*Hardenbergia violacea*	Purple Coral-pea	<10	NA
18. P	*Lomandra filiformis*	Wattle Mat-lily	<10	NA
19. P	*Lomandra longifolia*	Spiny-headed Mat-lily	10s	NA
20.	*Microlaena stipoides*	Weeping Grass	1000s	NA
21. P	*Rhagodia parabolica*	Fragrant Saltbush	10s	NA

TC 8 Duke to Watson

ZONE NO	TC 8	ALTITUDE:	EVC	164 Creekline Herb-rich Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	1.7
COLLECTOR:	BB MW	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Includes extensive mature plantings of non-indigenous trees including many natives. Creekline in this area is severely, deeply eroded. The tree plantings appear to be inhibiting the establishment of fibrous rooted groundstorey and thus are probably contributing to the erosion prblems in this area. Some of the planted trees are of particular interest horticulturally, aesthetically and for habitat eg.*Eucalyptus cornuta* which is over 1.5 m diameter at breast height DBH			

	Name	Common name	Prevalence (est.)	Weed prioity
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
* P	*Cupressus macrocarpa*	Monterey Cypress	<10	2
* P	*Eucalyptus astringens*	Brown Mallet	<10	NA
* P	*Eucalyptus cladocalyx*	Sugar Gum	<10	2
* P	*Eucalyptus cornuta*	Yate	1	NA
* P	*Eucalyptus neglecta*	Omeo Gum	1	NA
* P	*Eucalyptus sp.*	Eucalyptus sp.	<10	NA
*	*Genista monspessulana*	Montpellier Broom	100s	1
*	*Nasturtium officionale*	Two-row Bitter-cress	<10	2
* P	*Pinus canariensis*	Canary Islands Pine	<10	NA

* P	*Pinus radiata*	Monterey Pine	<10	2
1.	*Acacia mearnsii*	Black Wattle	<10	NA
2.	*Acacia melanoxylon*	Blackwood	<10	NA
3.	*Amphibromus nervosus*	Veined Swamp Wallaby-grass	10s	NA
4.	*Amyema pendulum*	Drooping Mistletoe	1	NA
5.	*Austrodanthonia caespitosa*	Common Wallaby-grass	1000s	NA
6.	*Austrodanthonia penicillata*	Slender Wallaby-grass	10s	NA
7.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
8.	*Austrodanthonia setacea*	Bristly Wallaby-grass	1000s	NA
9.	*Carex appressa*	Tall Sedge	10s	NA
10.	*Cassinia arcuata*	Drooping Cassinia	<10	NA
11.	*Elymus scaber*	Common Wheat-grass	1000s	NA
12. P	*Eucalyptus botryoides*	Bangalay	<10	NA
13. P	*Eucalyptus melliodora*	Yellow Box	<10	NA
14. P	*Eucalyptus microcarpa*	Grey Box	<10	NA
15. P	*Eucalyptus rubida*	Candlebark	<10	NA
16.	*Geranium solanderi sensu lato*	Austral Crane's-bill	10s	NA
17.	*Glyceria australis*	Australian Sweet-grass	10s	NA
18.	*Isolepis inundata*	Swamp Club-rush	10s	NA
19.	*Juncus sp Sect Septati*	Rush	10s	NA
20.	*Microlaena stipoides*	Weeping Grass	1000s	NA
21.	*Senecio quadridentatus sensu lato*	Cotton Fireweed	10s	NA

TC9 Watson to Queen

ZONE NO	TC9	ALTITUDE:	EVC	164 Creekline Herb-rich Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	1.6
COLLECTOR:	BB MW	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Serious damage to native *Juncus* spp. and other remnants in the southern parto fo this site due to off-target damage from herbicide spraying for Gorse control. One area of remnant trees at Lisa St is described seperately as TC 1 'Lisa St'			

