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WEST BELCONNEN | LANDSCAPE AND OPEN SPACE STRATEGY

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Prepared for Riverview Projects [ACT] Pty Ltd & ACT Land Development Agency by McGregor Coxall [Sydney]

Proj No: 322SL **Report Contact:** Matt Ritson

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Cover Image - Murrumbidgee River and Conservation Corridor from Shepherd's Lookout
[Image: Tony Adams]

DISCLAIMER

1. The development parameters, (dwelling numbers, stages etc.) referred to in this report may vary over time. The figures contained herein are estimates; they represent a good approximation of likely development outcomes to a sufficient level of accuracy for the purposes of this report.

2. This Study is for the confidential use only of the party to whom it is addressed (the client) for the specific purposes to which it refers. We disclaim any responsibility to any third party acting upon or using the whole or part of its contents or reference thereto that may be published in any document, statement or circular or in any communication with third parties without prior written approval of the form and content in which it will appear. This Study and its attached appendices are based on estimates, assumptions and information sourced and referenced by McGregor Coxall and its sub consultants. We present these estimates and assumptions as a basis for the reader's interpretation and analysis. With respect to forecasts we do not present them as results that will actually be achieved. We rely upon the interpretation of the reader to judge for themselves the likelihood of whether these projections can be achieved or not. If financial models have been included, they have been prepared from the best information available at the time of writing, no responsibility can be undertaken for errors or inaccuracies that may have occurred both with the programming or the financial projections and their assumptions. In preparing this Study we have relied upon information concerning the subject property and/or study area provided by the client and we have not independently verified this information except where noted in this Study.

Contents

Figures

Terminology

Abbreviation	Name
ACTPLA	ACT Planning and Land Authority
ACTRFS	ACT Rural Fire Service
APZ	Asset Protection Zone
BNT	Bicentennial National Trail
CERES	Centre for Education and Research in Environmental Strategies
CPTED	Crime Prevention Through Environmental Design
DCP	Development Control Plan
FCT	Federal Capital Territory
HRB	Hills Ridges and Buffer Spaces
NCA	National Capital Authority
NCOSS	National Capital Open Space System
NCP	National Capital Plan
NSW	New South Wales
PTWL	Pink-tailed Worm Lizard
RFS	Rural Fire Service
WBRMC	West Belconnen Resource Management Centre
WSUD	Water Sensitive Urban Design

1.0 Introduction

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1.1 WEST BELCONNEN VISION

West Belconnen will be a sustainable community of international significance in the nation's capital, exemplifying World's Best Practice in its design, construction and long-term liveability. The project objectives and principles are based on an integrated triple bottom line sustainability framework that encompasses the following headline categories;

- Partnering - collaborating with government agencies, non-governmental bodies and the community to achieve sustainability outcomes.
- Evaluation - delivering a transparent and accountable sustainability monitoring and reporting process.
- Ecology - respecting natural ecosystems and minimising the environmental footprint of the development.
- Society and culture - creating a vibrant, culturally connected and healthy community
- Economy - ensuring the long-term financial viability of the project while supporting local jobs and industry.

1.2 PROJECT OVERVIEW

The West Belconnen project site covers a total area of 1623ha and will ultimately be home to a community of 30,000 people. The site is located on the northwestern edge of the Belconnen district as shown on the diagram below. As outlined above the project aims to become a world leading residential community providing an unrivalled level of sustainability and liveability. The new community will be integrated into the existing adjacent suburbs through its open space and movement networks, providing valuable open space to the neighbouring communities.

The Murrumbidgee River Corridor, which runs along the western boundary of the site, is home to significant ecological communities and their conservation is a primary focus of the site planning. Ginninderra Creek, Falls and Gorge to the north, add to the natural beauty of the project area.

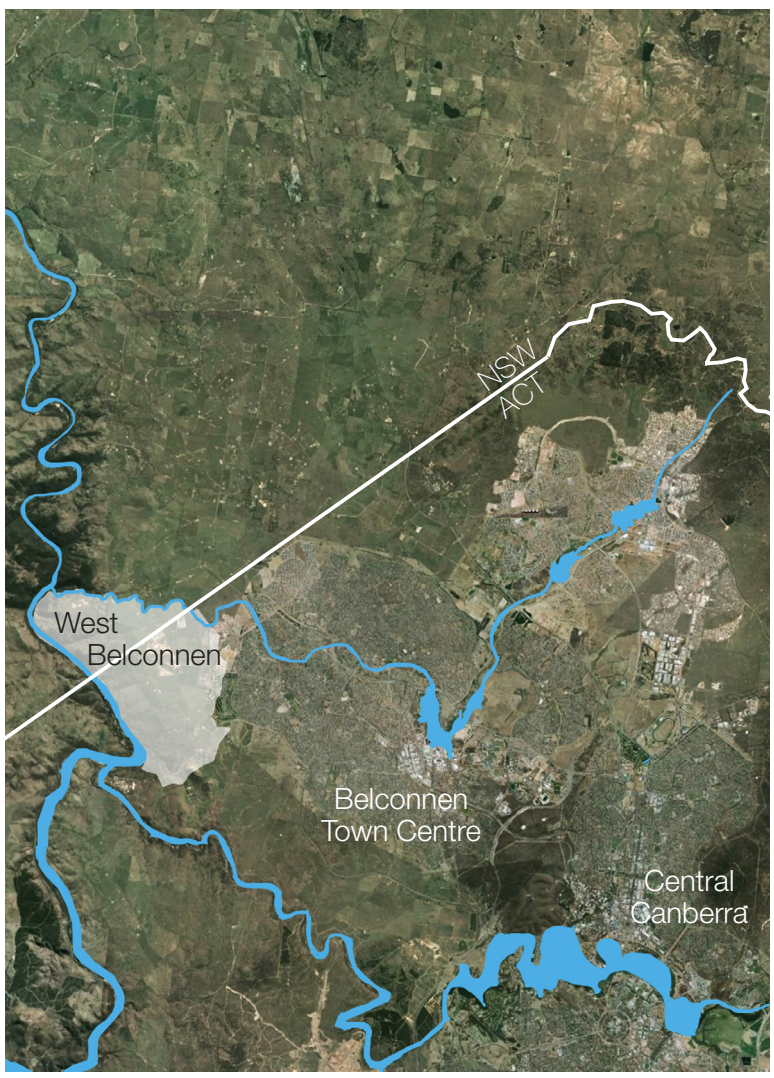


Figure 1.01- Site Context

Image - Murrumbidgee River Corridor

1.3 SUSTAINABILITY TARGETS

Green Star Communities accreditation

West Belconnen has been accepted as a Green Star Communities Pilot project giving it the opportunity to become one of the first communities in Australia to be accredited. The aim is for 6 star accreditation which will give West Belconnen the distinction of being recognised as a world leader. The Greenstar Communities tool will assess the project within 6 categories;

- Governance - demonstrate leadership and commitment to sustainability through engagement, transparency, community and industry capacity building, community resilience to climate change.
- Design - sustainable urbanism through best practice planning and design, creating places for people, encouraging smart growth that is compact, connected and people-focussed.
- Liveability - safe, accessible and place-making with a high level of amenity, activity and inclusiveness.
- Economic prosperity - provision of affordable living and housing, investment in education and skills development, facilitation of community capacity building.
- Environment - resource management and efficiency by promoting infrastructure, transport and buildings with reduced ecological footprints. Reduce impacts on sensitive ecosystems on land, water and the atmosphere.
- Innovation - adopt innovation in planning, design and delivery of communities.

A number of the available credits are to be addressed by the landscape and open space strategy and are outlined below and on the following pages.

Green Star Communities Credit [Points Available]		Credit Criteria
DES-2	CONTEXT ANALYSIS [2]	Context analysis - Two points are awarded where comprehensive context analysis is provided. The comprehensive analysis needs to include consideration of: ● The general site context; ● The local site context; and ● The characteristics of the project site.
LIV-3	HEALTHY AND ACTIVE LIVING [5]	There is a minimum requirement and five points available in this credit. To achieve any points, the project must comply with the 'Minimum Requirement - Footpaths' criterion. The points for 'Active Lifestyle' and 'Recreational Facilities' are independent of each other. The points for 'Healthy Places' can only be achieved if full points have been achieved in the 'Active Transport' and 'Recreational Facilities' Credit Criteria. **Minimum Requirement -** Footpaths To be eligible for this credit, projects must provide footpaths in line with the project's street hierarchy. **Active Lifestyle -** Two points are awarded where the community has been designed and built to promote an active lifestyle, through well designed walking paths and cyclist facilities. **Recreational Facilities -** One point is awarded where all dwellings, places of employment and/or places of education have easy access to both a public park and an appropriate number of publicly accessible sports facilities relevant to the size and demographics of the project community. **Healthy Places -** Two additional points are awarded where the development has been designed and built in line with holistic active and healthy living principles.
LIV-4	ACCESS TO FRESH FOOD [2]	There are two points in this credit. Each is Credit Criteria is independent from the other. **Access to Fresh Food** One point is awarded where all habitable buildings are close to a source of fresh food. **Local Food Production** One point is awarded where there are well sized, located, and serviced community food garden(s) within the project site.

Table 1 - Green Star Communities Credit Points

Green Star Communities Credit [Points Available]		Credit Criteria
LIV-5	SAFE PLACES [2]	There is a minimum requirement and two points available in this credit. To achieve any points, the project must comply with the 'Minimum Requirement - Visibility' criterion. Two points are available for projects that comply with the 'Design for Safety' criterion. **Minimum Requirement Visibility** ● All tunnels or underpasses within the community have end-to-end visibility; and ● All public areas, such as playgrounds, skate parks and community food gardens, are visible from at least one street. **Design for Safety Two points are awarded where:** ● A crime risk assessment process is undertaken; and ● As a result of the risk assessment, all urban structures, activity centres, parks, open spaces, car parking areas and public facilities through good design deter criminal behaviour.
ENV-3	HEAT ISLAND EFFECT [1]	There is one point available in this credit. **Heat Island Effect -** One point is awarded if at least 50% of the total project site area in plan view comprises one, or a combination, of the following: ● Vegetation; ● Roof materials having a minimum solar reflectance index (SRI) of >78; ● Un-shaded hard-scaping elements with a SRI of > 29; ● Water bodies and/or water courses.
ENV-7	POTABLE WATER CONSUMPTION [4]	There are four points available in this credit. **Alternative water sources** Up to four points are awarded where: ● irrigation for public open spaces and public realm areas is sourced from non-potable water sources, or no irrigation is required; and ● buildings in the project have access to alternative water sources that will meet non-potable water demand for those buildings. There are two options to demonstrate compliance, a deemed-to-satisfy approach and a calculation-based approach.
INN-1	INNOVATION [10]	Up to ten points can be awarded for innovation. Points are awarded at the GBCA's discretion, and can be claimed against one or more of the following categories: **Innovative Strategies and Technologies** The initiative is a process, methodology and/or technology with a level of sustainability performance that is considered innovative in Australia or the world **Market Transformation** The initiative substantially contributes to the broader market transformation towards sustainable development in Australia or in the world. **Improving on Green Star Benchmarks** The initiative results in a substantial improvement to a specific impact (environment, social, economic), addressed by the Green Star credit targeted. **Green Star Innovation Challenges** Initiatives will need to respond to one or more of the Green Star - Communities Innovation Challenges posted on the GBCA innovation portal. These challenges have been designed to challenge projects to be even more sustainable. **Sustainable Design Initiatives** Initiatives will need to addresses an issue not included within any of the existing Green Star Credits or Green Star - Communities Innovation Challenges.

Table 2 - Green Star Communities Credit Points

1.4 LOSS - INTEGRATED OPEN SPACE SYSTEM

Developing an open space system that is integrated with the surrounding open space systems and adjacent communities of West Macgregor, Holt and Dunlop will be of vital importance to the success of West Belconnen. Equally important will be the integration of the varying open space typologies within the development. The Landscape and Open Space Strategy [LOSS] will connect the open space system with the primary features of the development, including schools and retail centres, while also enabling connection between local villages and neighbourhoods.

The open space system comprises of two primary parts;

- Conservation Corridor and Ginninderra Creek riparian zone; 576ha of open space to the periphery of the development area which will protect a number of ecological communities, provide a vast recreational resource and contribute to the National Capital Open Space System [NCOSS].
- Open space within the developable area; consisting of parks and recreation spaces, streets, transmission easement corridors, Belconnen Farm heritage precinct and the Belconnen Landfill site.

The integration and connection of these two parts, and all of the elements they contain, will be achieved through a comprehensive movement network catering for all forms of transport. The final element of the system will be the Conservation Management Trust, which is described further in section 4, that will oversee the Conservation Corridor and engage the community to become custodians of the open space system.

A number of key elements will be integrated into the open space system to create a diverse and vibrant asset for the community of West Belconnen, these are outlined below and will be discussed in greater detail in the following sections.

Key Elements

Conservation

The ongoing protection, restoration and regeneration of the Conservation Corridor will be a major measure of the success of the West Belconnen development. A key element of the conservation programs will be the development of management plans for the individual species and communities to ensure their long term survival. These specific management plans will sit within a broader management plan to be developed as the basis for ongoing management of the corridor into the long term future. The development of the management plans will be a first step to be commenced immediately following the rezoning.

Recreation

Recreation will be a key use of the entire open space system and its integration with the other uses will be of primary importance.

Industrial Ecology

The opportunity to embed Industrial Ecology systems within West Belconnen, particularly within the open space system, will play a major role in the future sustainability of the community. Industrial Ecology uses the functioning of ecological systems as a model for developing industrial systems. The primary goal of Industrial Ecology systems is identifying waste products from one system that can be used as an input for another. These ‘closed loop’ systems reduce waste and also reduce the need for the input of virgin materials.

Urban Agriculture

Urban agriculture has been a part of cities since the earliest civilisations. In recent decades advances in industrial farming, rising land values and sprawling cities have led to a decline in the amount of food grown within our city boundaries. Recently however, local food movements have started championing the need to grow food closer to consumers as issues regarding food security, food miles and the increasing environmental costs of land clearing and degradation gain momentum.

The urban agriculture network will become integrated into Industrial Ecology systems, particularly through the conversion of organic/green waste into soil improving components including compost and soil conditioners. Urban agriculture offers the opportunity to develop a ‘closed loop’ system that diverts waste from landfill by utilising green wastes, creating a sustainable local green waste network that produces food for the community.

Parks

The open spaces within the developable areas, which provide the day to day experiences for the community, will be vitally important notwithstanding the extensive amounts of open space available in the Corridor. The urban parks will be especially important for local children, providing safe places for social interactions and play.

Interpretation

A number of opportunities exist to provide interpretive elements within the open space system. Indigenous and Non-Indigenous cultural elements are found as well as opportunities for ecological and environmental interpretation.

Management

It is proposed the management and governance of the Conservation Corridor will be undertaken by a Trust set up by the Development Manager to ensure the ongoing conservation, restoration and management of this vital open space system.

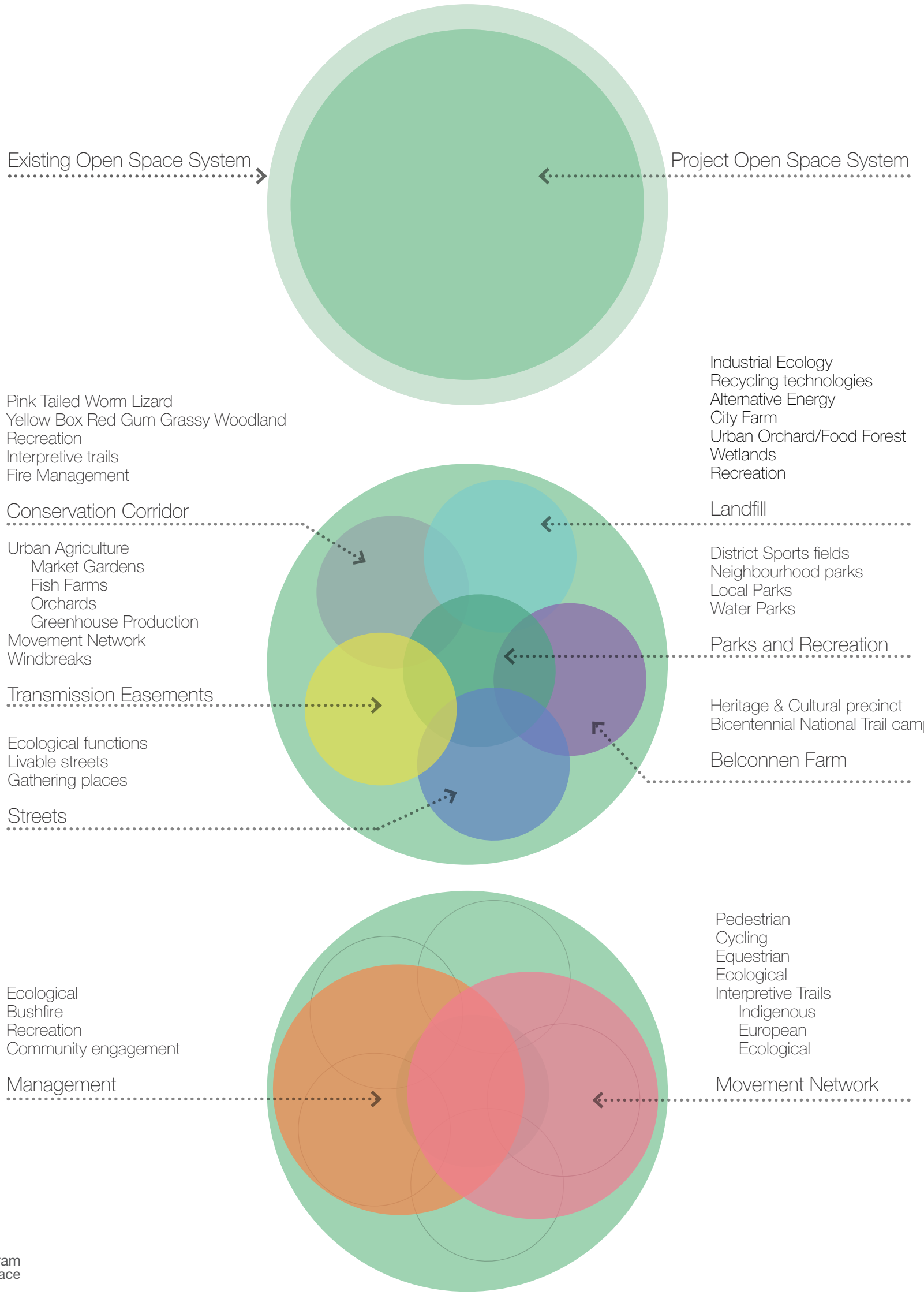
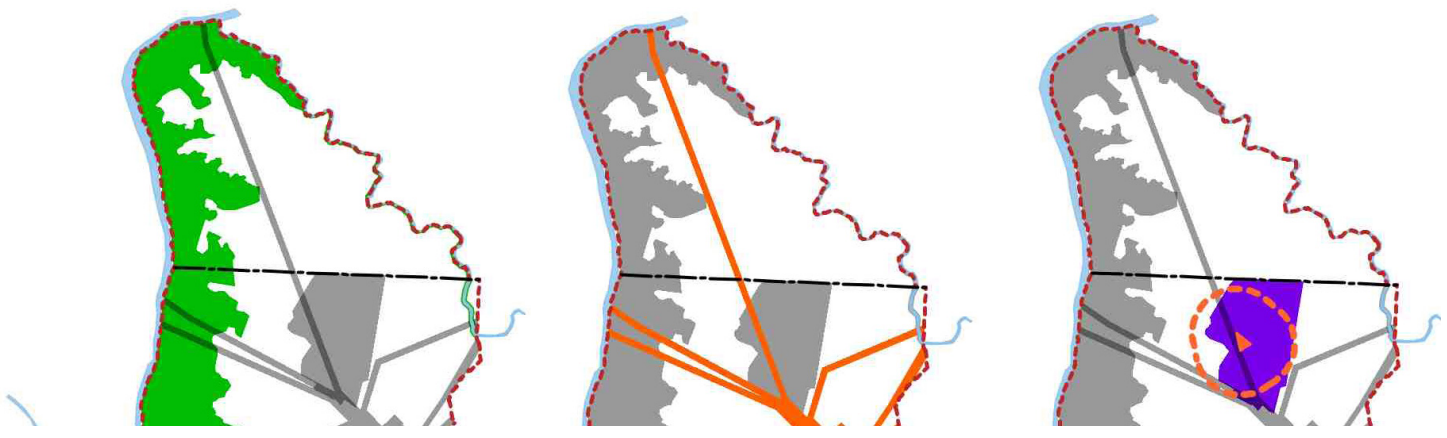


Figure 1.02 - Concept diagram showing Integrated Open Space System.

1.5 ROLE OF THE LOSS

The primary role of the LOSS is to guide the development of the open space system over the forecast 30 to 40 year development period. The LOSS encompasses a wide range of open space typologies and sets up the framework for their implementation and use in perpetuity.

This report provides a detailed commentary on the components of the LOSS. Section 2.0 outlines the Analysis carried out to understand the nuances of the site and its contextual positioning, including the detailed planning context. Section 3.0 discusses the opportunities for the open space system of West Belconnen, outlining the strategies proposed to create a sustainable, integrated and world leading residential community.



2.0 Analysis

2.1 ACT DEVELOPMENT POLICY BACKGROUND

The key document that guides the future planning of Canberra is the National Capital Plan [NCP], prepared and administered by the National Capital Planning Authority [NCA]. A number of documents control development in the ACT, the hierarchy of these documents are;

- National Capital Plan
- Territory Plan
- Precinct Code
- Development Code
- General Code

Canberra's planning policies are developed from the blueprint provided by the Griffin Legacy. The Griffin Legacy's intention is to restore the urbanity and vitality of Canberra as a cosmopolitan lakeside city. Griffins plan had four main elements;

- Use topography as an integral design feature and as a setting
- A symbolic hierarchy of land uses designed to reflect the order and functions of democratic government
- A geometric plan with a central triangle formed by grand avenues terminating Capital Hill, the symbolic centre of the nation
- A system of urban centres

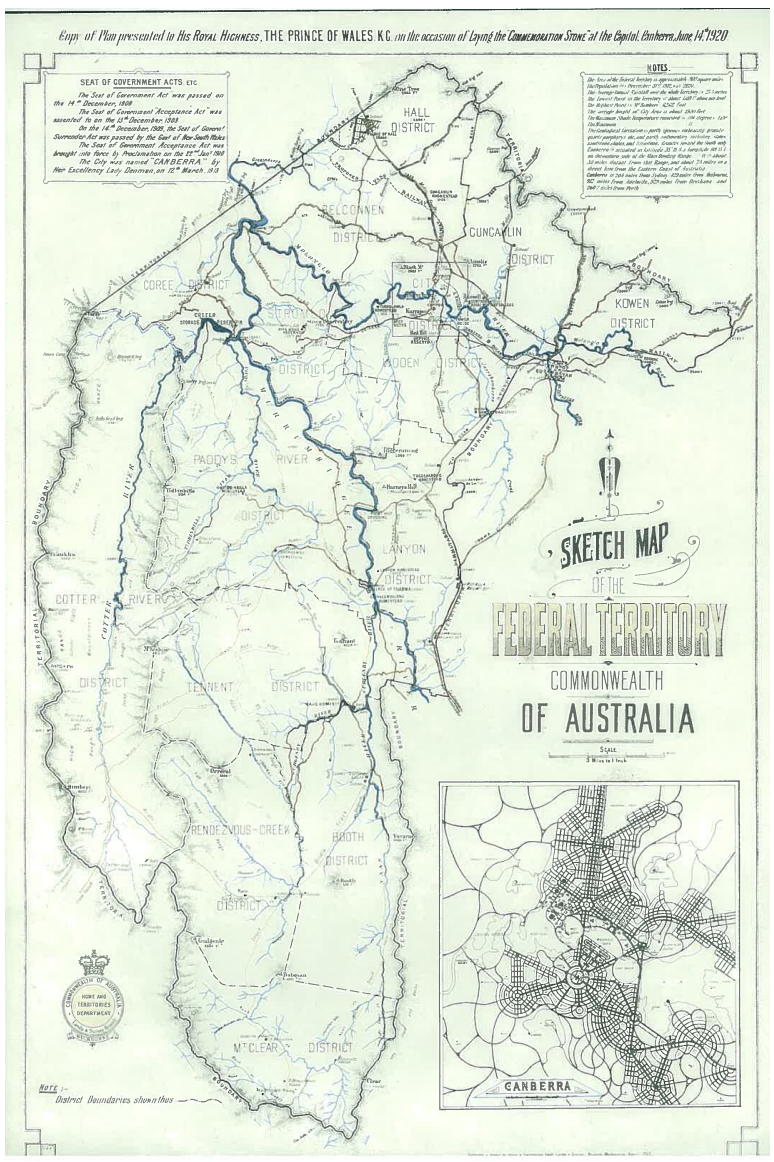


Figure 2.01 - Federal Territory Prince of Wales Map with inset showing Griffins Geometry for Central Canberra

National Capital Plan

The NCP 'ensures Canberra and the Territory are planned and developed in accordance with their national significance' [NCA, 2013]. The NCP controls the development potential of West Belconnen through two possible mechanisms.

The first is the requirement for development of 'National Land' to be consistent with a Development Control Plan [DCP] prepared by the National Capital Authority [NCA]. No part of the project area is defined as National Land.

Secondly the NCP exerts influence through its own provisions, which in turn influence the provisions of the Territory Plan which is required to be "not inconsistent" with the NCP under the provisions of the *(Commonwealth) ACT Planning and Land Management Act.*

The NCP identifies Territory Land [i.e land that is not "national land"] which has the special characteristics of the National Capital as 'Designated Areas'. The National Capital Plan sets out detailed planning controls and the National Capital Authority maintains planning jurisdiction over Designated Areas. There are no "designated areas" within the West Belconnen project area.

The West Belconnen project area falls into three land use categories under the NCP, refer figure 1.02;

- River Corridors
- Hills Ridges and Buffer Spaces
- Broadacre

A separate report prepared by A.T Adams Consulting and submitted to the NCA addresses the required amendments to the NCP.

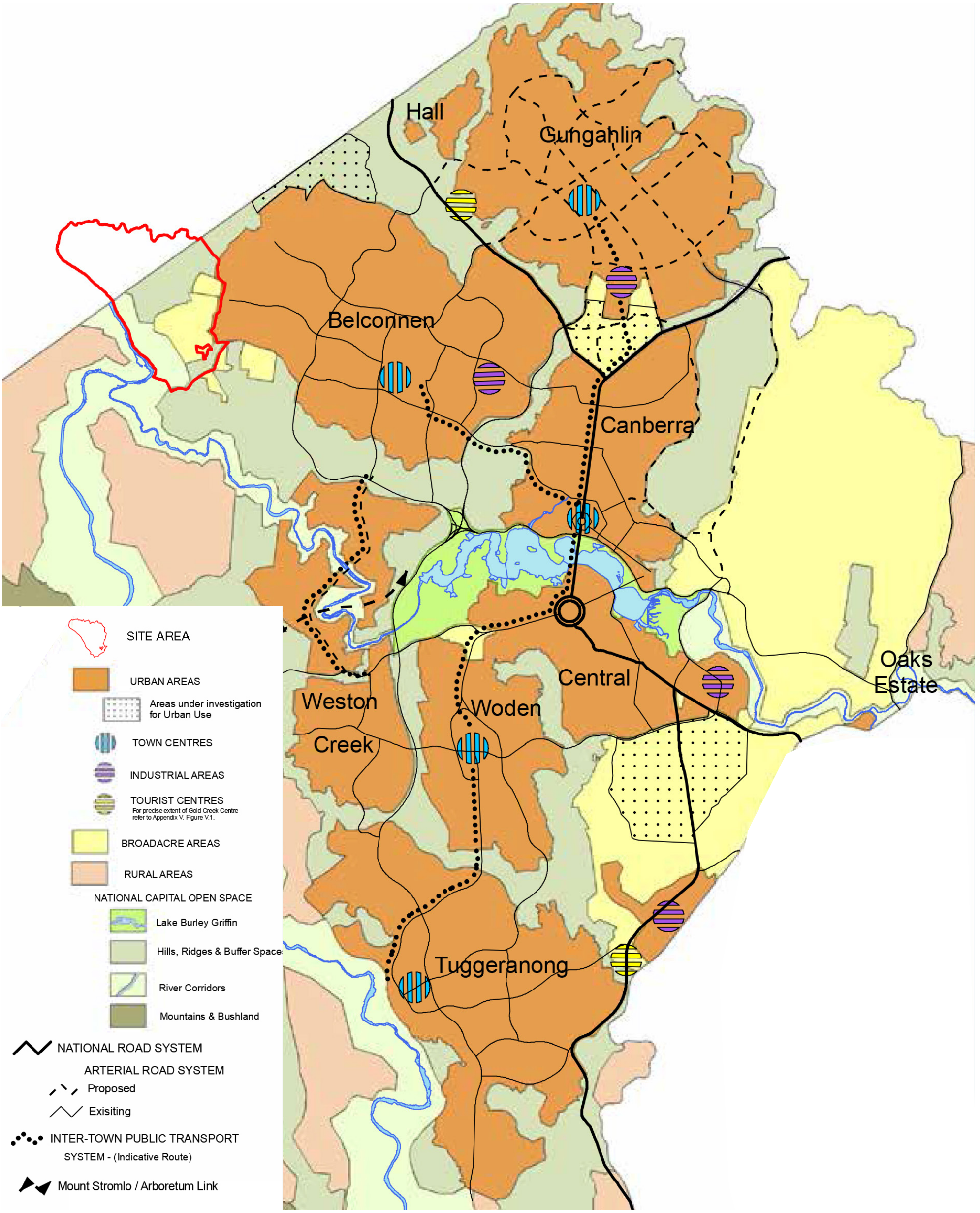


Figure 2.02 - General Policy Plan
Adapted from National Capital

Territory Plan

The Territory Plan complements and applies concurrently with the principles and policies set out in the NCP while emphasising the particular needs of the Territory.

The Territory Plan contains the 'Statement of Strategic Directions' that set out the principles for sustainable development as well as spatial planning and urban design principles that are intended to guide the more specific policy content of the Plan. A number of these principles apply directly to the open space system of the West Belconnen project as follows;

- 1.6 The pattern of development is to reflect land capability constraints resulting from topography, soils, geotechnical factors, drainage, natural hazards, microclimate and the sensitivity of ecosystems. Particular attention will be given to the need to conserve soil, water and vegetation; maintain biological diversity; safeguard important ecosystems and ecological processes; and provide and protect wildlife corridors.
- 1.19 A variety of open space types will be provided in each district or local area to meet the diverse recreational needs of residents and visitors, and to contribute to community health.
- 1.20 Planning policies for community facilities and open space will encourage multiple use and flexible design to allow for changing needs.
- 1.25 Heritage and cultural values will be safeguarded, including in particular those of the Territory's Aboriginal peoples and those derived from both its rural history and urban development as the National Capital
- 2.10 ...Open space will be planned and carefully maintained as an integrated, hierarchical system that provides for a diversity of sport and recreation activities, contributes to the legibility and character of urban development, is cost-effective to maintain, and assists in the effective management of stormwater.
- 2.11 Planning policies will protect the landscape and environmental qualities of the hills and ridges surrounding urban areas, the Murrumbidgee and other river corridors, the mountains and forests west of the Murrumbidgee River, and productive rural landscapes.
- 2.15 Acknowledge Canberra as the national capital and the symbolic heart of Australia and will seek to preserve the landscape features that give the national capital its character and setting and conserve open space between urban areas as visual separation buffers consistent with the landscape setting.
- 2.16 Retention of Canberra's unique landscape setting, including the integration of natural and cultural elements that create its 'garden city' and 'bush capital' qualities, will be accorded the highest priority. Special attention will be given to safeguarding visual amenity, protecting vegetation and other important features within the established urban landscape, and ensuring the high quality of environmental design in new developments or redevelopment.

The design of the open space system for the West Belconnen project will address each of these principles to ensure the proposal contributes to the social, cultural and natural capital of the ACT.

Image - Aerial view to north over Canberra showing 'bushland' setting

National Capital Open Space System

The importance of the natural setting of the National Capital has been recognised by the creation and formal adoption of the concept of the National Capital Open Space System [NCOSS] as a component of the National Capital Plan. This system essentially comprises the inner hills and ridges which surround and frame the urban areas, the major lakes and river corridors, and the distant mountains and bushland to the west of the Murrumbidgee River and covers 70% of the ACT.

The following is the 'Principle for the National Capital Open Space System' as described in the NCP;

"NCOSS is required to protect the nationally significant open-space framework, visual backdrop and landscape setting for the National Capital. NCOSS will blend city and country in a way that symbolises the character of the National Capital and provides a balanced range of uses which reinforces the natural, cultural, scenic and recreational values of the ACT."

The NCOSS has four main types of open space;

- Symbolic spaces - key symbolic spaces of the gazetted 1925 plan based on Griffin's design for the city, providing the unique and monumental landscapes integral to a National Capital.
- Living spaces - network of regional and metro-politan parks which are generally accessible for a broad variety of recreation and tourist uses
- Linking spaces - fingers of urban land and open space that both physically and visually unite 'the city with the country'.
- Conservation spaces - protection for the natural and cultural heritage of the ACT.

Together these open spaces constitute a system which protects the environmental quality of Canberra's present and future water catchments, river systems, and important ecological and heritage areas from the increasing pressure of Canberra's growth. While each part has its own land use and character they are all interrelated as parts of a total system. Land Use Categories

The project area is covered by three land use categories. Each of these categories are described below and the impacts on the project discussed.

Image 1 - Symbolic Space
Image 2 - Living Space
Image 3 - Linking Space
Image 4 - Conservation Space

NCOSS Review

The NCOSS review report, published in February 2014, provides a series of recommendations describing ways to establish a framework for future reviews, greater promotion of the NCOSS, and better engage stakeholders in managing the values of the NCOSS.

The report reiterated the four different types of open space provided for in the National Capital Plan, as outlined previously.

It also reported on the extensive community consultation that had been conducted during the preparation of the report. The consultation process found that the community recognised the importance of four functions of the NCOSS (to varying degrees):

- the visual and symbolic importance of the NCOSS to the overall look and feel of Canberra
- the contribution of the NCOSS to a sustainable environment that provides many social and health benefits
- the biodiversity values of the NCOSS which help provide resilient spaces for plants and animals
- the NCOSS as a place for recreation (such as walking, riding and running).

The report makes a number of recommendations in response to the terms of reference set for the review. The recommendations include provision for periodic review of the NCOSS, at intervals no greater than seven years. Inter alia, the intent is that periodic reviews should recommend boundary changes and improvements as required. The West Belconnen project as set out in this report is proposed on the premise that two areas of NCOSS land currently zoned as “hills ridges and buffer” should be removed from the NCOSS with an extension to the area identified for Vegetation Restoration to protect ecological communities identified on the site. The rationale for this is discussed further below.

River Corridors

Principle for River Corridors;

“To protect and enhance the environmental quality, landscape setting and the natural and cultural resources of the Murrumbidgee and Molonglo River Corridors. The Murrumbidgee River Corridor is to be conserved as an important national resource and a key open space element which provides a definable edge to the developed urban areas.”

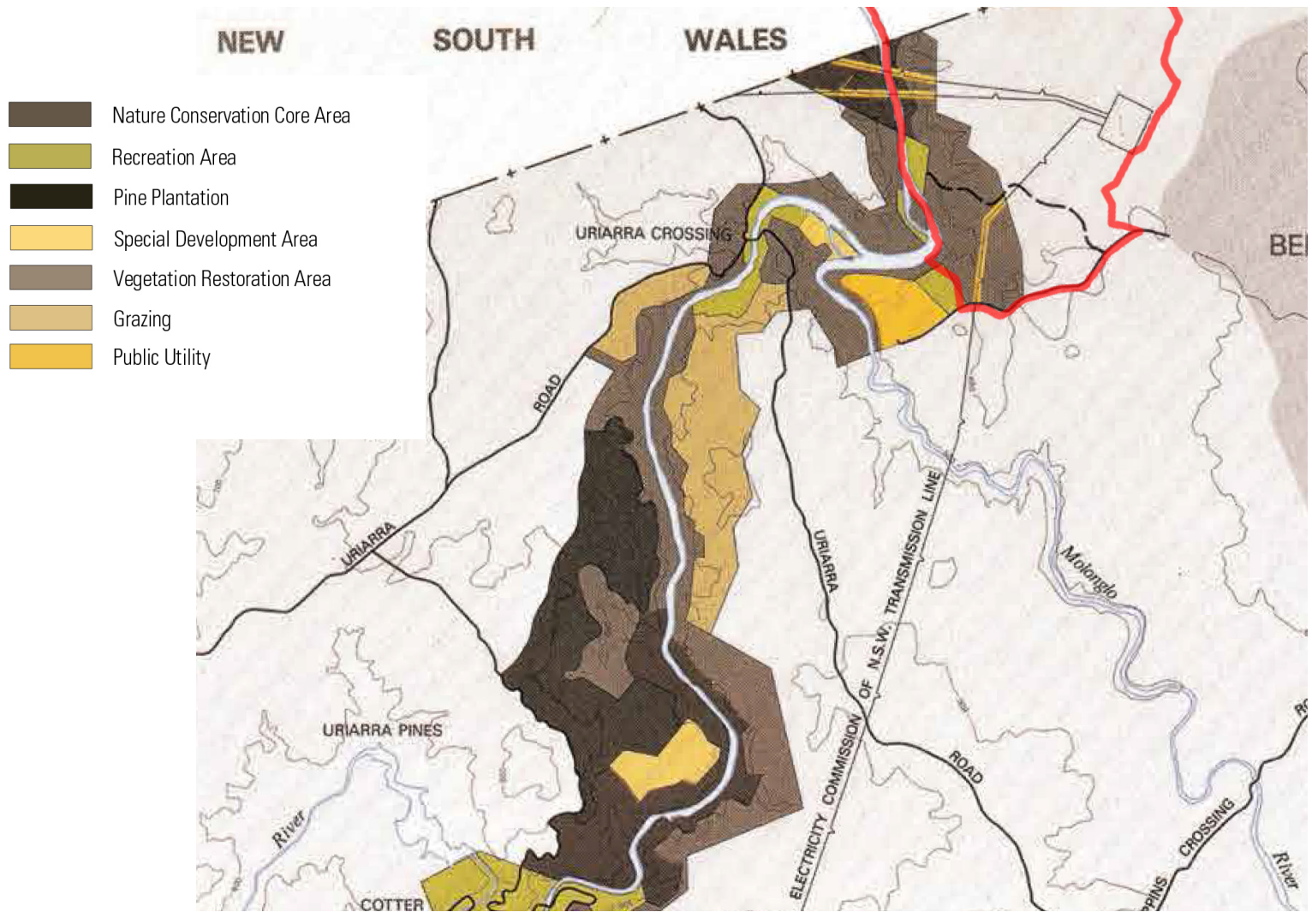


Figure 2.03 - Murrumbidgee River Corridor Plan - NCP

The corridors of the Murrumbidgee and Molonglo Rivers form part of the NCOSS with a primary aim of reinforcing and preserving their landscape and heritage values. They also provide important ecological connections as well as recreation and tourism uses.

Recreation and conservation are recognised as the primary goals of the established planning and management policies for the Murrumbidgee River Corridor. The river corridor is recognised as providing a definable edge to Canberra's development.

The current river corridor within the ACT [identified in both the NCP and Territory Plan] located within the site boundary covers an area of approximately 290.8ha. Three ecological communities of regional and national importance are found within the corridor. These are rocky habitat for the Pink Tailed Worm Lizard [PTWL], Yellow Box Red Gum Grassy Woodland [YBRGGW] and River Oak Forest. Substantial and detailed environmental research and mapping have led to the creation of a proposed new river corridor boundary to better reflect the habitat areas of the PTWL and YBRRGW. The new boundary will expand the river corridor area with the ACT to approximately 359.2ha. Additionally, the corridor will be continued into the NSW portion of the site adding a further 220.7ha of protected conservation lands that will enable ecological connections to the Murrumbidgee River in NSW as well as Ginninderra Creek.

A recreation area is identified within the river corridor by the NCP and this will be implemented as part of the landscape and open space strategy. Careful planning is required to ensure no detrimental impacts occur to the ecological communities present in the corridor.

The proposed expansion of the river corridor zone area to accommodate outcomes of national environmental significance is in accord with the intent of the NCP in regards to river corridors and consequently would align well with overall planning policy.

Image 1- Murrumbidgee River Corridor
Image 2 - View over Recreation Area identified in the NCP.
Image 3 - View north into NSW along Murrumbidgee River Corridor

Hills Ridges and Buffer Spaces

Principle for Hills Ridges and Buffer Spaces [HRB];

"remain substantially undeveloped in order to protect the symbolic role and Australian landscape character of the hills and ridges as the scenic backdrop to the Parliamentary Zone, Civic and other National Capital precincts, to maintain the visual definition and physical containment of the surrounding towns and to ensure that their landscape, environmental and recreation values become an integral part of the National Capital."

There are two "hills ridges and buffer" zone areas on the site: adjacent to Stockdill Drive in the south east and adjacent to the ACT/NSW border in the north. Neither of these areas is a hill or ridge that could provide a landscape containment effect to nearby developed areas as is the case with the majority of HRB zoned areas elsewhere in the ACT. Their function is that of a buffer only and the continuing need for this, in the context of the West Belconnen project proposal, is discussed below.

The Stockdill Drive HRB zone lies between land zoned as "broadacre" (a zone in which 'peri-urban' development is already permissible) both within the West Belconnen project area and to the south of Stockdill Drive. All of the land to the south of Stockdill Drive extending to Weston Creek was identified in the 2004 Canberra Spatial Plan as "future greenfield residential". It was intended to be developed as "central Molonglo" , complementing the east Molonglo development (now under construction) and "west Molonglo" which is within the west Belconnen project area. The Stockdill Drive HRB zone provided a buffer between central and west Molonglo. This is depicted on the "Molonglo Valley Concept Structure Plan" prepared by Annand Allcock for the ACT Planning Authority in 2006 (ACTPLA, 2006).

Following more detailed environmental investigations the great bulk of central Molonglo was excised from the proposed development area and this was reflected in the subsequent finalisation of variations to both the National Capital and Territory plans. Vestigial portions of central Molonglo immediately south of Stockdill Drive were found to have no ecological value and were rezoned as broadacre, with potential for future 'peri-urban' development. When and if these areas are developed then they should logically be integrated with West Molonglo/West Belconnen rather than with the central Molonglo area which is, now devoted to agriculture and conservation uses, and provides a substantial buffer between east Molonglo and the West Molonglo/West Belconnen development. The consequence of this is that the Stockdill drive buffer function has been taken over by the central Molonglo buffer and so is no longer required. The proximity of this land to substantial facilities and services at Holt (for example the

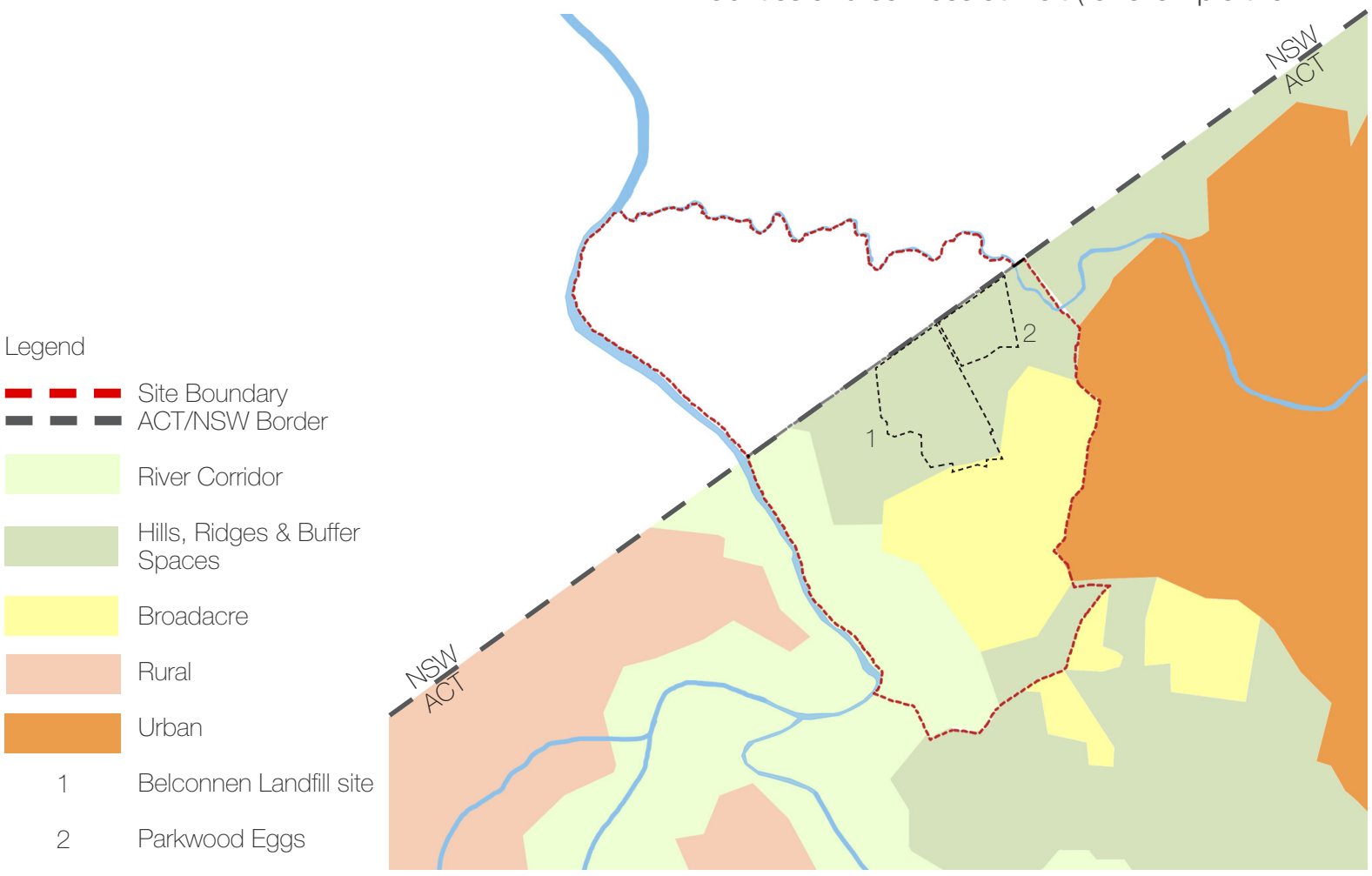


Figure 2.04 - Existing Land Use Zones.