	Name	Common name	Prevalence (est.)	Weed prioity
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*	*Callitriche stagnalis*	Water Starwort	100s	3
*	*Crataegus monogyna*	Hawthorn	10s	1
*	*Cynodon dactylon*	Couch	1000s	2
*	*Cyperus eragrostis*	Drain Flat-sedge	1000s	2
*	*Echium plantagineum*	Paterson's Curse	1000s	1
*	*Helminthotheca echioides*	Ox-tongue	1000s	2
*	*Holcus lanatus*	Yorkshire Fog	1000s	2
*	*Prunus cerasifera*	Cherry-plum	10s	1
*	*Rumex crispus*	Curled Dock	10s	2
*	*Rumex obtusifolius*	Broad-leaf Dock	10s	2
*	*Ulex europaeus*	Gorse	100s	1
1.	*Acacia dealbata*	Silver Wattle	<10	NA
2.	*Acacia mearnsii*	Black Wattle	10s	NA
3.	*Acacia melanoxylon*	Blackwood	<10	NA
4.	*Amyema pendulum*	Drooping Mistletoe	<10	NA
5.	*Austrodanthonia caespitosa*	Common Wallaby-grass	1000s	NA
6.	*Austrostipa rudis*	Veined Spear-grass	10s	NA
7.	*Carex appressa*	Tall Sedge	10s	NA
8.	*Eleocharis acuta*	Common Spike-sedge	100s	NA
9.	*Elymus scaber*	Common Wheat-grass	1000s	NA
10.	*Epilobium hirtigerum*	Hairy Willow-herb	1000s	NA
11.	*Glyceria australis*	Australian Sweet-grass	1000s	NA
12.	*Juncus australis*	Austral Rush	1000s	NA
13.	*Microlaena stipoides*	Weeping Grass	1000s	NA
14.	*Solanum laciniatum*	Large Kangaroo Apple	<10	NA

TC10 East of the Northern Highway

ZONE NO	TC10	ALTITUDE: 300m ASL	EVC	932 Wet Verge Sedgeland
DATE:	13/12/07	LATITUDE:	Area (ha)	0.3
COLLECTOR:	BB MW	LONGITUDE:	Veg Category	Remnant patch
NOTES	A narrow strip, retaining wetland species partly because eof ditch structure. Sseriously threatened by			

	shading from suckering poplar, willow etc. Jewel spider colonies present and a likely habitat for crakes and rails. Valuable source of propagules of indigenous species.			
	Name	Common name	Prevalence (est.)	Weed prioity
*	*Acetosella vulgaris*	Sheep Sorrel	1000s	2
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*	*Alisma lanceolata*	Water Plantain	100s	2
*	*Bromus diandrus*	Great Brome	1000s	2
*	*Cirsium vulgare*	Spear Thistle	10s	1
*	*Convolvulus arvensis*	Common Bindweed	10s	1
*	*Crataegus monogyna*	Hawthorn	<10	1
*	*Cyperus eragrostis*	Drain Flat-sedge	1000s	2
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Fraxinus spp.*	Ash	<10	1
*	*Helminthotheca echioides*	Ox-tongue	1000s	2
*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Lactuca serriola*	Prickly Lettuce	1000s	3
*	*Malus domestica (hybrid)*	Domestic Apple	<10	2
*	*Nasturtium officionale*	Two-row Bitter-cress	100s	2
*	*Paspalum distichum*	Water Couch	100s	2
*	*Phalaris aquatica*	Toowoomba Canary-grass	1000s	2
*	*Phalaris minor*	Lesser Canary-grass	1000s	2
*	*Plantago lanceolata*	Ribwort	1000s	2
*	*Populus alba*	White Poplar	100s	2
*	*Prunella vulgaris*	Self-heal	<10	2
*	*Prunus cerasifera*	Cherry-plum	<10	1
*	*Rosa rubiginosa*	Sweet Briar	10s	1
*	*Rumex conglomeratus*	Clustered Dock	1000s	2
*	*Rumex crispus*	Curled Dock	1000s	2
*	*Salix spp.*	Willow		1
*	*Sonchus oleraceus*	Milk Thistle	1000s	3
*	*Tragopogon porrifolius*	Salsify	1000s	2
*	*Ulex europaeus*	Furze	10s	1
*	*Ulmus procera*	Elm	100s	1
*	*Vulpia bromoides*	Squirrel-tail Fescue	1000s	3
	Acaena novae-zelandiae	Bidgee-widgee	10s	NA
	Amphibromus nervosus	Veined Swamp Wallaby-grass	1000s	NA
	Austrodanthonia caespitosa	Common Wallaby-grass	1000s	NA
	Carex appressa	Tall Sedge	1000s	NA
	Epilobium hirtigerum	Hairy Willow-herb		NA
	Geranium solanderi sensu lato	Austral Crane's-bill	1000s	NA
	Glyceria australis	Australian Sweet-grass	1000s	NA
	Juncus pallidus	Pale Rush	10s	NA
	Juncus sp Sect Septati	Rush	10s	NA
	Lachnagrostis aemula	Blown-grass	1000s	NA
	Microlaena stipoides	Weeping Grass	1000s	NA
	Myriophyllum crispatum	Upright Milfoil	1000s	NA
	Senecio glomeratus	Annual Fireweed	<10	NA