Kingsford Smith School, Kippax centre, Drake Brockman Drive) means that its development for urban purposes would incur minimal public infrastructure expenditure and would rate highly on efficiency measures.

The function of the HRB land along the ACT/NSW border is referred to in National Capital Plan Policy 8.5.3(f); it says as follows:-

"The rural landscape in the areas adjacent to the ACT border between Hall and the Murrumbidgee River ……. will be retained as an intrinsic part of the National Capital Character and with additional landscape treatment provide physical containment to this part of Belconnen ……."

This buffer is along the only "straight line" segment of the ACT border and consequently it is unrelated to the surrounding landform and does not conform to the principle for HRB outlined earlier.

Whilst the intended function of the HRB Zone is clear in reality this has been substantially eroded at West Belconnen by the development of the Belconnen landfill and Pace Egg Farm abutting the border.

Taken together these factors have led to a review being undertaken of an appropriate location for a buffer to provide, in the long term, an appropriate separation between Belconnen and the land to the west.

It is identified by the NCP as 'fundamental' to future consideration of the area for urban development that an open space buffer is retained to separate West Belconnen from possible future urban development in NSW [NCP 2013,p.xiii].

Appropriate natural containment lines are in fact provided by the Murrumbidgee River and hills to the west, and a prominent ridge of hills immediately to the north of Ginninderra creek. This is illustrated in Figure 2.05 which shows the West Belconnen site as an extension of greater Belconnen and within physical containment lines similar to other areas of metropolitan Canberra.

For these reasons it is proposed that the HRB zone within the west Belconnen project site is unnecessary in a context where development is contiguous across the border, as is proposed and outlined below.

One of the key outcomes of this LOSS document is to demonstrate how the open space system will be developed as an effective buffer space while meeting demand for recreational activities from the new community and existing residents in neighbouring suburbs.

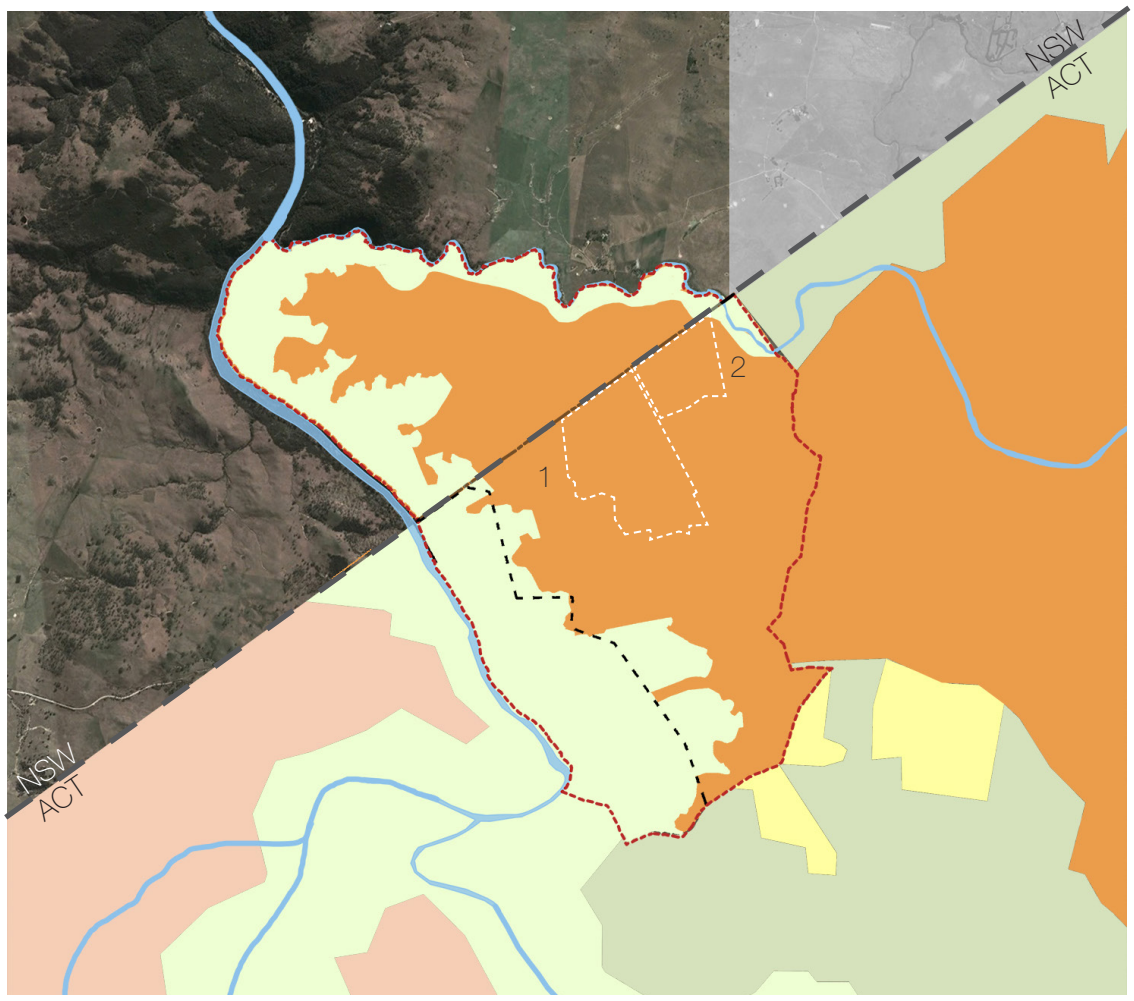


Figure 2.05 - Proposed Land Use Zones.

NCP Land Use Zone Comparison

Land Use Zone	Current [ha]	%	Proposed [ha]	%
River Corridor	290.8	27.9	392 [364 Murrumbidgee R. + 28 Ginninderra Ck]	37.7
Broadacre	340	32.7	107.9	10.4
Hills Ridges & Buffers	410	39.4	0	0
Urban	0	0	540.1	51.9
TOTAL	1040	100	1040	100

Broadacre Areas

The NCP defines Broadacre Areas as those that may act as buffers between towns, provide sites for uses which require large land areas or may benefit from or be best located within a non-urban setting, and in some cases provide a land bank for future urban areas [NCP 2013]. The following objectives are outlined for Broadacre Zones by the Territory Plan;

- Make provision in a predominantly rural landscape setting for a range of uses which require larger sites and/or a location outside urban areas
- Make provision for activities requiring clearance zones or protection from conflicting development
- Ensure that development does not adversely impact or visually intrude on the landscape and environmental quality of the locality
- Ensure, where appropriate, that development and the use of land does not undermine the future use of land which may be required for urban and other purposes

NSW

The NSW component of the project consists of a ‘peninsula’ without road access from NSW. The closest township in NSW is Murrumbateman approximately 25km to the northwest. The lands within the NSW component are rural lands in part zoned ‘E3 Environmental Management’ and ‘RU1 Primary Production’ both of which will ensure the preservation of a rural or bushland environment into the long term.

Due to this situation it is proposed this portion of the development will be serviced from the ACT.

2.2 CONTEXT

West Belconnen is situated approximately 12.5km northwest of central Canberra and 50km south of Yass. The site is located on the northwestern edge of the ACT straddling the ACT/NSW border, with the Murrumbidgee River and Ginninderra Creek forming the western and northern boundaries respectively. To the south the site is bound by land zoned broadacre and hills ridges and buffers and to the east, the Magpies Belconnen Golf Club and the suburbs of West Macgregor and Holt. The total site area is 1623ha.

Climate

The mean annual rainfall measures 633mm with the wettest month being September and the driest June. The hottest month is January with a mean maximum temperature of 28.5ºC and minimum of 13.6ºC with the coldest month being July with mean maximum of 11.5ºC and minimum of 0ºC. The ACT experiences 53 days with a mean minimum temperature ≤0ºC. The predominant winds are from the north, northwest and west.

Water Systems

Murrumbidgee River

The Murrumbidgee River flows in a northerly direction along the western boundary of the site and is a major tributary of the Murray River within the Murray-Darling Basin. The Murrumbidgee River is an important natural asset for the ACT providing a diverse ecological, scenic, cultural and recreational resource.

The Murrumbidgee River Corridor is subject to the NCP *Murrumbidgee River Corridor Policy Plan* which outlines policies for future land and water use in the river corridor. The following policies will guide the uses and programming of the West Belconnen section of the Murrumbidgee River Corridor, however not all are relevant to the site.

- Conserving the essential landscape and environmental character of the river.
- maintaining streamflow and protecting water quality from adverse external influences.
- protect ecological resources of the river and river corridor and associated areas in a relatively undisturbed state, maintaining a diversity of habitats, protecting significant natural sites and native plants and animals, and sustaining the ecological integrity and continuity of the river system for migrating fish and other wildlife populations.
- maintain and enhance the scenic and landscape character, preserving that which is valuable and enhancing unsatisfactory areas.
- protect and conserve the cultural heritage resources, including their landscape context.
- provide opportunities for a balanced range of recreational activities appropriate to the characteristics of the river and adjacent land and in the context of the provision of recreation in the ACT.
- To provide for public access to the river corridor for Canberra residents and tourists in a manner compatible with the other planning policies and make provision for a system of walking and interpretation trails within the river corridor.
- provide opportunities for appropriate environmental education, interpretation, research and

Figure 2.06 - Murray Darling Tributaries

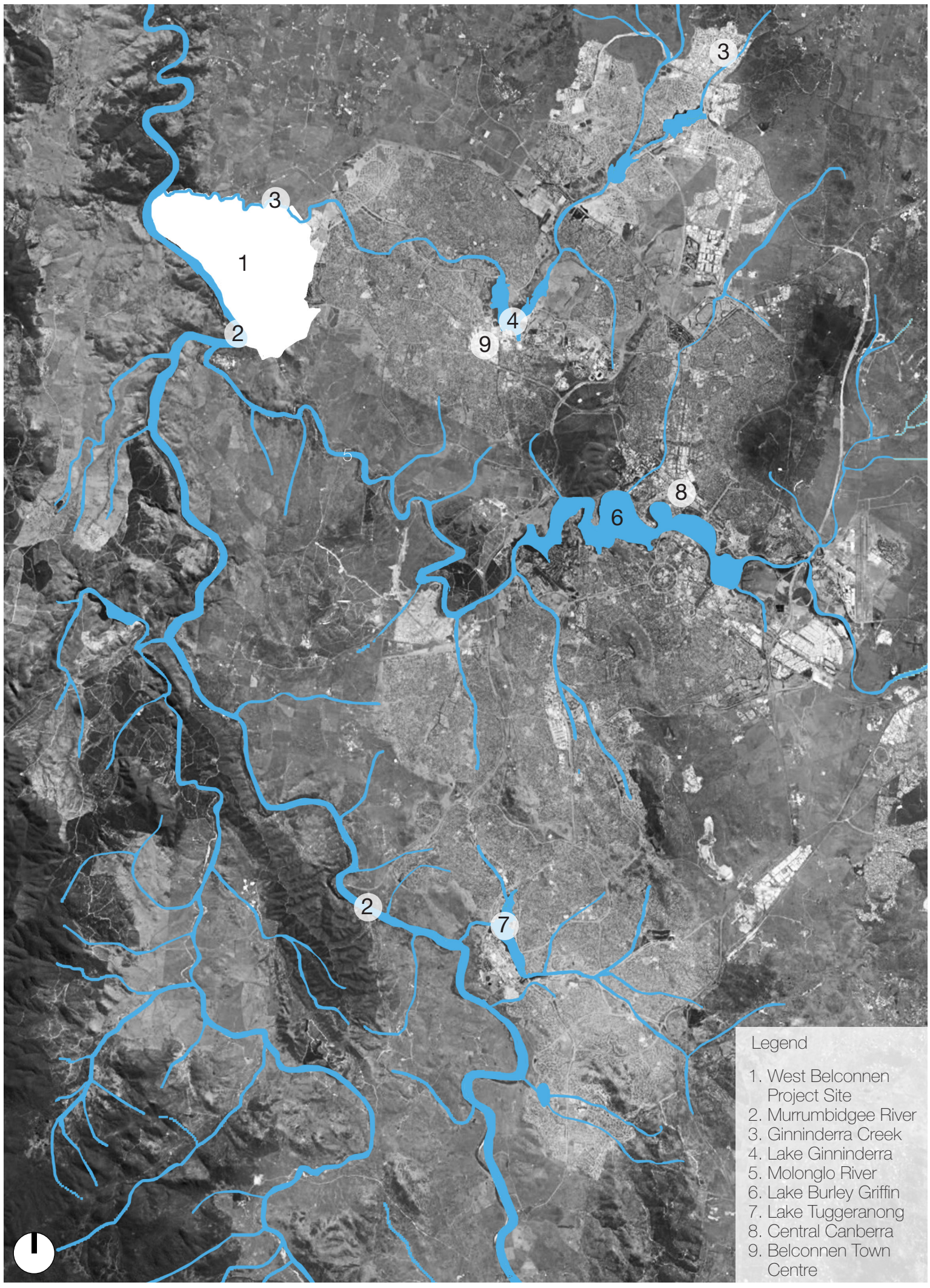


Figure 2.07 - ACT Waterways & Site Context

Scientific programmes; these should also enrich and broaden the recreational experience.

Ginninderra Creek

Ginninderra Creek is a tributary of the Murrumbidgee River rising within Mulligans Flat Nature Reserve to the northeast of Gungahlin adjacent the new suburb of Forde. It carries approximately one quarter of the urban runoff from Canberra towards the Murrumbidgee River [http://www.ginniderralandcare.org.au].

Ginninderra Falls and Gorge

Found along the northern boundary of the site, these features provide spectacular natural scenery, including Callitris forests and rock formations. They also offer the opportunity for introducing a variety of recreational uses [http://www.ginniderralandcare.org.au].

Site Drainage

The site drainage network consists of 60 sub catchments which generally flow to the east or west. A ridge line runs roughly northwest to southeast through the centre of the site. A number of drainage lines are found across the site, predominantly within the river corridor. The only named creek on the site is Spring Creek which flows from north of the landfill site in a westerly direction past Belconnen Farm discharging into the Murrumbidgee River.

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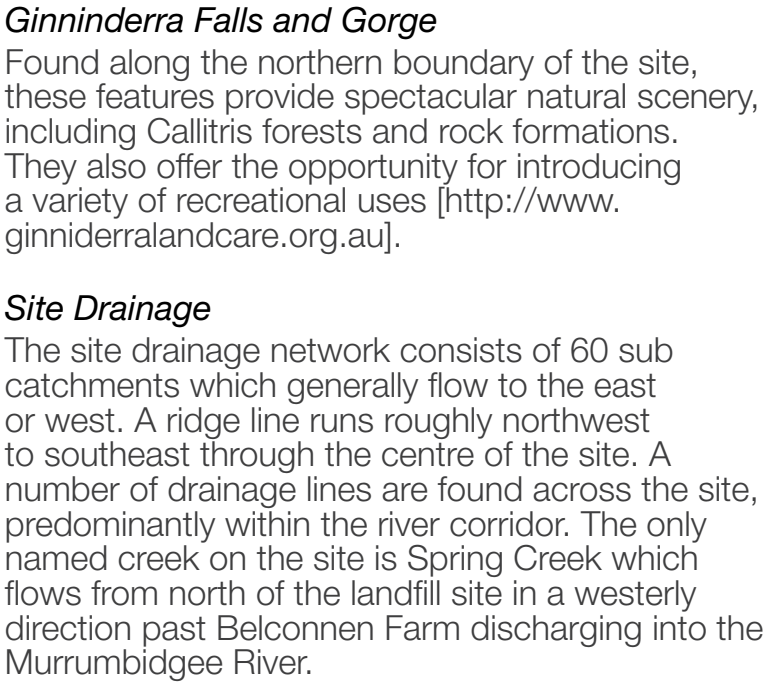

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Image 1 - Ginninderra Falls [Image Tony Adams]

Image 2 - Murrumbidgee River Corridor

Image 3 - Ginninderra Creek along northern boundary of site

Image 4 - Ginninderra Gorge

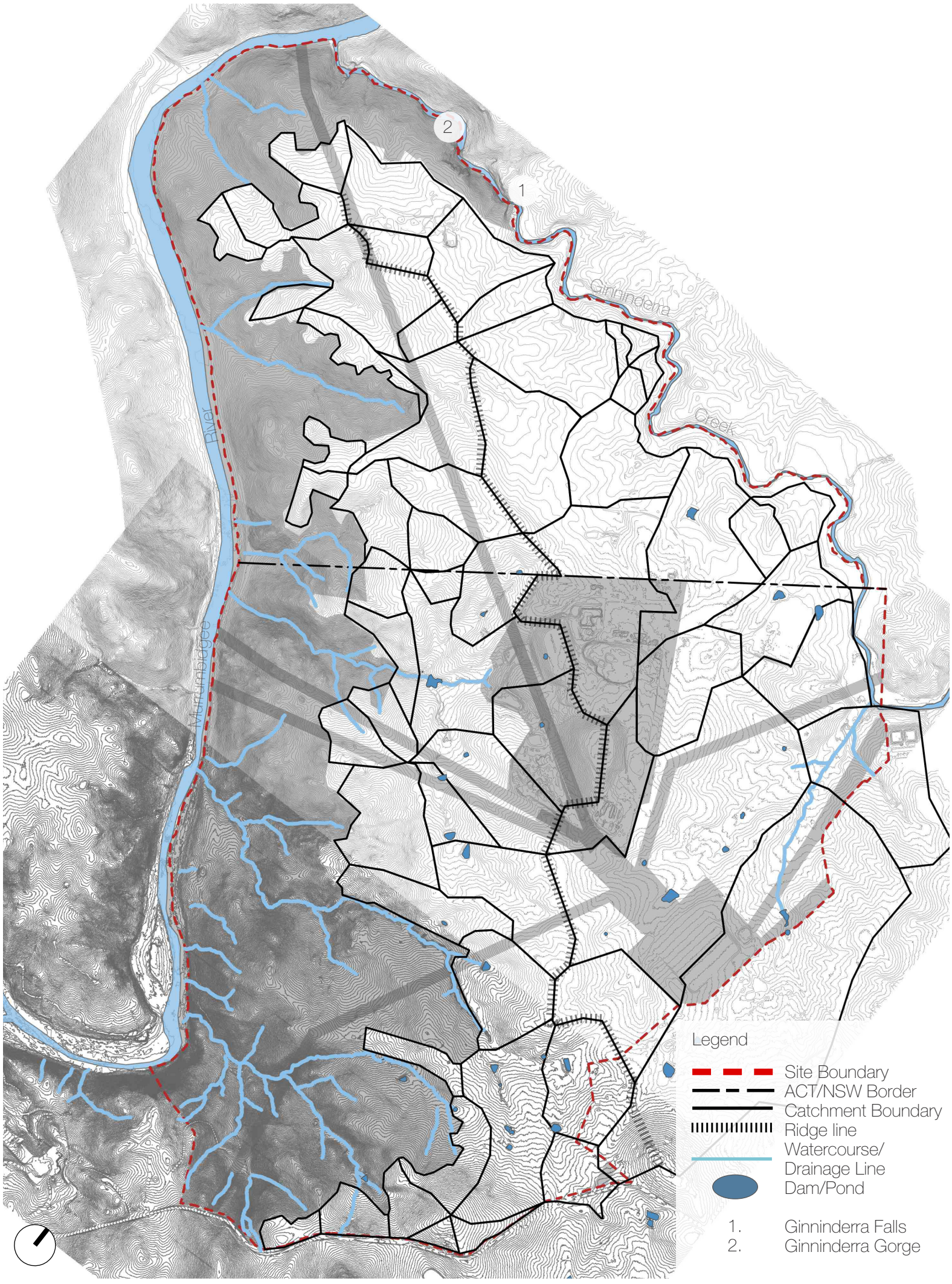
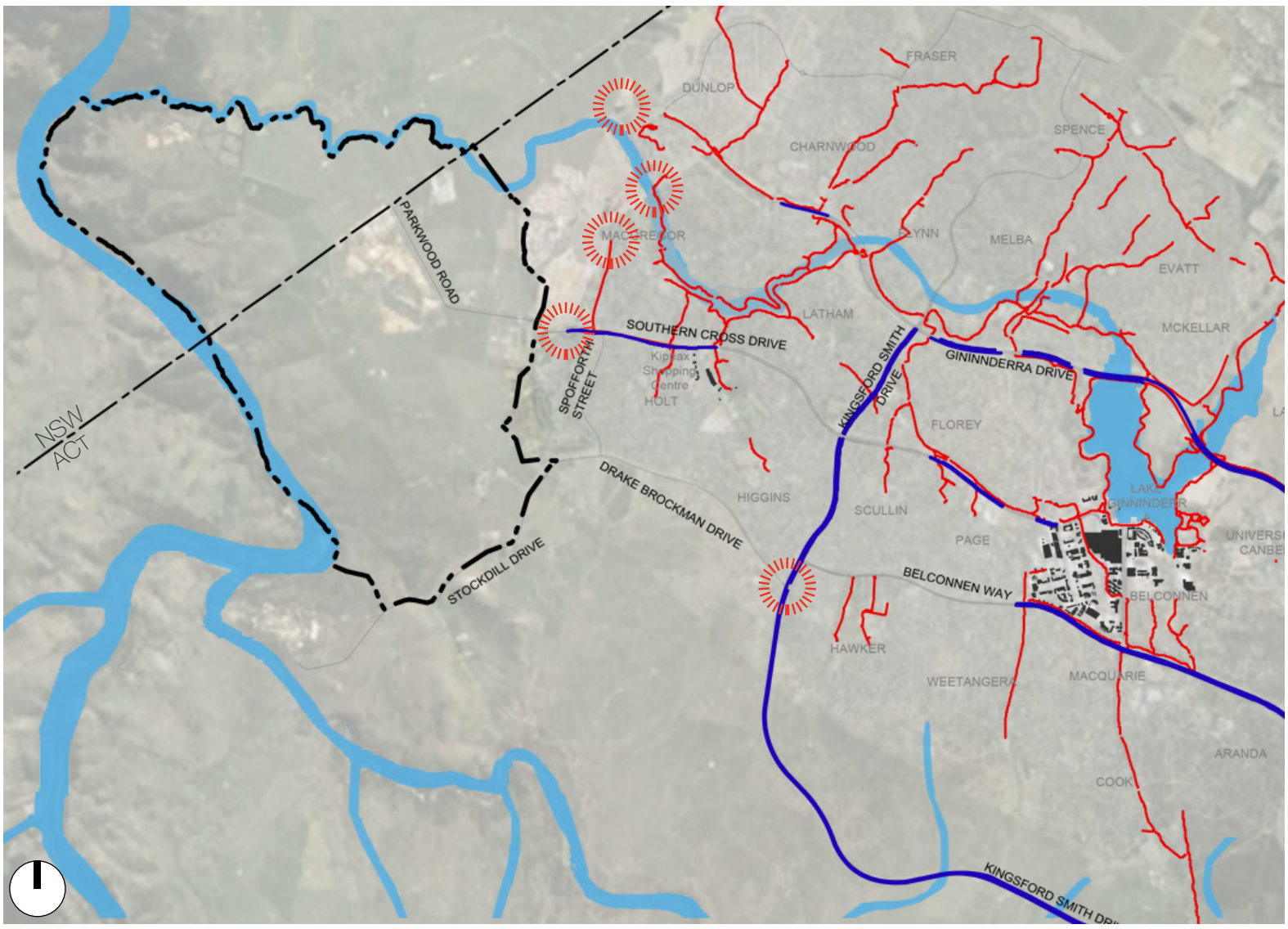