TC11 West of the Northern Highway

ZONE NO	TC11	ALTITUDE: 300 m ASL	EVC	932 Wet Verge Sedgeland
DATE:	13/12/07	LATITUDE:	Area (ha)	0.3
COLLECTOR:	BB MW	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Slashed highway verge, indigenous vegetation restricted to ditches. Massive Poplar suckering is degrading remnants. Only occurrence of *Nassella neesiana* seen in survey, suggest high priority for treatment.			

	Name	Common name	Prevalence	Weed Priority
1.	*Acacia mearnsii*	Black Wattle	10s	NA
2.	*Acacia melanoxylon*	Blackwood	10s	NA
3.	*Amphibromus nervosus*	Veined Swamp Wallaby-	10s	NA

4.	*Asperula conferta*	Common Woodruff	<10	NA
5.	*Austrodanthonia caespitosa*	Common Wallaby-grass	100s	NA
6.	*Carex appressa*	Tall Sedge	10s	NA
7.	*Cassinia arcuata*	Drooping Cassinia	<10	NA
8.	*Eleocharis acuta*	Common Spike-sedge	100s	NA
9.	*Epilobium hirtigerum*	Hairy Willow-herb	1000s	NA
10.	*Geranium solanderi* sensu lato	Austral Crane's-bill	10s	NA
11.	*Gnaphalium involucratum sensu lato*	Cudweed	<10	NA
12.	*Haloragis heterophylla*	Varied Raspwort	10s	NA
13.	*Juncus australis*	Austral Rush	100s	NA
14.	*Juncus pallidus*	Pale Rush	10s	NA
15.	*Lachnagrostis aemula*	Blown-grass	1000s	NA
16.	*Lythrum hyssopifolia*	Small Loosestrife	100s	NA
17.	*Persicaria prostrata*	Creeping Knotweed	10s	NA
18.	*Poa labillardierei*	Common Tussock-grass	10s	NA
19.	*Senecio quadridentatus sensu lato*	Cotton Fireweed	10s	NA
*	*Acetosella vulgaris*	Sheep Sorrel	100s	2
*	*Agrostis capillaris*	Brown-top Bent	100s	2
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	1000s	2
*	*Bromus catharticus*	Prairie Grass	1000s	2
*	*Bromus diandrus*	Great Brome	1000s	2
*	*Cirsium vulgare*	Spear Thistle	10s	1
*	*Conyza bonariensis*	Tall Fleabane	100s	2
*	*Crataegus monogyna*	Hawthorn	<10	1
*	*Cynodon dactylon*	Couch	10s	2
*	*Cyperus eragrostis*	Drain Flat-sedge	100s	2
*	*Dactylis glomerata*	Cocksfoot	100s	2
* P	*Eucalyptus botryoides*	Bangalay	<10	NA
* P	*Eucalyptus cladocalyx*	Sugar Gum	<10	NA
*	*Genista monspessulana*	Montpellier Broom	10s	1
*	*Helminthotheca echioides*	Ox-tongue	100s	2
*	*Holcus lanatus*	Yorkshire Fog	1000s	2
*	*Hypochoeris glabra*	Smooth Cat's Ear	1000s	3
*	*Lactuca serriola*	Prickly Lettuce	10s	3
*	*Malus domestica (hybrid)*	Domestic Apple	<10	2
*	*Nassella neesiana*	Chilean Needle-grass	10s	1
*	*Paspalum dilatatum*	Paspalum	100s	2
*	*Petrorhagia velutina*	Hairy Pink	10s	3
*	*Plantago lanceolata*	Ribwort	1000s	2
*	*Prunella vulgaris*	Self-heal	10s	2
*	*Romulea rosea*	Common Onion-grass	1000s	3
*	*Rumex crispus*	Curled Dock	100s	2
*	*Salix spp.*	Willow	10s	1
*	*Sisyrinchium iridifolium*	Striped Rush-leaf	10s	3
*	*Sonchus asper*	Rough Sow-thistle	10s	3
*	*Sonchus oleraceus*	Milk Thistle	100s	3
*	*Tragopogon porrifolius*	Salsify	10s	2
*	*Trifolium dubium*	Suckling Clover	100s	3
*	*Trifolium fragiferum*	Strawberry Clover	100s	3
*	*Ulex europaeus*	Furze	10s	1
*	*Vicia sativa ssp. nigra*	Narrow-leaf Vetch	100s	3
*	*Vinca major*	Blue Periwinkle	10s	2