Figure 2.08 - Site catchments and drainage systems

Cycle Network

The existing local cycle network consists of a range of on and off road facilities. On road cycle routes are available along all major roads including Southern Cross Drive and Drake Brockman Drive towards Belconnen and central Canberra. An extensive off road network also exists through most of the local open space network including along Ginninderra Creek towards Lake Ginninderra. The map below illustrates the existing cycle network and the potential connection to be made by the West Belconnen movement network.



Legend

- Site Boundary
- On Road Cycle Lane
- Off Road Cycle Path
- Future Network Connections

Figure 2.09 - Existing Cycle Network

Road Network

Access to West Belconnen at present is via one of two primary roads. Southern Cross Drive provides access to and from Belconnen Town Centre and joins Parkwood Road, which is the only existing public road within the site. Drake Brockman Drive also provides access towards Belconnen Town Centre and joins Kingsford Smith Drive which gives access to central Canberra. Stockdill Drive which runs adjacent to the sites southern boundary joins Drake Brockman Drive. The completion of Ginninderra Drive as the third access proposed subject to further study.

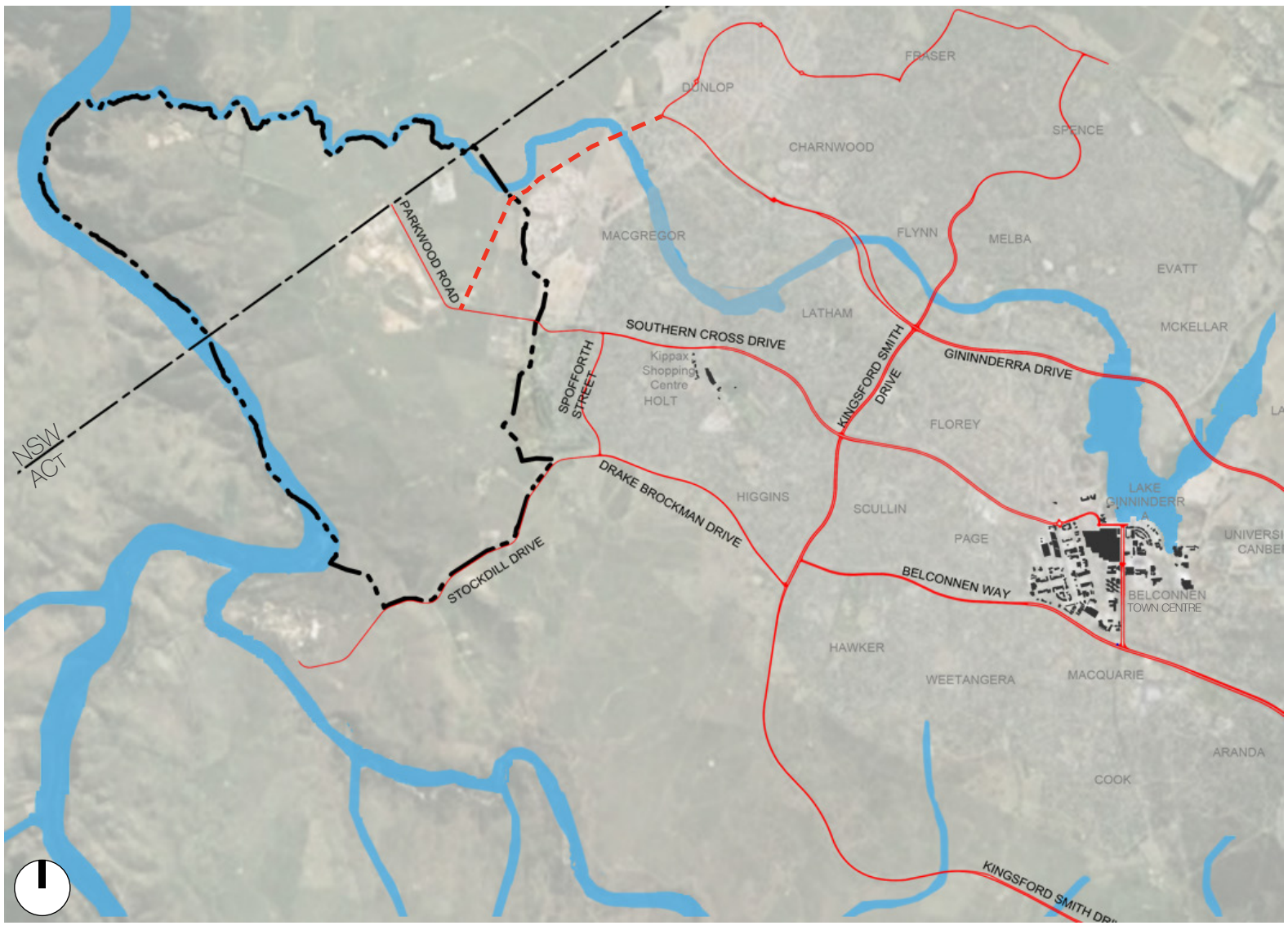


Figure 2.10 - Primary Road Connections

2.2 SITE ANALYSIS

Topography & Slope

The site has an elevation range from 625m on the southern boundary down to 425m on the banks of the Murrumbidgee River. A NW/SW ridge line running through the site has an elevation ranging from 560m - 585m at the landfill. The topography to the west of the ridge line is typified by steep slopes rising from the river before flattening out towards the ridge. To the east the landscape is undulating with a gentle elevation change of roughly 20-30m from the ridge line down to Ginninderra Creek. Slope analysis identifies a number of steep south facing slopes throughout the river corridor with predominately south west slopes along the edge of the Murrumbidgee River.

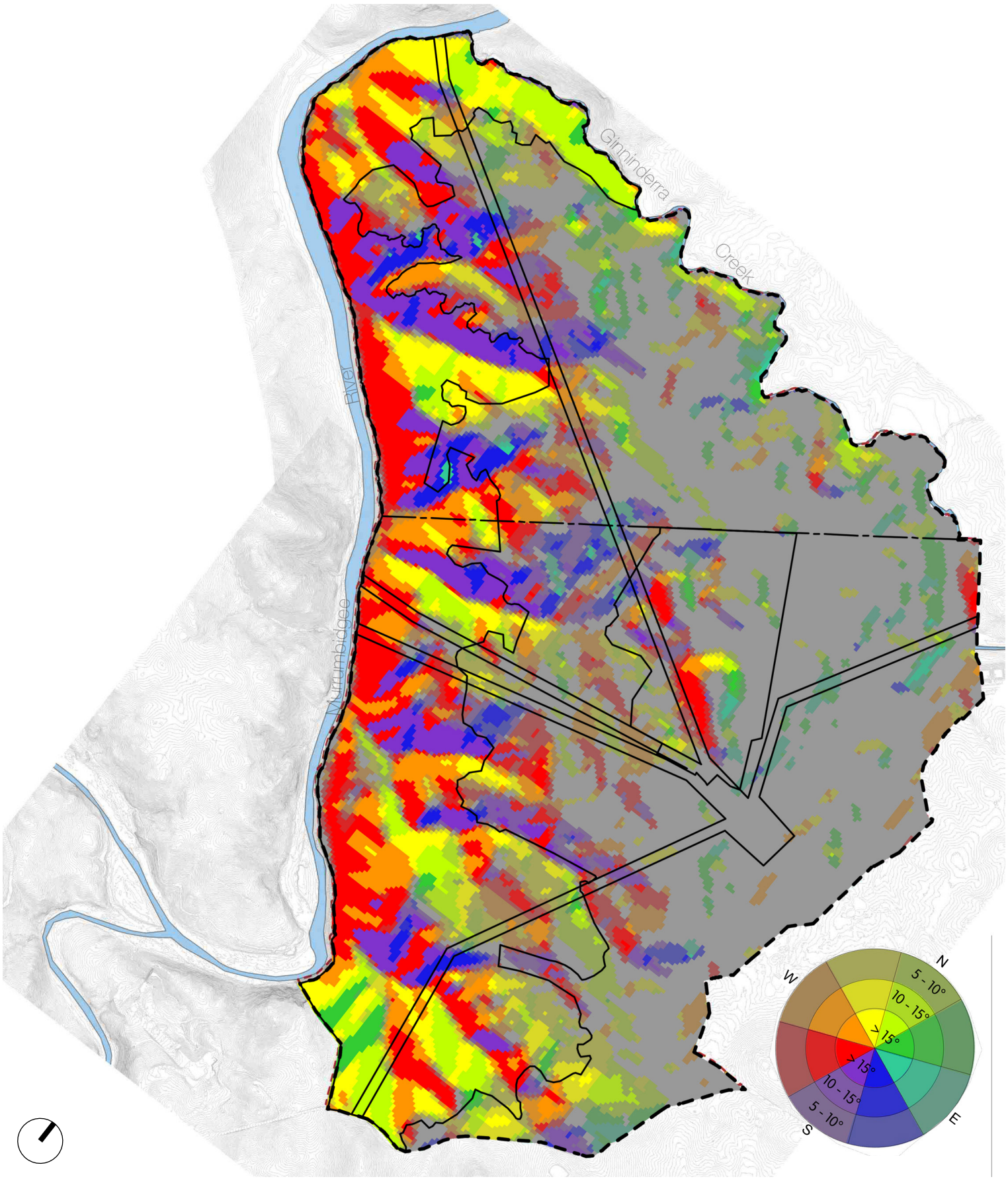


Figure 2.11 - Slope & Aspect Analysis
[adapted from Roberts Day]

ELEVATION VALUES

- 418-420m
- 421-425m
- 426-430m
- 431-435m
- 436-440m
- 441-445m
- 446-450m
- 451-455m
- 456-460m
- 461-465m
- 466-470m
- 471-475m
- 476-480m
- 481-485m
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- 631-635m
- 636-640m
- 641-645m
- 646-650m

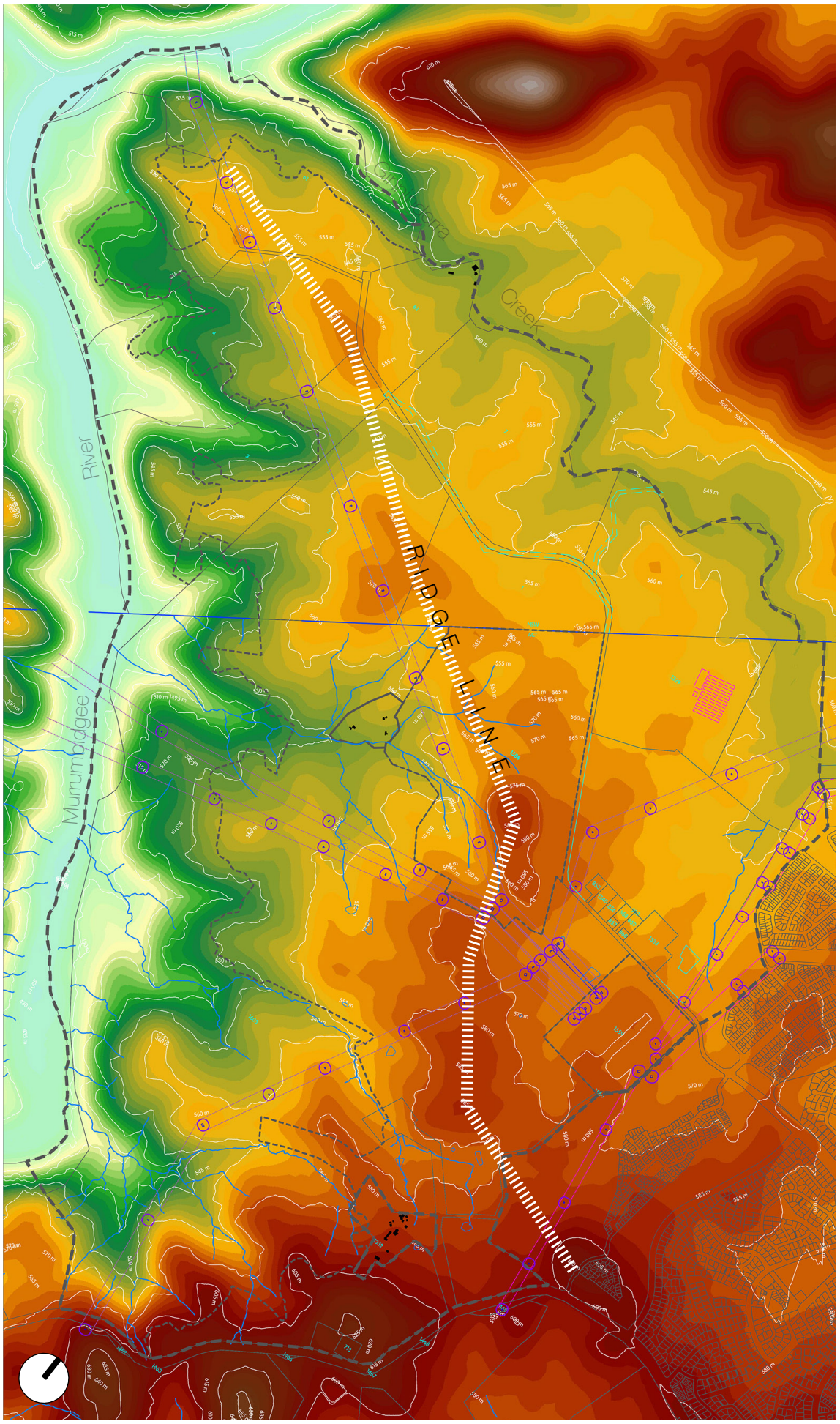

Figure 2.12 - Topographical analysis
[Roberts Day]

River Corridor

Ecology

Detailed ecological reports have been prepared for the West Belconnen project area. These document the range of flora and fauna present and are the basis for planning and managing their protection. Four significant natural features of conservation concern are found at West Belconnen and they are briefly described below.

1. Pink-tailed Worm Lizard [Aprasia parapulchella]

The pink tailed worm lizard [PTWL] inhabits rocky outcrops located mainly across the north and east facing slopes of the ridges and valleys that border the Murrumbidgee River. The PTWL is listed as a vulnerable species under both Australian and ACT legislation. This recognises the conservation significance of ACT populations in both regional and national contexts. The ACT Riparian Zone Conservation Strategy [2007] sets out a number of aims to protect and manage the species including;

- ensuring urban development and associated recreational pressures do not adversely impact the species.
- encourage management to be undertaken in an adaptive framework incorporating research results into management plans
- manage sites to maintain optimum habitat for the species

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2. Box-Gum Woodland

A total of 71ha of Yellow Box- Red Gum Grassy Woodland [YBRGGW], listed as an endangered ecological community under both Australian and ACT legislation has been identified. Yellow Box-Blakely's Red Gum Grassy Woodland is dominated by *Eucalyptus melliodora* [Yellow Box] and *Eucalyptus blakelyi* [Blakely's Red Gum]. The YBRGGW is subject to a National Recovery Plan that identifies a range of actions to be undertaken to ensure its long-term viability.

3. River Oak Forest

The River Oak *[Casuarina cunninghamiana]* Forest occurs almost continually along the banks of the Murrumbidgee River and also a small section of Ginninderra Creek. The stands are in healthy condition with a wide range of size [age] of trees. [Mills, 2009, p.11]

4. Black Cypress Pine

Black Cypress Pine occurs in a number of areas within the River Corridor primarily along Ginninderra Gorge and in an isolated patch to the south of the corridor near the site boundary. This community is particularly sensitive to fire and will require special management to ensure its continued health and survival. Refer image 1 & 4 on page 21 for reference.

Image 1 - Pink-tailed Worm Lizard [Image K. Mills]

Image 2 - Rocky outcrop habitat of Pink-tailed worm lizard [Image K. Mills]

Image 3 - Box Gum Woodland [Image D. Hogg]

Image 4 - River Oak Forest along Murrumbidgee River

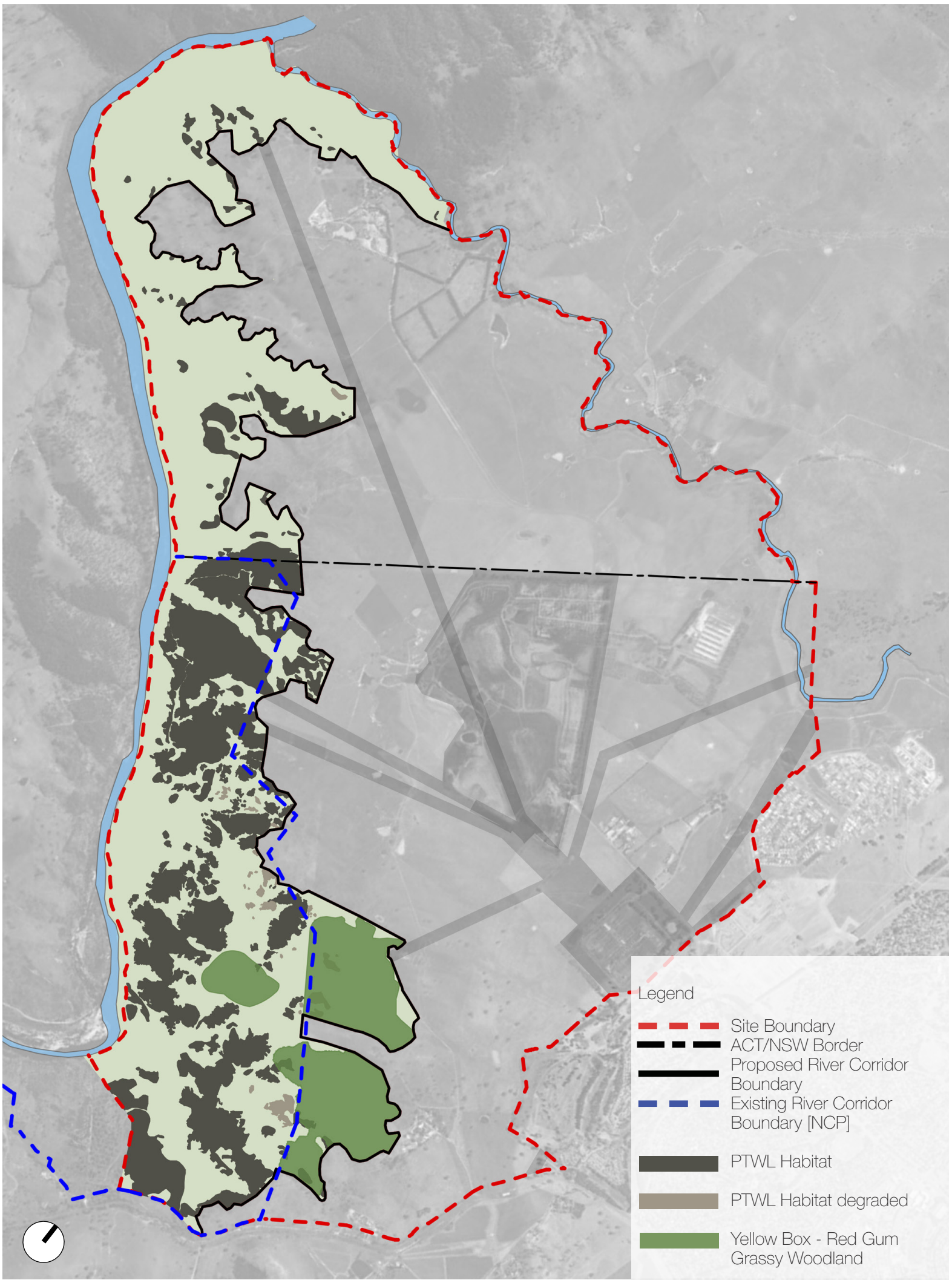

Figure 2.13 - River Corridor Ecological Communities

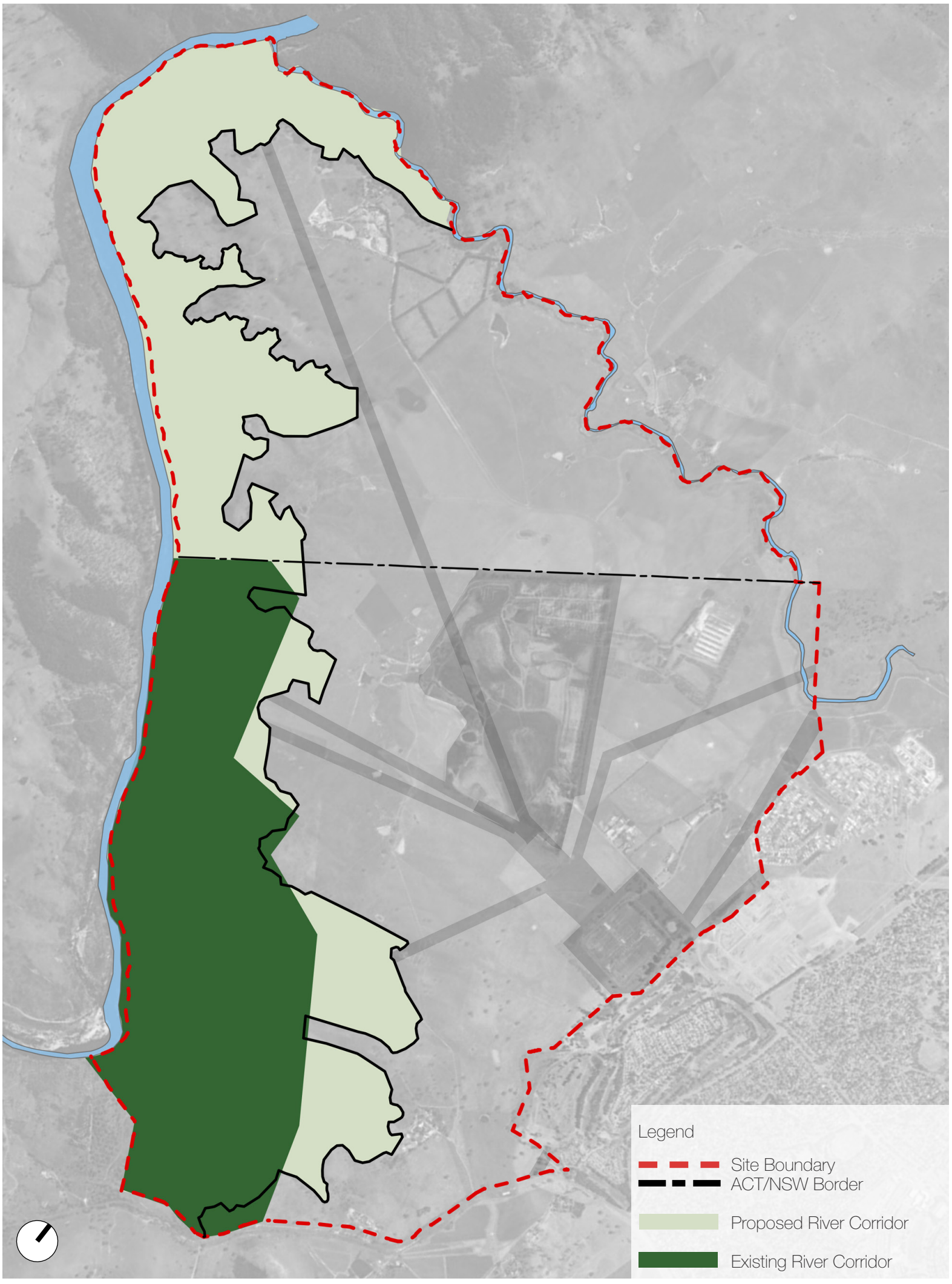

Figure 2.14 - Existing & Proposed River Corridors

Power Transmission Easements

5 transmission easements traverse the site carrying power from a number of sources including the Snowy Hydro. The easements feed into the Canberra Substation which is located off Parkwood Road on the eastern boundary of the site. Each of these 330kV power lines sit within a 60m easement under which activities and land uses are restricted. The total land regulated by the easements is 87.5ha excluding land within the Conservation Corridor.

Permissible uses include:

- Agricultural activities with a machinery height restriction of 4.3m
- Domestic recreational activities [excl. kite flying]
- Gardening - mature plant heights less than 4m
- Vehicle parking - vehicle height under 4.3m
- Storage non-flammable materials under 2.5m
- Minor structures under 2.5m provided metallic parts earthed

Additional uses may be permitted with prior approval;

- Operation of machinery exceeding 4.3m
- Use of irrigation equipment
- Utilities installation
- Outbuildings - sheds, stables etc.
- Sporting and recreational facilities incl. tennis courts.
- Swimming pools - not within 30m of transmission line structure.
- Development of subdivisions including roads
- Excavation
- Quarrying activities, earthworks & dam construction.

Prohibited uses

- Housing, buildings or other substantial structures
- Fixed plant and equipment
- Storage of flammable materials
- Storage of garbage and fallen timber
- Vegetation with mature height exceeding 4m
- Any obstructions within 15m of transmission line structure

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Image 1 - 330KV Transmission Tower
Image 2 - Transmission Towers on site
Image 3 - Canberra Substation

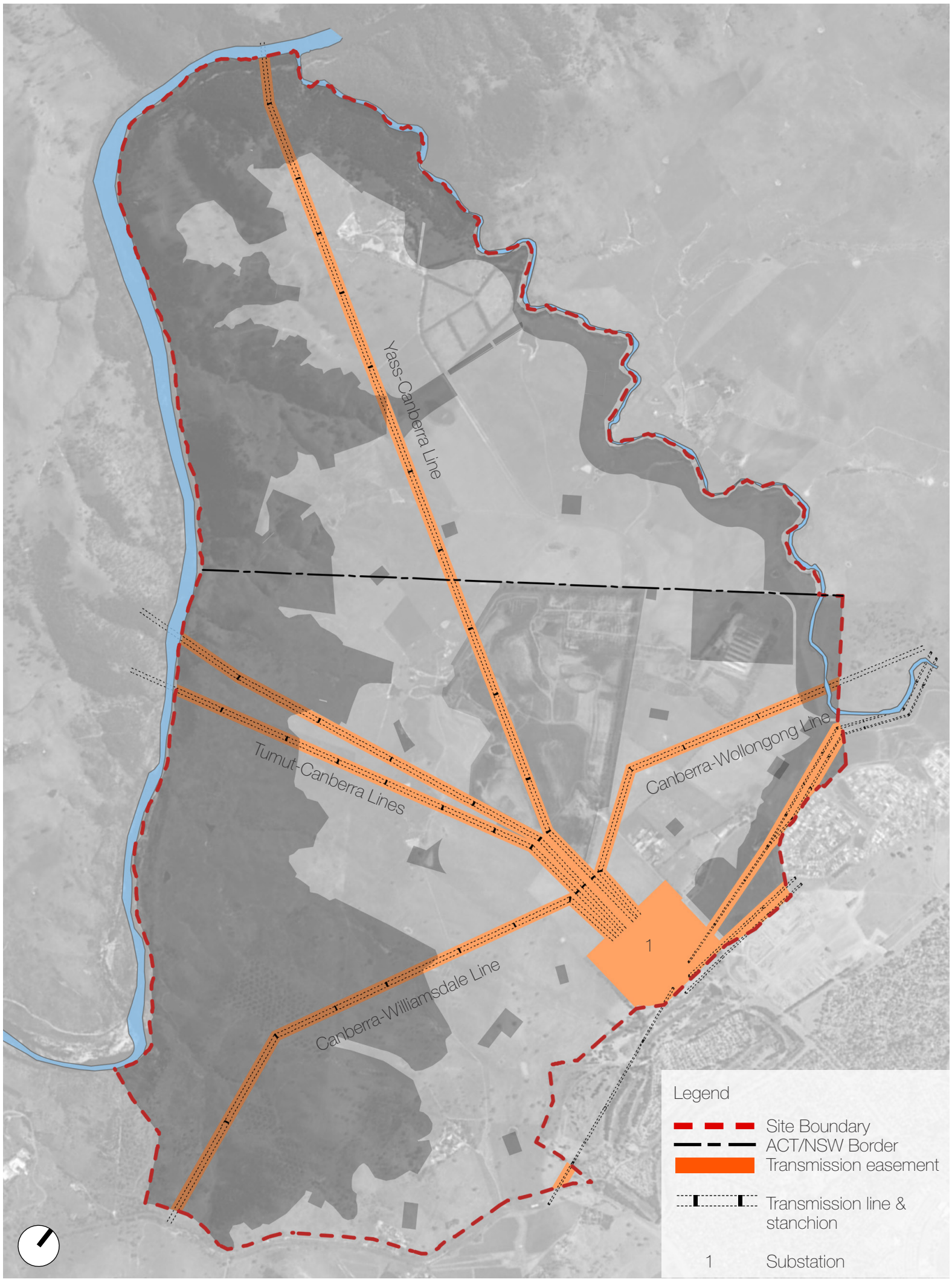

Figure 2.15 - Transmission Corridors
Diagram showing transmission corridor locations and substation

West Belconnen Resource Management Centre [Belconnen Landfill]

[text extracted from GHD report 20.02.12]

The WBRMC operated as a landfill site accepting a range of materials (predominantly putrescible wastes) between approximately 1970 and 2002. From this time to present, landfilling of 'special wastes' (such as asbestos wastes and wastes associated with the 2003 ACT bushfires) has occurred when required. Certain areas of the historical landfill area are understood to have a rudimentary basal lining system, to have been progressively restored and to have an operational landfill gas collection and treatment system. In addition to the existing "special waste" landfill areas and the historical landfill area, several resource recovery operations currently occur at the Site.

The WBRMC is an important part of ACT NOWaste's overall waste management strategy as it currently acts as the ACT's emergency landfill, and provides a location for contracted commercial resource recovery operations.

In the north eastern corner of the site, lies Parkwood Road Recycling Estate, a facility which recycles many resources. This area also contains a Pesticide Storeroom and a Chemical Depot. Within the site boundary, along the eastern side is a tyre trench and the area leased by Canberra Sand and Gravel. To the north of the site is an Asbestos Pit, which is slowly being restored by filling with imported asbestos contaminated materials. Likewise, to the south of the historical landfill area lies a Borrow Pit which is also slowly being restored by filling with imported asbestos contaminated materials.

The resource recovery operations currently operating at the site include:

– A public drop off facility for paper and cardboard, glass jars and bottles, rigid plastic containers,

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Image 1 - View south over dam 1 towards Borrow Pit [2013].

Image 2 - View to north along transmission easement through landfill [2013].

Image 3 - View to west across Borrow Pit from base of Old Landfill Area [2013].

milk and juice cartons, aluminium and steel cans, car batteries and waste oils; and

– A green waste processing facility operated by Canberra Sand and Gravel (CSG).

Due to the topography of the site, created through the landfilling activities and subsequent capping, a number of vantage points exist with 360º views across the proposed development area.

An assessment is being carried out into the landfill site, including assessment of potential future uses, potential buffer requirements etc. When this is concluded, a Master Plan for the site will be prepared.

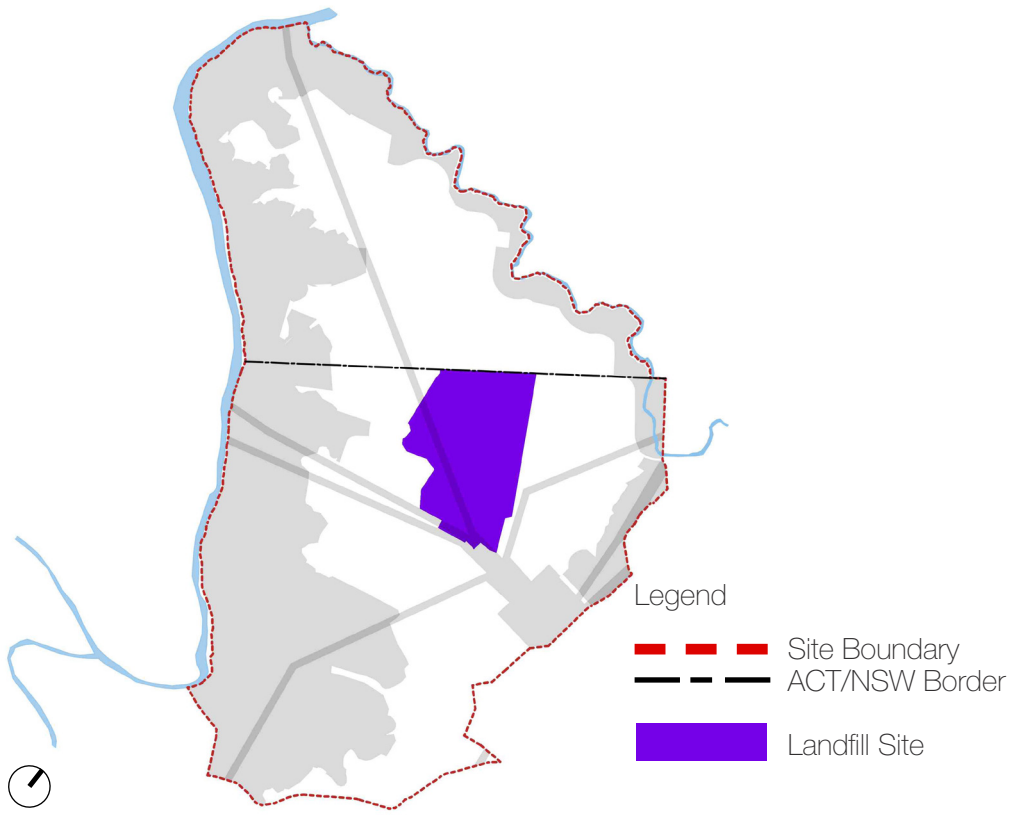

Figure 2.16 - Landfill Site and Diagram.

Figure 2.17 - West Belconnen Landfill Existing Site Plan [GHD Consultants 2010]

Heritage

Indigenous

A number of sites of indigenous cultural significance have been identified across the site, particularly in proximity to the adjacent waterways. The location of these sites can not be made publicly available under Part 9 of the *Heritage Act 2004.* Future access to these sites as part of cultural walks and education programs will require co-ordination and approval with and by local indigenous community members.

European

[Extracts taken from Eric Martin & Associates Belconnen Farm Management Plan 2012]

Belconnen Farm

The primary site of significance for European heritage is the heritage listed Belconnen Farm House. Belconnen Farm is a significant farm group with the succession of buildings, remnant layout, cumulative plantings and various archaeological resources which all contribute to an understanding of the use and development of the place since the 1830s. The homestead group contains a stone cottage c. 1850 by Charles Campbell, the main Ken Oliphant house erected in 1950 and a galvanized iron garage. It has a single Monterey Pine [*Pinus adiate*] and an edible Fig *[Ficus carica]* beside the stone house which are both rare in the ACT and integral parts of the site's history. The Oliphant house, of patterned concrete brick with tiled roof, and a timber verandah is a plain structure reflecting none of Oliphant's more typical designs. A woolshed, shearers' quarters, an ablutions/laundry building and machinery shed form a functional group and are located to the north-north-east of the homestead group. The archaeological remnants of yards, fences and former structures, plantation and windbreaks demonstrate an evolution of the farm and farming practice. There is a strong community interest from the Belconnen Community, the National Trust and the ACT Community demonstrated by the interest and support for heritage listing. A Conservation and Management Plan has been produced for the Belconnen Farm detailing specific information on conservation and management of the place.

Strathnairn

Strathnairn is an older (C1900) homestead complex (homestead, sheds, shearing shed, shearer's quarters, chef's quarters and outhouse) now developed as an arts precinct under Arts ACT and includes a gallery, artist studios, artist in residence flat, caretakers flat within a landscape setting. (trees, shrubs, paths, grassed areas, dam). No current heritage listing or consideration (unlikely to meet threshold for listing). Strathnairn will be a valuable cultural site adjacent to the West Belconnen project.

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Image 1 - View south over Belconnen Farm precinct with elms to left of image

Image 2 - Belconnen Farm buildings

Image 3 - Elm planting to north of Belconnen Farm

Image 4 - Strathnairn Arts Village image source[http://www.strathnairn.com.au/facilities/]

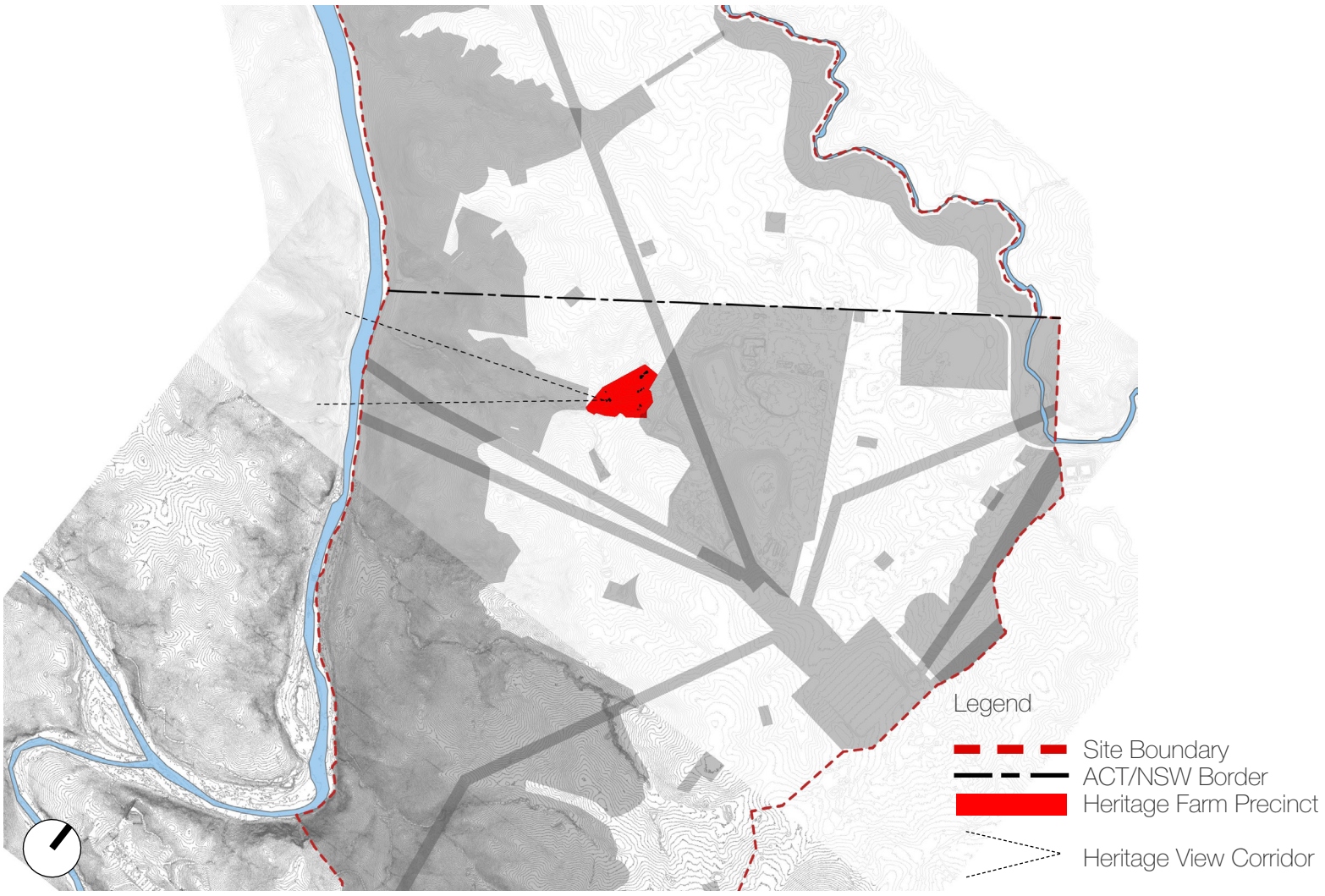

Figure 2.18 - Belconnen Farm Site Plan
Figure 2.19 - Belconnen Farm Precinct

Farming Operations

Farming has been a significant and enduring land use of the site since the late 1830's when the land was first granted to Charles Sturt and soon after sold to Charles Campbell who put the property to use as a sheep station. Sheep farming continued for many decades under Austin Shepherd who additionally grew crops including oats and wheat. Most recently the property has been used for cattle farming and cropping by the Corkhill family.