TC13 Pretty Sally slope- Habitat patch

ZONE NO	TC13	ALTITUDE: 300 m ASL	EVC	932 Wet Verge Sedgeland
DATE:	5/12/07	LATITUDE:	Area (ha)	0.6
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Habitat patch
NOTES	A small area where the indigenous grasses were particularly high in density, to approx 50%			

	Name	Common name	Prevalence (est.)	Weed Priority
*	*Acetosella vulgaris*	Sheep Sorrel	100s	2
*	*Agrostis capillaris*	Brown-top Bent	1000s	2
*	*Aira cupaniana*	Hair-grass	1000s	3
*	*Anthoxanthum odoratum*	Sweet Vernal-grass	1000s	2
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Cirsium vulgare*	Spear Thistle	10s	1
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Dactylis glomerata*	Cocksfoot	100s	2

*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
1.	*Acaena ovina*	Australian Sheep's Burr	100s	NA
2.	*Austrodanthonia auriculata*	Lobed Wallaby-grass	100s	NA
3.	*Austrodanthonia duttoniana*	Brown-back Wallaby-grass	1000s	NA
4.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
5.	*Elymus scaber*	Common Wheat-grass	1000s	NA
6.	*Microlaena stipoides*	Weeping Grass	1000s	NA
7.	*Oxalis perennans*	Grassland Wood-sorrel	100s	NA

TC14 Pretty Sally slope- Scattered trees

ZONE NO	TC14	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:	5/12/07	LATITUDE:	Area (ha)	0.2
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Scattered trees
NOTES				

	Name	Common name	Prevalence (est.)	Weed Priority
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Dactylis glomerata*	Cocksfoot	1000s	2
*	*Gaudinia fragilis*	Fragile Oat	1000s	2
*	*Genista monspessulana*	Montpellier Broom	10s	1
*	*Hypochoeris radicata*	Cat's Ear	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Lotus uliginosus*	Greater Bird's-foot Trefoil	100s	2
*	*Rosa rubiginosa*	Sweet Briar	10s	1
*	*Rubus anglocandicans*	Blackberry	10s	1
*	*Rumex conglomeratus*	Clustered Dock	100s	2
*	*Rumex crispus*	Curled Dock	100s	2
*	*Silybum marianum*	Variegated Thistle	10s	2
*	*Sonchus oleraceus*	Milk Thistle	100s	3
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
1.	*Acacia mearnsii*	Black Wattle	1	NA
2.	*Austrodanthonia racemosa*	Branched Wallaby-grass	1000s	NA
3.	*Carex appressa*	Tall Sedge	10s	NA
4.	*Eleocharis acuta*	Common Spike-sedge	100s	NA
5.	*Eucalyptus obliqua*	Messmate	1	NA
6.	*Eucalyptus radiata sensu lato*	Narrow-leaf Peppermint	3	NA
7.	*Eucalyptus viminalis*	Manna Gum	1	NA
8.	*Juncus australis*	Austral Rush	100s	NA
9.	*Lythrum hyssopifolia*	Small Loosestrife	100s	NA
10.	*Microlaena stipoides*	Weeping Grass	1000s	NA
11.	*Persicaria prostrata*	Creeping Knotweed	10s	NA