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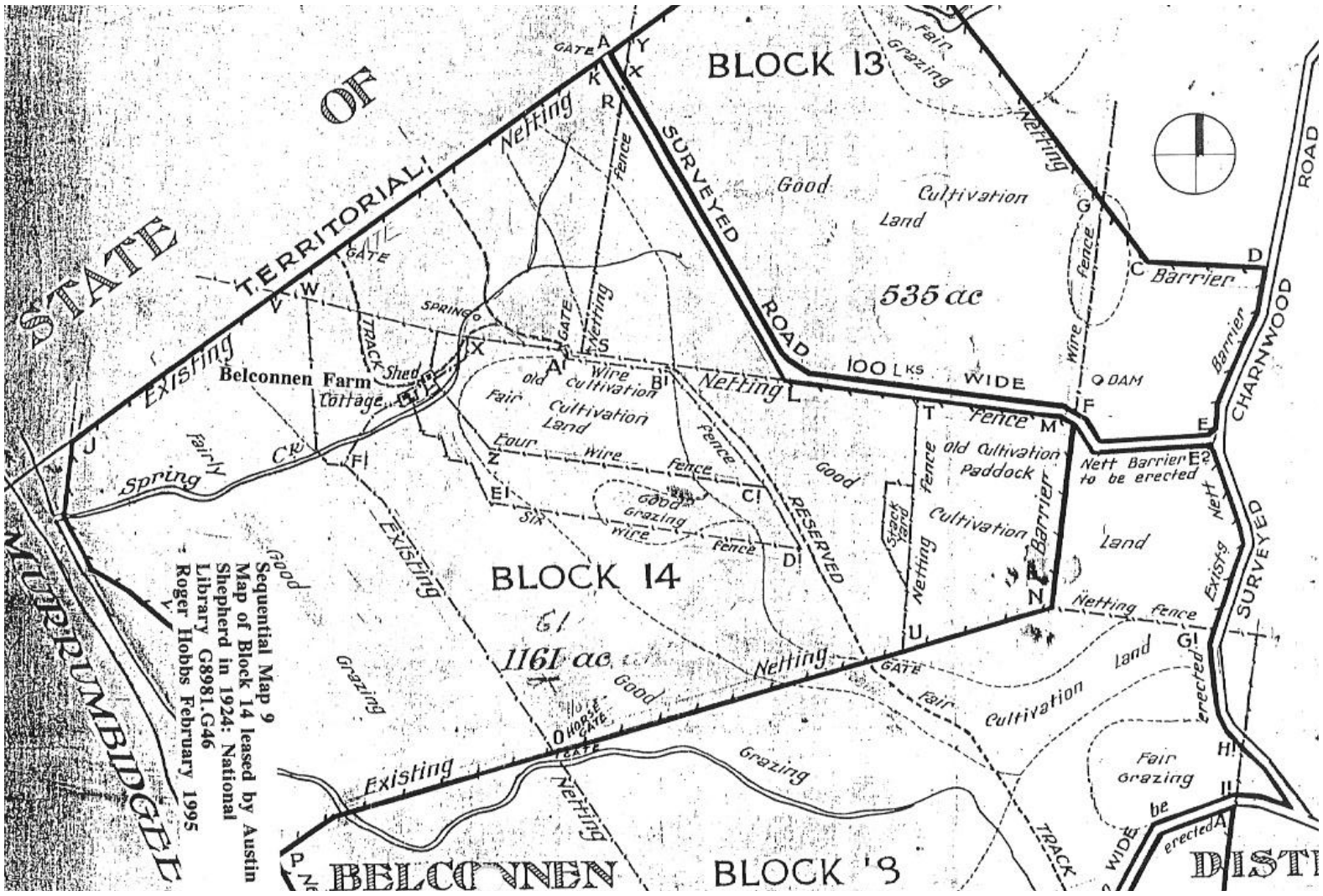
Image 1 - Cattle Grazing near Strathnairn.

Image 2 - Cattle Grazing under power lines [Image I. Sinclair]



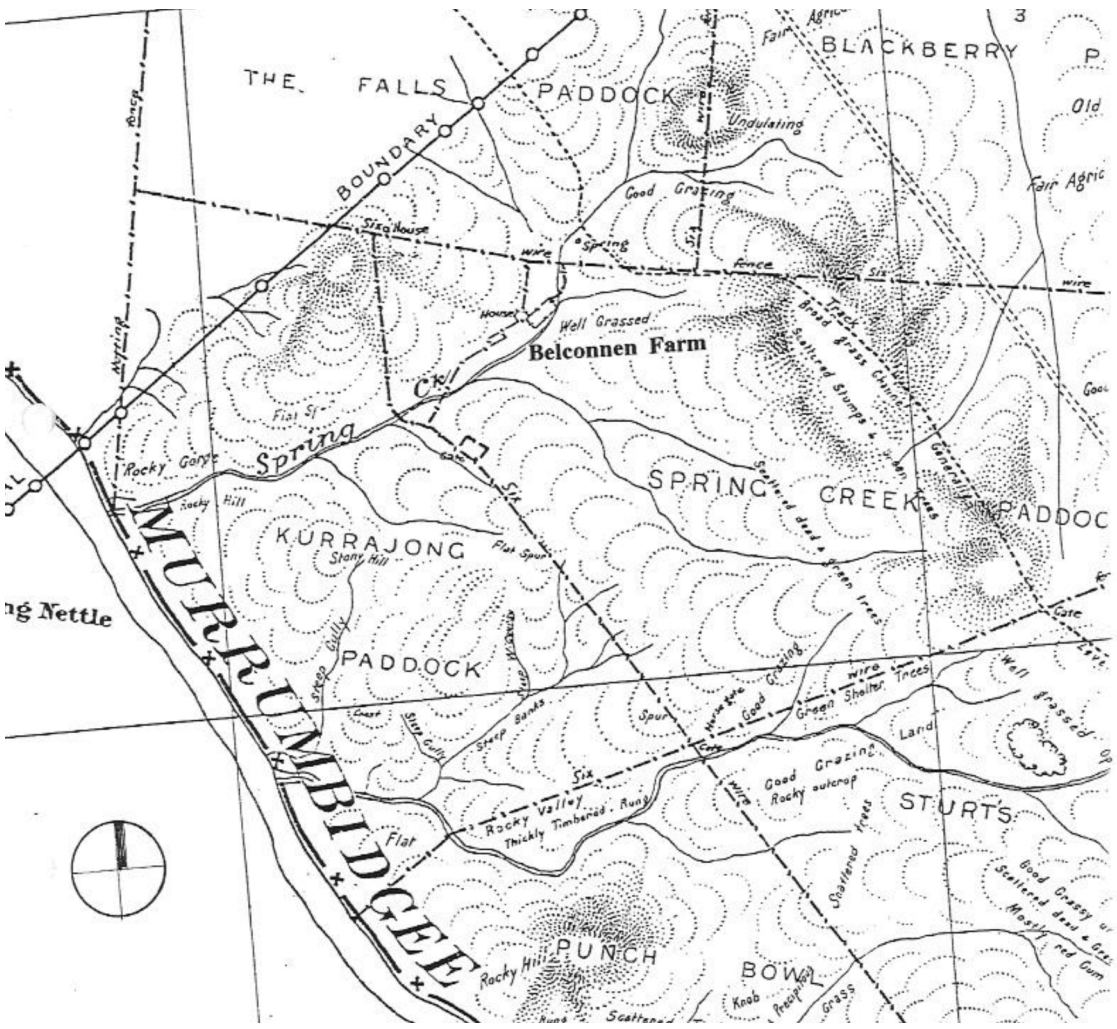


Figure 2.20 - Map of Block 14 including Belconnen Farm, leased by Austin Shepherd 1924.
[Eric Martin & Assoc. 2012]

Figure 2.21 - Feature map of the FCT c.1915.
[Eric Martin & Assoc. 2012]

Views

West Belconnen is fortunate to have unencumbered views to the north and west of the magnificent ranges that form such an important part of Canberra's identity. The opportunity to celebrate these views throughout the open space system will make West Belconnen a destination for the wider community. A heritage view corridor from Belconnen Farm has also been identified.

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Image 1 - View south along Murrumbidgee River

Image 2 - View north over Conservation Corridor

Image 3 - View up heritage view corridor

Image 4 - View west and north to ranges.

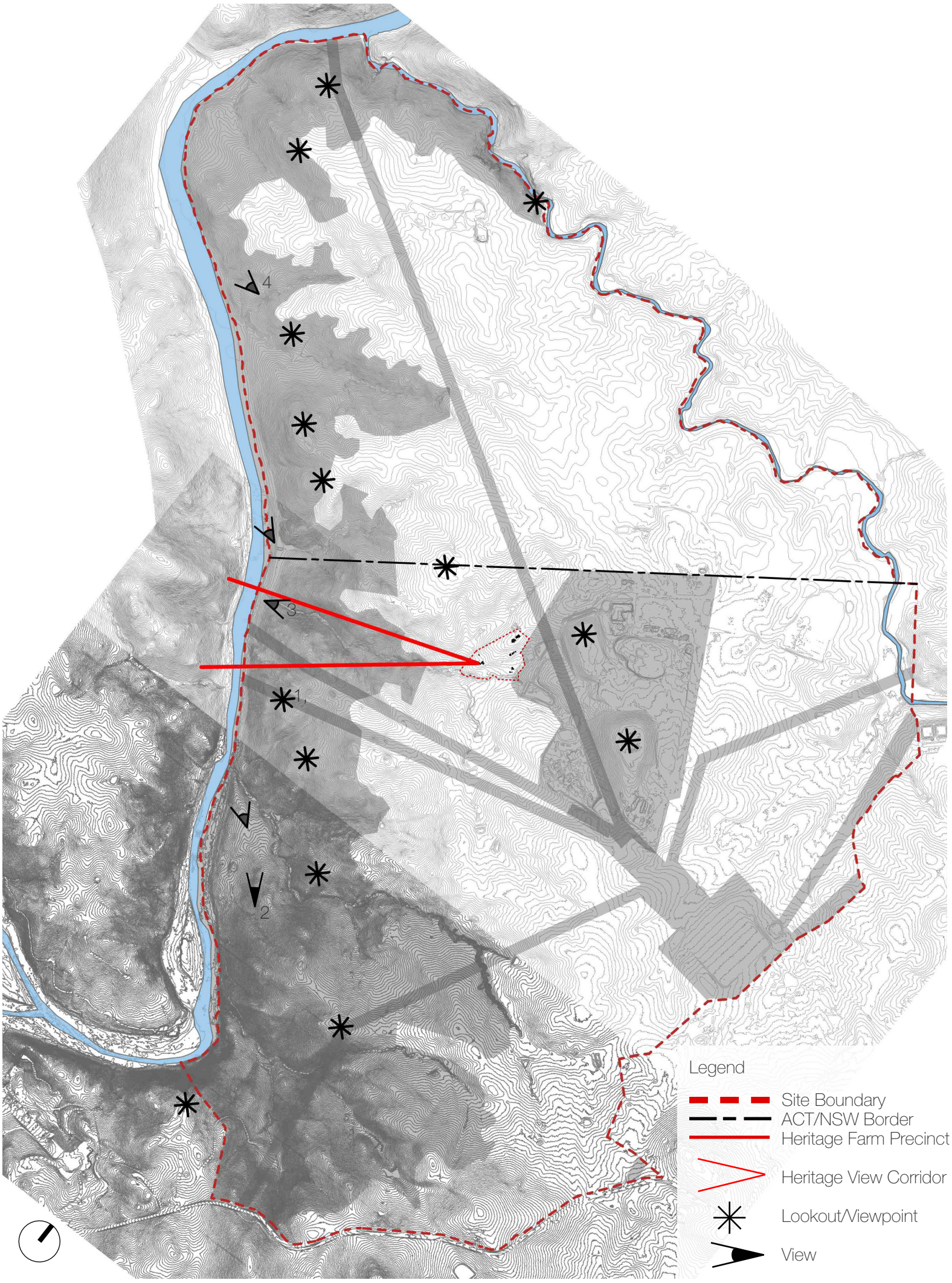

Figure 2.22 - Primary lookouts and views

Existing Trees

Existing trees have been identified across the proposed development areas of the site and placed into 5 categories according to separate arboricultural and urban amenity assessments as depicted in the figures on the following pages;

- Exceptional quality
- High quality
- Medium quality
- Poor quality
- Dead

All trees within the Exceptional category will be retained either in open space or within development lots. High quality trees and tree groups will be retained wherever practical. Hollow bearing trees that provide habitat for fauna have also been identified and will be preserved where practical. Trees in other categories have been also been assessed for their retention and decision on specific trees will be made during detailed design.

A total of 4 trees have been identified as having Exceptional quality in one or both assessment categories, including 3 Yellow Box [*Eucalyptus Melliodora*] and 1 Blakely's Red Gum [*Eucalyptus blakelyi*], representative of the original YBRGGW community.

A total of 56 individual trees and 7 groups of varying sizes have been rated as high quality. The trees are both exotic and native species. The tree survey conducted by DSB Landscape Architects outlines the full characteristics and details of each tree or group.

It is proposed as a part of the YBRGGW restoration strategy, within the Conservation Corridor, that selected trees felled as part of the development works are to be incorporated into the woodland area in accordance with the woodland management plan, this is discussed further in section 3.0.

Image - View south east over existing YBRGGW within Conservation Corridor

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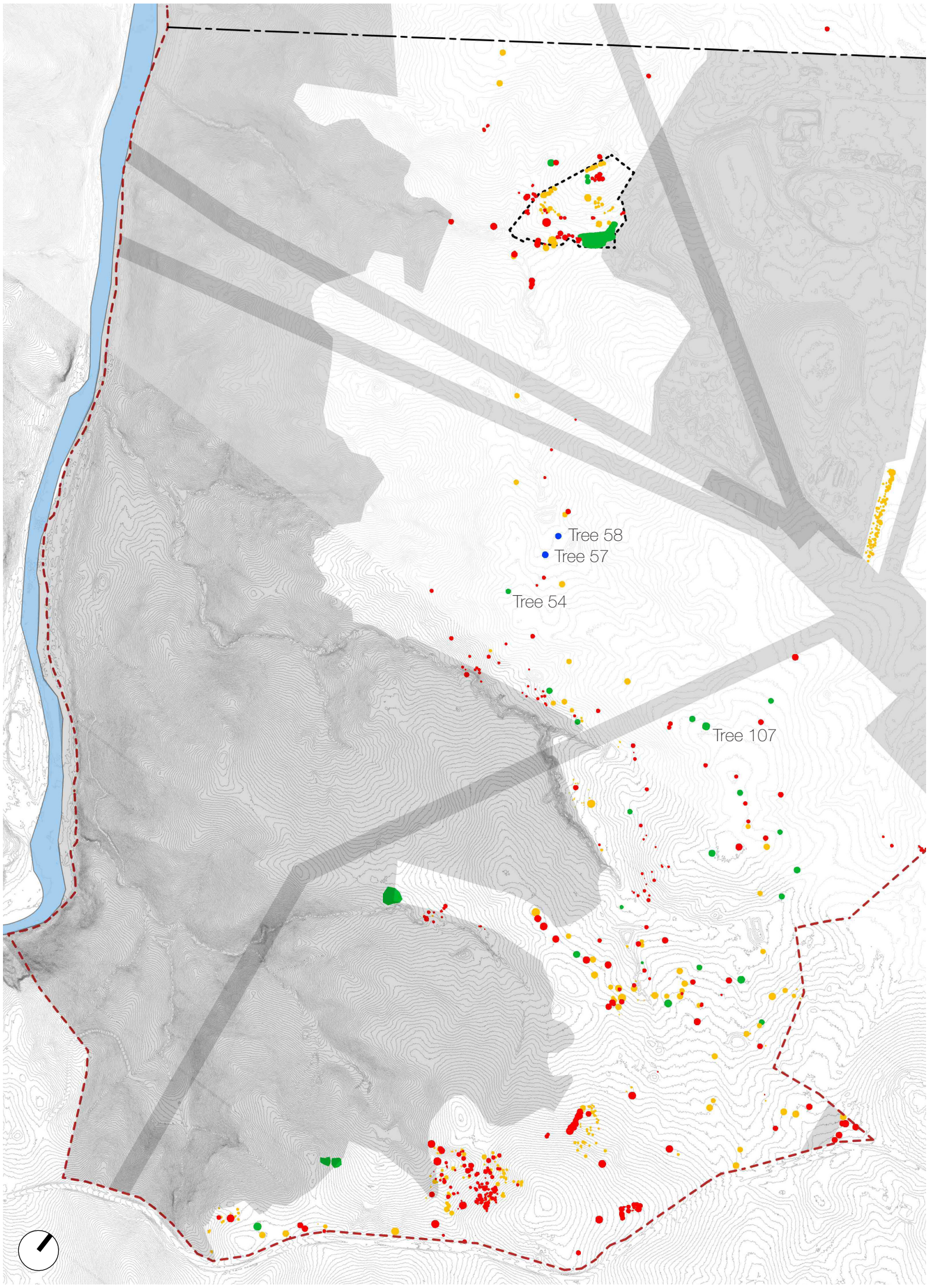
Image 1 - Exceptional Tree 54 *Eucalyptus melliodora* [Image DSB Landscape Architects]

Image 2 - Exceptional Tree 57 *Eucalyptus melliodora* [Image DSB Landscape Architects]

Image 3 - Exceptional Tree 58 *Eucalyptus blakelyi* [Image DSB Landscape Architects]

Image 4 - Exceptional Tree 107 *Eucalyptus melliodora* [Image DSB Landscape Architects]



Legend

- Site Boundary
- Exceptional
- High
- Medium
- Poor

Note: Rating refers to arboricultural assessment

Figure 2.23 - Existing tree locations

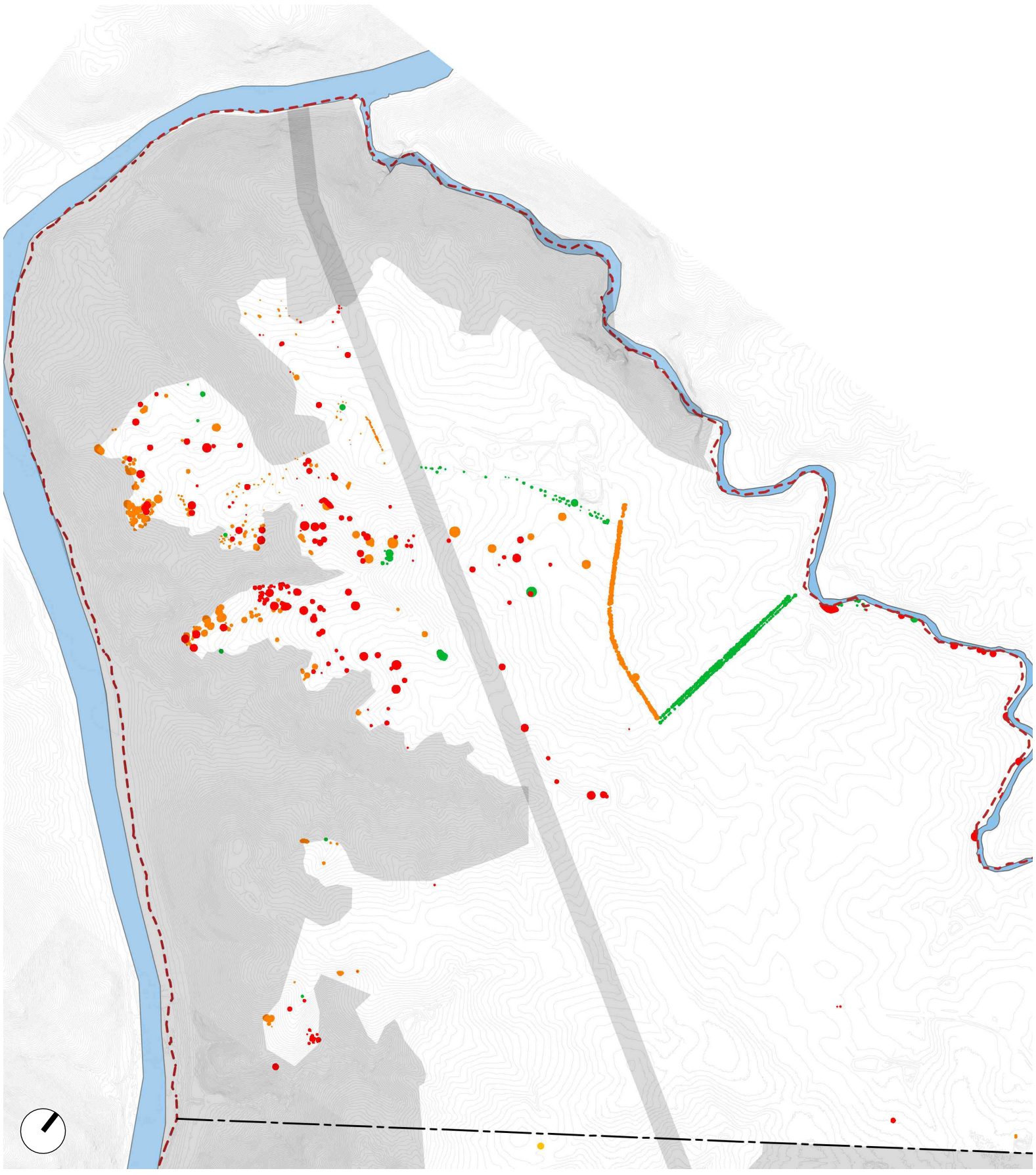


Figure 2.24 - Existing tree locations

Bushfire

The West Belconnen site is located within a fire prone area. The primary areas of attack are from the north around to the south west along the Murrumbidgee River corridor. The bushfire risk is highest in the River Corridor, however appropriate fuel load management and landscape planning will need to be employed along the corridor to reduce the bushfire risk to the development area. There are a number of considerations for managing the bushfire risk including;

- minimising bushland corridors that permit the passage of bush fire
- providing and locating, open space and public recreation areas as part of buffers (APZs)
- fire management relationship with recreational usage, particularly within river corridor
- fire regimens for conservation of biodiversity.
- exotic rather than native vegetation in fire prone areas
- the advantage of public lands irrigation as a fire control measure.

Extensive and detailed fire management research is being conducted for the project by Ecological Pty. Ltd. in consultation with ACT and NSW emergency services agencies.

2.3 ACT GOVERNMENT AGENCY CODE REVIEW

Territory Plan

Estate Development Code

The Estate Development Code provides planning, design and environmental controls. The main objective is to facilitate sustainable, safe, convenient and attractive neighbourhoods that meet the diverse and changing needs of the community. Outlined below are the sections of the Code that relate to the landscape and open space system of West Belconnen.

Public Realm

Types and Purposes of public realm spaces

Public Realm Type	Size	Primary Functions	Management Intentions	Stage Identified
Town Park	1ha min. 0.05ha/ 1000 ppl	– Located in a Town Centre – Irrigated grass, paving, art and furniture – Shrub/flower beds, pavilions, water features – Play facilites lakes/ponds	High standard - intensive use and special events.	Structure Plans/ Concept Plans
District Park	4-10ha 0.45ha/ 1000 ppl	– Informal park or series of spaces – Population catchment 25-50,000 – Grass and trees – Informal recreation - bbq, adventure play, skatepark – Natural/cultural heritage conservation – Habitat creation – May be associated with waterways/ wetlands/ lakes/ ponds	High standard - intensive use and special events.	Structure Plans/ Concept Plans
District Sportsground	8ha min.	– Training and competition venue – Population catchment 25-50,000 – May be associated with high schools – Irrigated grass, public parking, training lights, pavilion w/ change rooms, toilets, kiosk	High standard - intensive sports training and events. May be enclosed and leased.	Structure Plans/ Concept Plans
Neighbourhood Ovals	not specif-ied	– Sporting purposes and recreational space for local residents – Generally adjacent primary schools and/or local shopping centre – Integral part surrounding parkland when not in use for sporting purposes – Irrigated – Amenities including pavilion, toilet block, training lights	Moderate intensity management - seasonal variability	Estate Development Plans

Table 3 - Estate Development Code - Public Realm outline

Neighbourhood Parks - Central - Local	1ha/ 1000 ppl 1-2ha 0.5-1ha	– Focal point of neighbourhood open spaces and off road movement networks – Outdoor meeting place – Accommodate informal and innovative free play – Range of unstructured recreation activities – Linked or adjacent other public realm spaces – Accommodate remnant native vegetation/natural features	Moderate intensity management - seasonal variability	Estate Development Plans
Heritage Parks		– Created to conserve heritage character elements	Moderate intensity management - seasonal variability. Can be enclosed.	Estate Development Plans
Lakes & Ponds	N/A	– For control of stormwater quality and quantity including flood mitigation. – designed waterscape for irrigation and second class water needs. – uses may include conservation or active & passive recreation.	Low intensity management - seasonal variability	Structure Plans/ Concept Plans/ Estate Development Plans
Broad Scale Open Space	N/A	– Bushland setting for Canberra – Areas remnant or planted vegetation, hills and ridges, informal recreation & wildlife habitat. – Biological diversity & connectivity – community activities [landcare, parkcare, community garden groups].	Low intensity management - seasonal variability may be agisted with grazing stock	Structure Plans/ Concept Plans/ Estate Development Plans
Habitat Sites	N/A	– Bushland setting for Canberra – Remnant grassland or woodland sites important for nature conservation purposes – may form part of regional ecosystem, provide food source or contain endangered plant or animal species. – used for connectivity and subject to conservation activities and monitoring in accord with Action Plans for their conservation prepared under provisions of the Nature Conservation Act 1980.	Low intensity management - seasonal variability	Structure Plans/ Concept Plans/ Estate Development Plans

Table 4 - Estate Development Code - Public Realm outline

Street Verges & Medians	N/A	– Movement Network – interconnected spaces for off road movement networks – provide for aesthetic purposes and microclimte control, driving experiences, character of place and environmental services. – surface treatment designed to maximise rainfall capture and ground water recharge and vegetation health.	Low intensity management - seasonal variability	Estate Development Plans
Pedestrian Parkland	N/A	– Movement Network – Corridors providing for pedestrian and cyclist routes within and between suburbs, linkages with parks, schools and workplaces. – May include playgrounds and fitness stations in suitable locations. – Often co-located with waterways for urban stormwater management and treatment and may contain small ponds and wetlands. – Often includes remnant vegetation and other natural features, may provide wildlife habitat conservation and/or connectivity. – Generally, the dominant surface treatment is dryland grass as dominant ground surface, with planted vegetation to enhance shade, shelter, character, seasonal diversity or wildlife movement.	Moderate intensity management - seasonal variability.	Concept Plans/estate Development Plans
ADDITIONAL OPEN SPACE TYPOLOGY [Not Identified by the EDC] Community Recreation Irrigated Park [CRIP]	0.75-1ha	– irrigated low maintenance play space to support informal physical activity and recreation activities – provided in suburbs where no District Playing Field, District Park or School Oval is located – construction of the irrigated area will be same as that used for a Neighbourhood Oval or District Playing Field – generally include the provision of a toilet block, community barbeque and picnic shelter. Other facilities that could also be considered include the provision of a children's playground, basketball half court, tennis wall and cricket nets.	Not Specified	Not Specified

Table 5 - Estate Development Code Shared Paths & Public Realm requirements

Rules	Criteria
	C23 Public realm spaces achieve all of the following: – a) consistency with the desired character – b) accommodation of a range of uses and activities (such as those listed in table 4) – c) links between existing or proposed areas of open space – d) opportunities for recreational facilities, including facilities for pedestrians and cyclists – e) opportunities for wildlife corridors between natural areas, where appropriate – f) stormwater management, where appropriate.
R27 A minimum of 75% of the perimeter of public realm spaces is bordered by one or more of the following: – a) edge roads with kerbside parking – b) public car parking areas – c) trunk shared paths – d) blocks with a commercial or community facility zoning.	C27 Public realm spaces (excluding street verges and medians, access ways and pedestrian lanes) are bounded by uses that provide all of the following: – a) reasonable levels of surveillance, through the use of such measures as edge roads, address frontages and lighting – b) reasonable public access including links from footpaths to the existing or proposed shared path network and the provision of public car parking in convenient locations.
	C29 Reasonable levels of public safety are achieved in pedestrian parkland and access ways (as defined in table 4). This may be achieved by all of the following: a) reasonable legibility b) reasonable sightlines c) avoidance of potential entrapment spots or hiding places.
R66 Local neighbourhood parks have an area not less than 0.5ha. Central neighbourhood parks have an area of between 1ha and 2ha.	This is a mandatory requirement. There is no applicable criterion.
R67 Blocks for residential use comply with at least one of the following: a) not more than 300m from at least one of the following: i) a local neighbourhood park ii) town park or a pedestrian parkland containing recreational facilities such as picnic and barbeque areas and playgrounds b) not more than 500m from at least one of the following: i) a central neighbourhood park ii) neighbourhood oval iii) district park iv) district sportsground.	C67 Public realm spaces containing recreational facilities or space are provided at accessible walking distances from all blocks for residential use.

Table 5 - Estate Development Code
Public Realm Rules & Criteria

ESTATE DEVELOPMENT CODE			
Shared Path Requirements			
Path Type	Function		Max longitudinal gradient
Minor Path	– local access with low traffic volumes – pedestrian and low speed cycle use	1.5	In accordance with AUSTROADS Guide to Traffic Engineering Practice Part 13
Intermediate Path	– commuting and local access with low traffic volumes – pedestrian & cyclist use where cyclists passing in opposite direction are rare	2.0	In accordance with AUSTROADS Guide to Traffic Engineering Practice Part 14
Trunk Path	– commuting and local access required to accommodate cyclist speed up to 20km/h – pedestrian & cyclist use where two way cyclist movements are common	2.5	In accordance with AUSTROADS Guide to Traffic Engineering Practice Part 14
Trunk Path [High Use]	– commuting path required to accommodate cyclist speeds up to 30km/h – high levels of pedestrian and cyclist use in both directions	3.0	In accordance with AUSTROADS Guide to Traffic Engineering Practice Part 14

Crime Prevention Through Environmental Design [CPTED] General Code

This Code provides more explicit direction to ensure that issues of community safety are adequately addressed in decision making for land use and development activities in the ACT.

Crime Prevention Through Environmental Design [CPTED] General Code	
Element 3: Public Realm	
3.1 Open Space & Community [Shared] Areas	
Rules	Criteria
There is no rule applicable.	C3 – Natural surveillance of open space and community areas is provided by: – a) locating to adjacent activity centres; – b) encouraging pedestrian (or cyclist) movement through the space; – c) ensuring clear site lines from, and between, buildings and open space areas: community areas; and – d) designing out any entrapment spaces..
There is no rule applicable.	C4 – Natural access is considered, providing clear entry and exit points and a legible, accessible route through the space.
There is no rule applicable.	C5 Planting in public spaces do not obscure views along paths and streets, or to entrances and should not create secluded, hiding areas.

Table 5 - Estate Development Code Shared Path Require-ments
Table 6 - CPTED General Code

There is no rule applicable.	C6 Selection of plant material are sturdy and in areas of high crime, to make it difficult to snap main growing stems, heavy standard (140-160mm girth) or semi-mature trees (200-270mm girth) should be used to increase their chance of survival.
There is no rule applicable.	C7 Plant material, such as creepers or low hedges may be used to deter to access and limit the opportunity for graffiti on fences and walls.
There is no rule applicable.	C8 Hard landscape features such as low walls, bollards are used to delineate movement areas from semi-private areas.
3.2 Children's Play Areas	
There is no rule applicable.	C9 Children's play areas are located and designed to to comply with each of the following: – a) there is natural surveillance from adjoining areas – b) adjacent areas are used by compatible groups – c) there are multiple entry/exits

Design Standards for Urban Infrastructure

In addition to the Estate Development Code a number of specific Design Standards for Urban Infrastructure, administered by Territory and Municipal Services [TaMS] also influence this stage of the Landscape and Open Space System Master Plan and are listed below. The requirements under these standards will be discussed in the relevant sections later in the report.

- DS03 Road Design
- DS04 Verge Design
- DS13 Pedestrian and Cycle Facilities
- DS14 Urban Open Space
- DS16 Urban Wetlands, Lakes and Ponds
- DS20 Urban Edge Management Zone
- DS23 Plant Species for Urban Landscape Projects.

A number of other Design Standards will also need to be consulted in later detailed design stages including;

- DS06 Pavement Design
- DS07 Bridges and related Structures
- DS10 Parking Areas
- DS11 Guardrails, Fencing and Barriers
- DS12 Public Lighting
- DS15 Playgrounds and Playground Equipment
- DS17 Shopping Centres and other public urban spaces
- DS18 Public Toilets
- DS19 Street & Park Furniture and Signage
- DS21 Irrigation
- DS22 Soft Landscape Design
- DS24 Sportsground Design
- DS25 Urban Park and Open Space Signage.

Note: Some changes are being proposed to some of these codes but will be addressed either during or after rezoning

Table 6 [cont.]- CPTED General Code

2.4 KEY OPPORTUNITIES AND CONSTRAINTS

The analysis undertaken to gain an understanding of the West Belconnen site and its surrounds has identified a number key opportunities and constraints;

Opportunities

- Capturing views of the surrounding landscapes to create special places for the West Belconnen community.
- Continuing the agricultural legacy of the site through the incorporation of urban agriculture within the open space system.
- Utilising the transmission easements for food production, recreation & active transport, making them a valuable part of the open space system.
- Development of the Belconnen landfill site as a parkland and sustainability precinct to bring a truly sustainable heart to the community.
- Conserving and restoring the valuable ecological communities within the Conservation Corridor and creating strong community ownership of their ongoing management
- Capturing and celebrating stormwater runoff, providing ecological services and aesthetic benefits for the local community
- Celebration of the historic Belconnen Farm, Ginninderra Falls, Strathnairn & the River Corridor as a focal points for the community.
- Using urban landscaping as part of the bushfire management strategy.

Constraints

- Protection of the threatened species and ecological communities and their impact on limiting recreational uses through the river corridor.
- Developing in a bushfire prone environment and ensuring the safety of the residents of West Belconnen and their property.
- Transmission easements creating barriers through the development.
- Capturing and treating large volumes of stormwater runoff to ensure no negative impacts on surrounding ecological communities and waterways.
- Ensure siting and future construction of stormwater ponds and wetlands do not have long term impacts on the protected natural assets.
- Safely utilising the landfill site through the decommissioning process to ensure health and safety of the community.

3.0 Landscape & Open Space System

3.0 Landscape & Open Space System

3.1 VISION STATEMENT

West Belconnen presents a unique opportunity to develop a world leading sustainable community in the ACT. Integral to the future sustainability of the development will be the open space system which makes up over half the total footprint of the site. The open space system of West Belconnen comprises three main parts;

- Conservation Corridor and Ginninderra Creek riparian zone;
- Open space within the developable area;
- The Landfill site

These three parts of the system, while very different in their landscape character, opportunities and ongoing requirements, will function as a singular, interconnected open space network. The open space system will provide a wealth of varied experiences and opportunities and will become an integral part of the identity of West Belconnen.

3.2 LANDSCAPE & OPEN SPACE PRINCIPLES

One: Protect, conserve and restore ecological values

- Protect and conserve Pink-tailed Worm-lizard habitat and River Oak Forests throughout the Conservation Corridor and restore degraded habitat areas.
- Restore Box-Gum Woodland habitat and connect existing areas.

Two: Prosperous Community

- Encourage, through the open space system, community activities and facilitate social interactions at many scales.
- Enable the community to be involved in the shaping and creation of the open space system through volunteer programs, particularly within the Conservation Corridor, but also the open space network within the development area.

Three: Fire Protection

- Life and property protection; design open space system to reduce fire risk to development areas
- Conservation Corridor management; provide required access through open space system for fire management and operations

Four: Create resilience

- Establish a local food network through the open space system, providing fresh food and utilising green waste generated by the community for soil improvement.
- Utilise site captured stormwater for irrigated parkland areas and urban agriculture throughout the project.

- Utilise planting strategies that employ species able to withstand and adapt to changing climatic conditions without the need for external inputs.
- Design an open space system that can be adapted to the changing needs of the community.

Five: Celebrate Heroic Landscapes

- Position recreation spaces and movement networks so they engage views of the Murrumbidgee River, Ginninderra Creek, nearby ranges and the unique character of the site.

Six: Connected and safe

- Create a movement network that enables connections across the West Belconnen community and beyond.
- Create a movement network that promotes safety through participation.

Seven: Conservation Custodianship

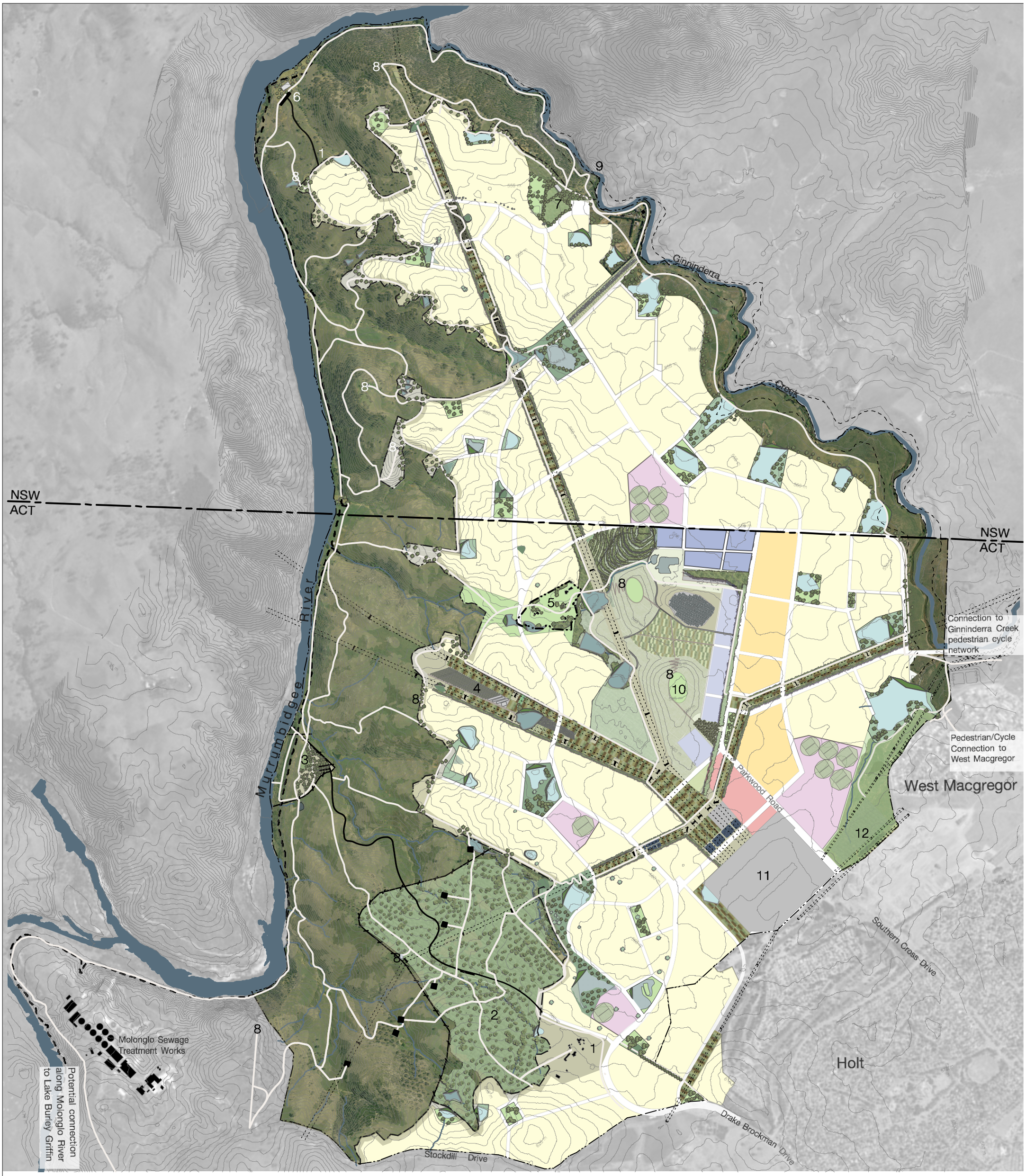
- Develop an awareness within the community of the importance of the ecological communities present on their doorstep and involve them in protection, conservation, restoration & monitoring activities.
- Provide interpretive elements and signage throughout the open space system to enhance community education programs and foster a sense of ownership.

Eight: Minimise carbon footprint.

- Challenge accepted standards to reduce material consumption and life cycle costs.
- Utilise recycled materials where possible.
- Design low maintenance open spaces to minimise ongoing material and capital inputs.

Nine: Livable Streets Network

- Street networks designed to prioritise pedestrian and cyclist movement
- Streets designed to perform ecological functions
- Streets designed to become meeting places and an integral part of the open space system



Legend

- NSW/ACT Border
- Site Boundary
- Conservation Corridor Boundary
- Approx. Flood Line
- Existing Drainage Line
- Transmission Line & Tower
- Residential Development
- School/Education
- Retail Centre
- Commercial
- Commercial [Landfill - subject to futher investigations]
- Mixed Use
- Central Neighbourhood Park
- Local Neighbourhood Park
- Water Park
- Sports Field [co-located with school]
- WSUD Wetland, Pond & Biofiltration
- Possible Dam/Pond [Fish Farm]
- Urban Agriculture - Commerical
- Urban Agriculture - Tree crops
- Urban Agriculture - Community
- Managed APZ Area
- Proposed Screen/Windbreak Planting
- Exceptional/High Value Tree Retained
- Shared Trail Network
- Road Access to Corridor
- PTWL Habitat Conservation Area
- 1 Strathnairn Arts Precinct
- 2 Strathnairn Woodland Regeneration Area
- 3 River Recreation Area
- 4 Potential Tree Crop & Greenhouse Agriculture
- 5 Belconnen Farm Heritage Precinct
- 6 Living River Discovery Centre & Conservation Corridor Head Quarters
- 7 Ginninderra Falls Function Centre
- 8 Lookout/ Viewpoint
- 9 Ginninderra Falls
- 10 Landfill Sustainability Precinct
- 11 Substation
- 12 Pony Club & Agistment Paddocks

West Belconnen

ACT

Draft Landscape Masterplan

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01

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3.3 OPEN SPACE LAND BUDGET

The open spaces of West Belconnen, which include the Conservation Corridor & Ginninderra Creek Corridor, Transmission Easements, Landfill site, Parks and Recreation spaces cover a total area of approximately 898ha or 54% of the site. This comprehensive open space system will provide for a diverse range of ecological, recreational and cultural requirements. The table opposite outlines the open spaces areas as well as proposed uses and activities for each land type.

West Belconnen Open Space Land Budget

Conservation Corridor + Ginninderra Creek Corridor	
River Corridor ACT	359.00
River Corridor NSW incl Ginninderra Ck	220.00
Included in Total	
River Recreation Area	8.70
Picnic Areas [2no.]	0.55
Living River Discovery Centre	5.10
SUB TOTAL	**579.00**
Transmission Easements [Excl. Landfill 8.30ha]	
Potential Urban Agriculture	42.25
Potential Community Gardens	1.37
Transmission Tower Clearance Areas	6.85
Windbreak/Screen Planting	5.82
WSUD Ponds and Infrastructure	2.16
Movement Network [Cycle/Ped] - approx 9.2km	2.30
Roads	3.10
Ginninderra Ck Corridor	9.00
Managed Native Vegetation buffer areas	4.50
SUB TOTAL	**77.35**
Landfill	
Total Site Area	107.90
SUB TOTAL	**107.90**
Parks & Recreation	
Central Neighbourhood Parks	13.18
Local Neighbourhood Parks	19.60
Water Parks	31.03
Sports Fields Co-Located with Schools	13.40
Woodland Buffer	9.18
Community Gardens [to Existing tree row in NSW]	1.81
Note: Community Gardens also to be incorporated into Water Parks	
SUB TOTAL	**88.20**
Additional Open Space	
Ginninderra Falls Function Centre	5.00
Belconnen Farmhouse - Heritage Precinct	7.40
Strathnairn - Arts Precinct	9.60
Pony Club & Agistment Paddocks	19.16
SUB TOTAL	**41.16**
TOTAL	**893.61**

3.4 OPEN SPACE PROGRAM

The open space system is comprised of a variety of open space types which will enable a broad range of programs and uses to be offered to the West Belconnen community.

The Conservation Corridor is the largest and most significant of the open spaces within the development. Encompassing both the Murrumbidgee River and Ginninderra Creek corridors, measuring 580ha, the corridor protects threatened species and ecological communities and will provide a valuable recreation resource.

The transmission easements which cross the site enable opportunities to introduce land uses which are normally excluded from urban developments. Occupying 87.5ha of land within their easements the transmission lines present the prospect of incorporating commercial scale urban agriculture. The easements also offer the opportunity to introduce a comprehensive off road movement network connecting all corners of the site.

The Landfill located at the heart of the development presents a further unique opportunity for West Belconnen. The possibility to make use of the decommissioned landfill site to create a sustainability precinct and parkland will further develop West Belconnen as a world leading sustainable community.

Just as important as these large scaled spaces will be the network of local parks to service the daily needs of the local residents. The spaces will offer all the facilities required by modern communities and will become the focal points of their local neighbourhoods.

Connecting all of these open space types will be the local street network that is to be designed using worlds best practice to ensure the streets of West Belconnen become more than just a movement network for vehicles. The streets will become a part of the ecological functioning of the site and will prioritise the safety and movement of pedestrians and cyclists. The following section will investigate further the opportunities presented by each of these components of the open space system.