TC15 Pretty Sally slope- Small species rich remnant

ZONE NO	TC15	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:	5/12/07	LATITUDE:	Area (ha)	< 0.1
COLLECTOR:	BB AD	LONGITUDE:	Veg category	Habitat patch
NOTES	A tiny remnant on the edge of the erosion Gully where some appearance			

	Name	Common name	Prevalence (est.)	Weed Priority
1.	*Acaena ovina*	Australian Sheep's Burr	<10	NA
2.	*Austrodanthonia racemosa*	Branched Wallaby-grass	<10	NA
3.	*Austrodanthonia setacea*	Bristly Wallaby-grass	100s	NA
4.	*Elymus scaber*	Common Wheat-grass	10s	NA
5.	*Oxalis perennans*	Grassland Wood-sorrel	<10	NA
6.	*Tricoryne elatior*	Yellow Rush-lily	<10	NA

TC19 King William Revegetation 2007

ZONE NO	TC19	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	0.8

COLLECTOR:	BB MW	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Recently revegetated with species mostly appropriate to the EVC.			

	Name	Common name	Prevalence (est.)	Weed Priority
1. P	*Acacia dealbata*	Silver Wattle	10s	NA
2. P	*Acacia mearnsii*	Black Wattle	10s	NA
3. P	*Acacia melanoxylon*	Blackwood	10s	NA
4. P	*Acacia pycnantha*	Golden Wattle	10s	NA
5. P	*Acaena novae-zelandiae*	Bidgee-widgee	100s	NA
6. P	*Allocasuarina verticillata*	Drooping Sheoke	10s	NA
7. P	*Austrodanthonia racemosa*	Branched Wallaby-grass	100s	NA
8. P	*Carex appressa*	Tall Sedge	100s	NA
9. P	*Cassinia arcuata*	Drooping Cassinia	10s	NA
10. P	*Eucalyptus ovata*	Swamp Gum	10s	NA
11. P	*Eucalyptus viminalis*	Manna Gum	10s	NA
12. P	*Lomandra longifolia*	Spiny-headed Mat-lily	100s	NA
13. P	*Poa labillardierei*	Common Tussock-grass	100s	NA
14. P	*Solanum laciniatum*	Large Kangaroo Apple	10s	NA

12.2.6. Sites assessed indirectly. Information requiring ground truthing.

TC16 Stewart to Wallan-Darraweit

ZONE NO	TC16	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:		LATITUDE:	Area (ha)	6.0
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Creek apparently barrel drained and houses built on them. Totally alienated			

	Name	Common name	Prevalence (est.)	Weed Priority
NOT ASSESSED FURTHER- URBAN GARDENS				

TC 17 Sydney Road Gully

ZONE NO	TC17	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:		LATITUDE:	Area (ha)	3.9
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Scattered trees
NOTES	Observed from 1840 Sydney Rd. Apparently a dense patch of indigenous trees, possibly a habitat patch but would require closer inspection.			

	Name	Common name	Prevalence (est.)	Weed Priority
1.	*Acacia mearnsii*	Black Wattle	10s	NA
2.	*Eucalyptus obliqua*	Messmate	10s	NA
3.	*Eucalyptus radiata sensu lato*	Narrow-leaf Peppermint	10s	NA

TC 18, 26 & 27 Pretty Sally Slopes

ZONE NO	TC 18, 26,27	ALTITUDE: 300 m ASL	EVC	55 ? Plains Grassy Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	61.5 (total of 23.4, 13.3 and 24.8)
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Based on species present in similar areas above and below slope and apparent similarity in appearance and management.			

	Name	Common name	Prevalence (est.)	Weed Priority
*	*Arctotheca calendula*	Cape Weed	1000s	2
*	*Bromus hordaceus*	Soft Brome	1000s	3
*	*Cynosurus echinatus*	Rough Dog's-tail	1000s	3
*	*Lolium rigidum*	Wimmera Rye-grass	1000s	3
*	*Trifolium subterraneum*	Subterraneum Clover	1000s	3
1.	*Acaena ovina*	Australian Sheep's Burr	100s	NA
2.	*Austrodanthonia penicillata*	Slender Wallaby-grass	100s	NA
3.	*Juncus australis*	Austral Rush	100s	NA
4.	*Lomandra filiformis*	Wattle Mat-lily	10s	NA
5.	*Rumex brownii*	Slender Dock	10s	NA

TC 20, 21,12 South of Taylors St

ZONE NO	TC20	ALTITUDE: 300 m ASL	EVC	932 Wet Verge Sedgeland, 126 Swampy Riparian Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	101.8 (total of 32.8, 34.1 & 34.9)
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Appears degraded, creek edges severely infested with Gorse. Single Manna Gum apparent on creekline in TC20			

	Name	Common name	Prevalence (est.)	Weed Priority
*	*Cichorium intybus*	Chicory	100s	2
*	*Populus alba*	White Poplar	100s	2
*	*Prunus spp.*	Prunus	100s	1
*	*Vulpia bromoides*	Squirrel-tail Fescue	1000s	3
1.	*Eucalyptus ovata*	Swamp Gum	<10	NA
2.	*Poa labillardierei*	Common Tussock-grass	1000s	NA

TC22 King William St to Wallan-Darraweit-Guim Rd- creekline

ZONE NO	TC22	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	1.0
COLLECTOR:	BB MW	LONGITUDE:	Veg category	Scattered trees
NOTES	Appears that some Indigenous *Acacia mearnsii* and possibly other indigenous trees are persisting amongst dense plantings and exotic trees as viewed from road Darraweit-Wallan Road			

	Name	Common name	Prevalence (est.)	Weed Priority
	Acacia mearnsii	Black Wattle	NA	

TC23 Northern Highway to Hume Freeway

ZONE NO	TC23	ALTITUDE: 300 m ASL	EVC	932 Wet Verge Sedgeland
DATE:	13/12/07	LATITUDE:	Area (ha)	8.2
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Degraded treeless vegetation
NOTES	Appears totally alienated, creek has been realigned into a ditch which is lined with indigenous *Juncus* spp.			

	Name	Common name	Prevalence (est.)	Weed Priority
1.	*Juncus australis*	Austral Rush	1000s	NA

TC24 King William St to Wallan-Darraweit- slopes

ZONE NO	TC24	ALTITUDE: 300 m ASL	EVC	55 Plains Grassy Woodland
DATE:	13/12/07	LATITUDE:	Area (ha)	4.8
COLLECTOR:	INDIRECT	LONGITUDE:	Veg category	Scattered trees
NOTES	NOT ASSESSED FURTHER appears to have undergone intensive gardening from Google Earth maps and from viewing from the roads at either end			

TC25 King William St, Swamp Gum bend

ZONE NO	TC25	ALTITUDE: 300 m ASL	EVC	164 Creekline Herb-rich Woodland
DATE:		LATITUDE:	Area (ha)	0.5
COLLECTOR:	BB TF	LONGITUDE:	Veg category	Scattered trees
NOTES				

	Name	Common name	Prevalence (est.)	Weed Priority
*	*Genista monspessulana*	Montpellier Broom	10s	1
*	*Phalaris aquatica*	Toowoomba Canary-grass	100s	2
*	*Salix cinerea*	Grey Sallow	10s	1
*	*Ulex europaeus*	Furze	10s	1
*	*Viola odorata*	Sweet Violet	<10	2
	Acacia mearnsii	Black Wattle	<10	NA
	Acacia melanoxylon	Blackwood	<10	NA

	Eleocharis acuta	Common Spike-sedge	10s	NA
	Eucalyptus ovata	Swamp Gum	<10	NA
	Geranium solanderi sensu lato	Austral Crane's-bill	10s	NA
	Juncus australis	Austral Rush	10s	NA

12.3. Estimated costs

[A table of broad management actions and their approximate costs will be developed.]

12.4. Sources of funds

[A list of possible sources of funding for the management actions will be developed.]

13. References

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