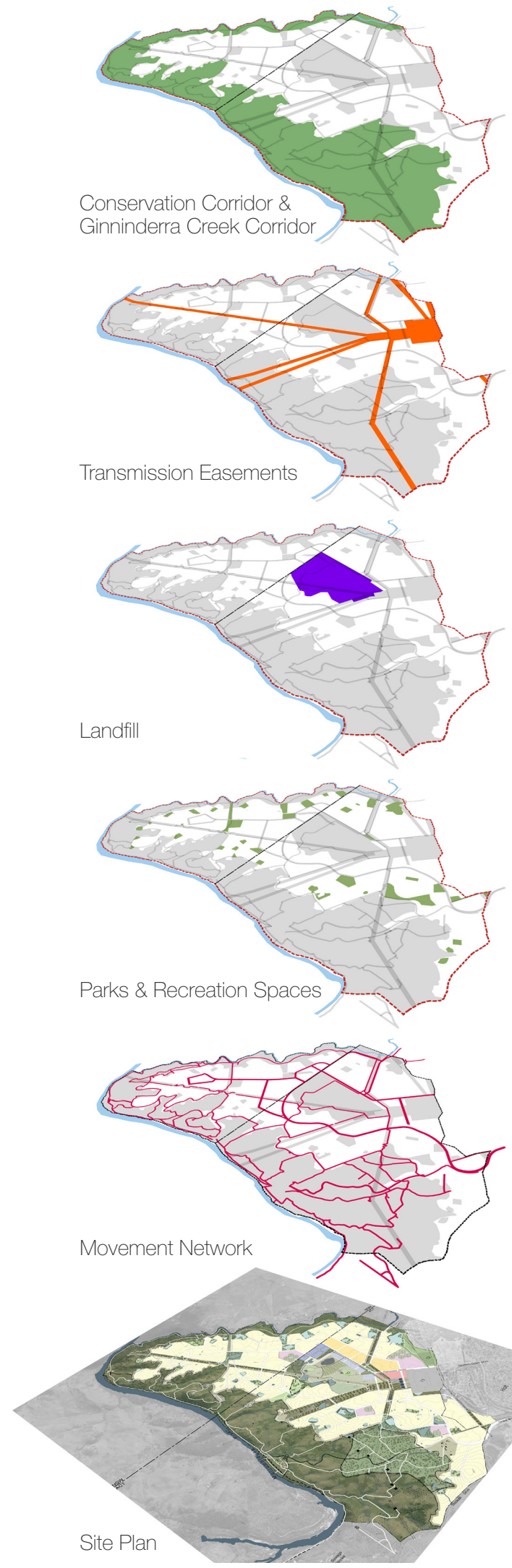
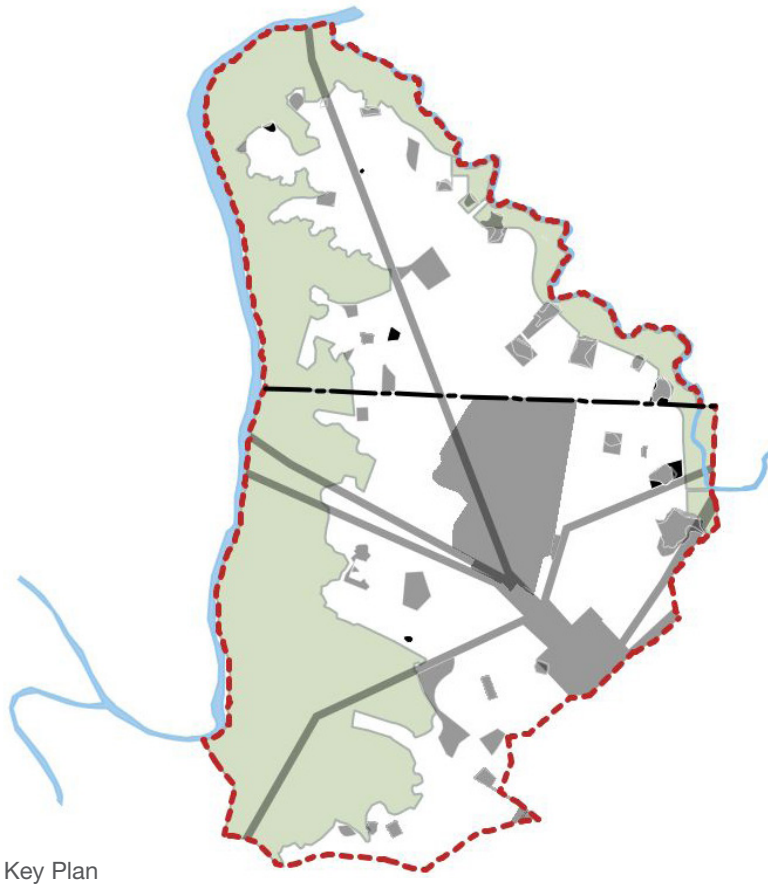


Figure 3.01 - Open Space System Components

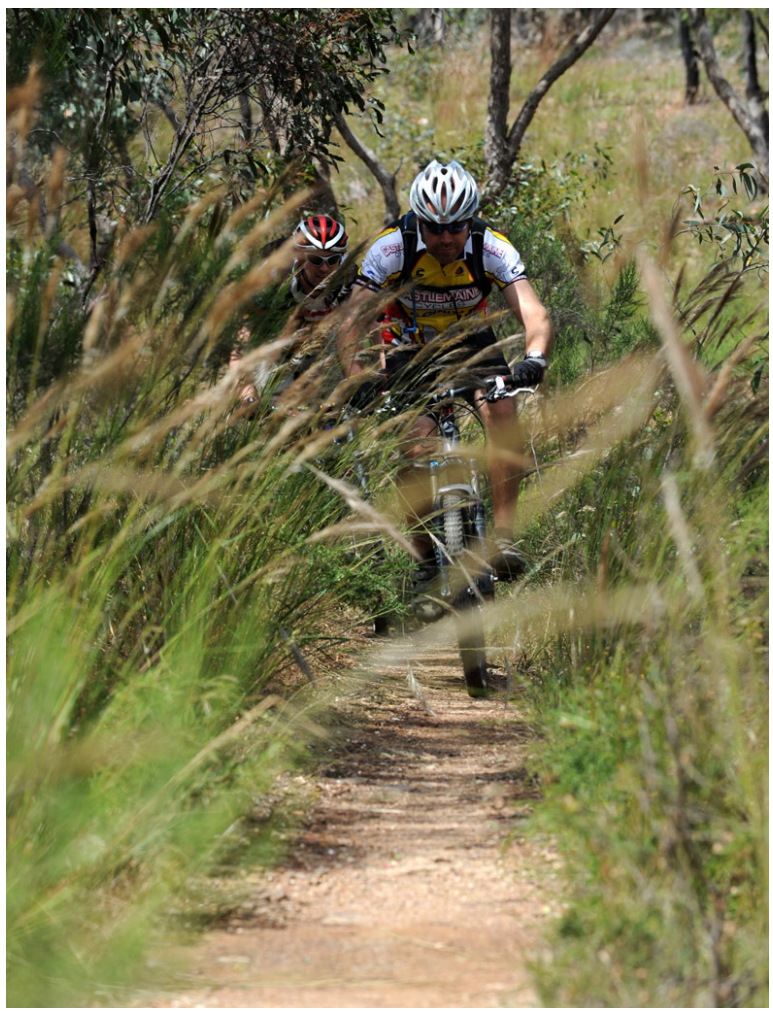


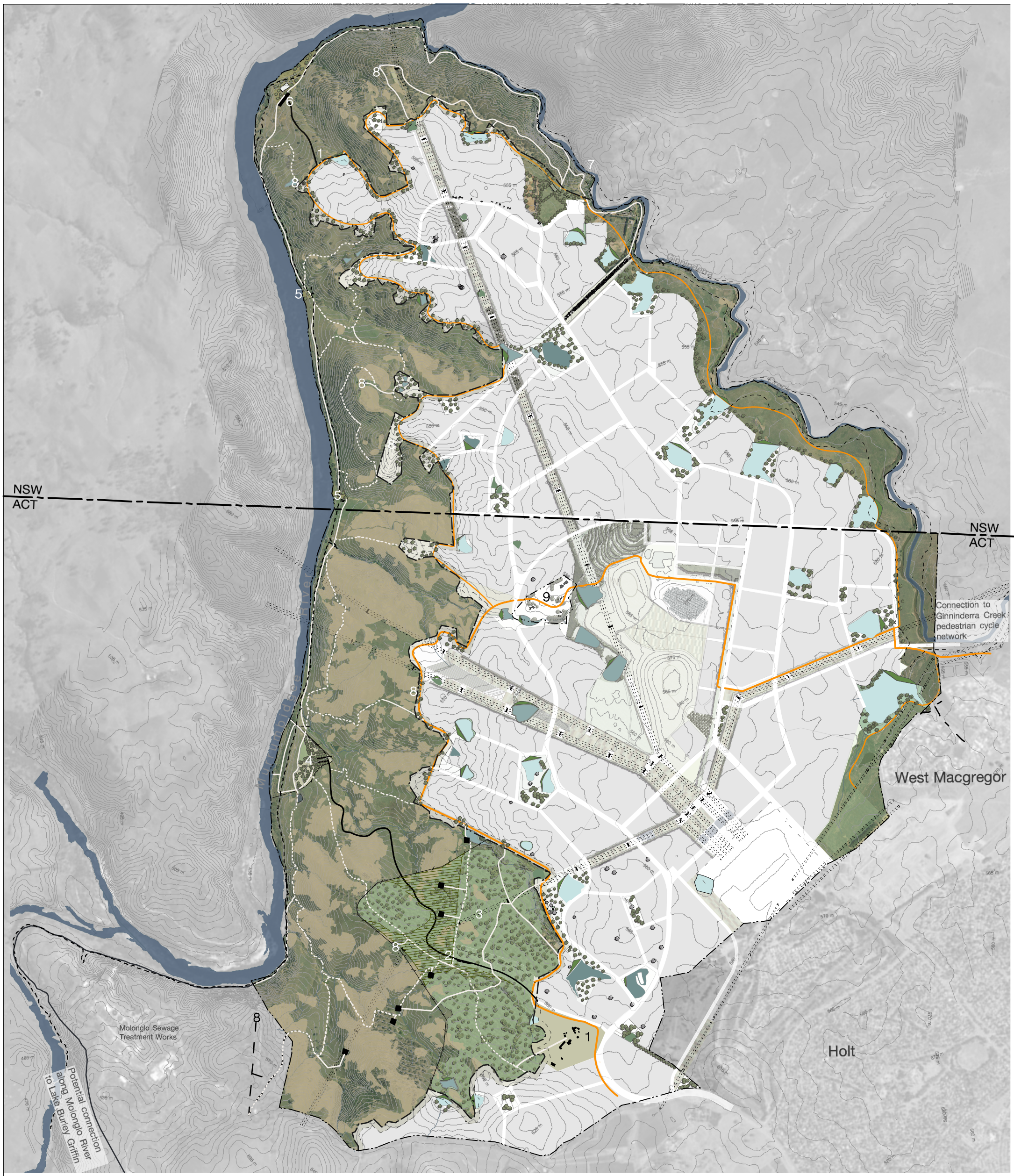
Key Plan

3.5 CONSERVATION CORRIDOR

Management Principles

- Protect and conserve Pink-tailed Worm-lizard [PTWL] habitat and maintain or improve habitat connectivity throughout the Conservation Corridor.
- Protect, restore and conserve Box Gum Woodland habitat.
- Protect and conserve River Oak Forests.
- Manage bushfire fuels to legislated standards.
- Establish native vegetation in those areas where past land use has caused loss of native habitat.
- Protect the Murrumbidgee RIver and Ginninderra Creek and their tributaries through mitigating and managing urban runoff upstream of their respective corridors.
- Develop an adaptive management framework [which may include techniques such as grazing and burning] appropriate to conserving the species, ecological communities and habitats.
- Engage with institutions to develop research and monitoring programs that keep managers of the Conservation Corridor and of urban development in the project area informed about impacts of the development on biodiversity and ecological values.
- Establish a local network of volunteers to assist land managers with management, monitoring and restoration programs.
- Facilitate community educational programs regarding the ecological importance of this landscape to engage the local community and develop a sense of custodianship.
- Facilitate education of Indigenous cultural heritage of the West Belconnen landscape.
- Facilitate education of non-indigenous heritage of the West Belconnen landscape.
- Provide for access and recreation activities for the community in ways that assist protection of the natural assets of the Conservation Corridor.





Legend

- NSW/ACT Border
- Site Boundary
- River Corridor Boundary
- Approx. Flood Line
- Inner APZ Boundary [30m]
- Existing Drainage Line
- Stock Fence
- Existing Dam/Pond
- PTWL Habitat
- Woodland Regeneration Area
- Additional Woodland Area to be Regenerated
- Managed APZ Area
- Pedestrian/Cycle Trail - Existing Trail Reused
- Pedestrian/Cycle Trail - Proposed
- Pedestrian/Cycle Trail - External Existing
- Pedestrian/Cycle Trail - External Proposed
- Pedestrian/Cycle Trail - External Existing
- Pedestrian/Cycle Trail - External Proposed
- Vehicular Trail/ Fire Access
- Shared Equestrian Trail
- 1 Strathnairn Arts Precinct
- 2 Vehicular Access Point + Parking Area
- 3 Strathnairn Woodland
- 4 Conservation Corridor Recreation Area [Vehicular Access]
- 5 River Picnic Area [Pedestrian/Cycle Access]
- 6 Living River Discovery Centre & Conservation Corridor Head Quarters
- 7 Ginninderra Falls
- 8 Lookout/ Viewpoint
- 9 Belconnen Farm Heritage Precinct

West Belconnen

ACT

Draft Conservation Corridor Plan

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02

Riverview Projects [ACT] Pty Ltd & Land Development Agency

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Pink-tailed Worm Lizard [Aprasia parapulchella] Habitat Management

Public access to PTWL habitat areas is to be directed to less sensitive areas through the use of fencing, tracks and information signage. Much of the significant lizard habitat is found on steep, inaccessible ground and this will aid in protecting the integrity of the rocky habitat.

Management techniques specific to the PTWL habitat are to be developed as part of the management plan for the Conservation Corridor. Stock grazing is expected to be continued as the primary tool for fire fuel load management as it has been compatible with the PTWL habitat to date.

Box Gum Woodland Management

The existing Box Gum Woodland will be protected as part of the management plan for the Conservation Corridor. The existing woodland habitat will be subject to a revegetation program designed to replace exotic grasses with native grasses and restoration actions to bring back key elements of ecosystem structure. Public access to the woodland areas will be facilitated through the provision of mown or surfaced paths. Information signage is to be incorporated at the entrances and key locations within the woodland area to encourage appreciation and appropriate use of the area.

It is noted that fallen timber has a significant role to play in woodland restoration as it replaces a resource removed over many years for rural management. Therefore, all timber required to be removed from development areas will be assessed for its suitability for woodland restoration works consistent with the management plan for the woodland.

River Oak Forest

The River Oak [*Casuarina cunninghamiana]* Forests along the banks of the Murrumbidgee River and Ginninderra Creek will be protected as part of the management plan for the Conservation Corridor. Appropriate management will ensure their important ecological and aesthetic roles along the river are continued in perpetuity.

Black Cypress Pine

A number of stands of Black Cypress Pine occur within the corridor, and while not a listed ecological community, they provide another layer to the ecological value to the corridor. The pines are sensitive to fire and will not regenerate if burnt. Particular care will be required in these areas when fuel reduction burns are being carried out with special protections put in place to preclude fire from these areas.

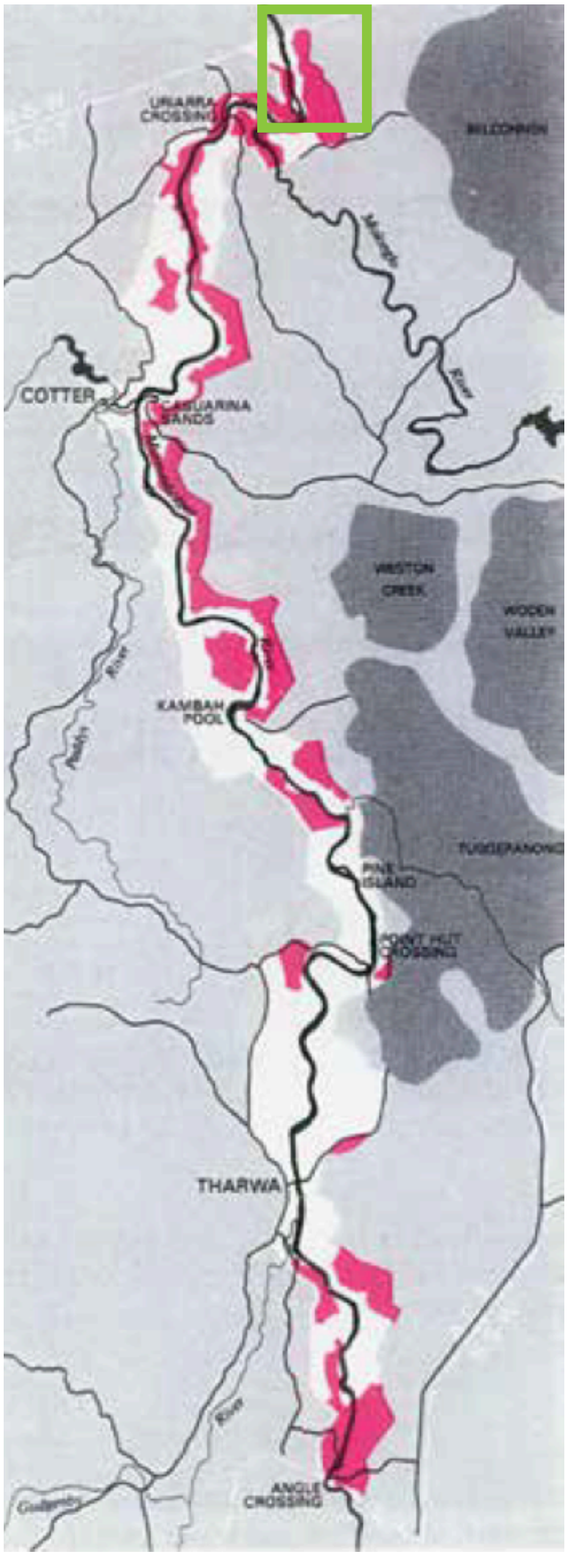

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Figure 3.02 - Murrumbidgee River Corridor Ecological Areas [NCP]
Image 1 - PTWL habitat
Image 2 - YBRGGW habitat
Image 3 - River Oak Forest [K. Mills]

River Access/Recreational Access

Fundamental to the success of the Conservation Corridor will be managing public access. The Draft Corridor Plan provides walking, cycle and vehicular access to and/or within the corridor and to the Murrumbidgee River and Ginninderra Creek. Due to the steep topography, access to many parts of the corridor will be limited to pedestrians and mountain biking.

The diagram opposite outlines the proposed trail network. The majority of proposed access trails utilise existing tracks and trails. The intention of this decision is to minimise new construction within the corridor, hence minimising disturbance to the threatened species and communities. Images and locations of a number of these trails are included on the following pages. These existing trails are the legacy of farming operations and are often located in the most accessible parts of the corridor. A few of the existing trails have been created using earth moving equipment and will require varying levels of remediation work to ensure public safety.

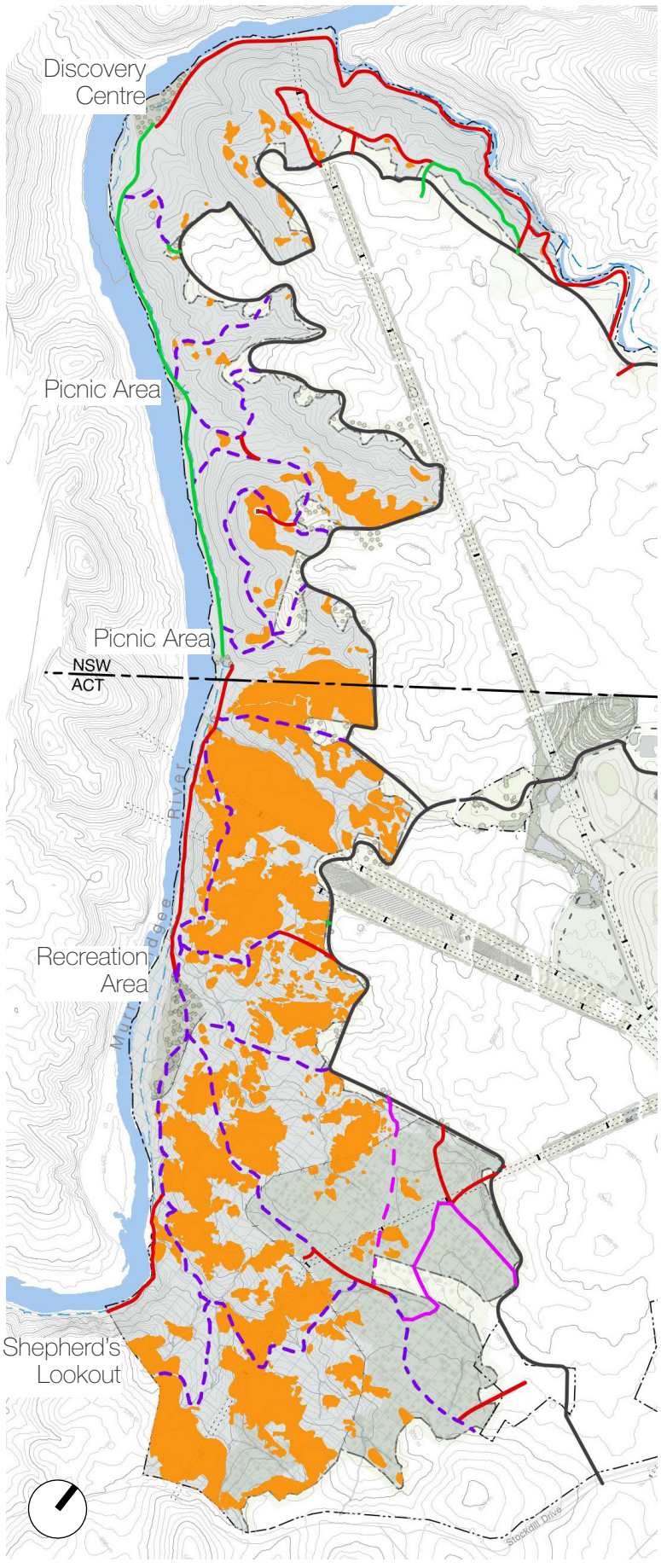
Where new trails are proposed, either to link existing trails or provide access from the development area, these have been located to avoid areas identified as PTWL habitat.

An opportunity also exists to utilise easements and maintenance trails required for service utilities and where feasible these have also been incorporated into the trail system.

A sealed access track is proposed to run parallel to the Murrumbidgee River from a proposed Living River Discovery Centre, described further below, to the picnic area on the NSW/ACT border. From this point south the topography becomes more rugged and as such the track will be unsealed. The track continues south along the river, providing access to the main recreation area and beyond to Shepherd's lookout and ultimately to the Molonglo River.

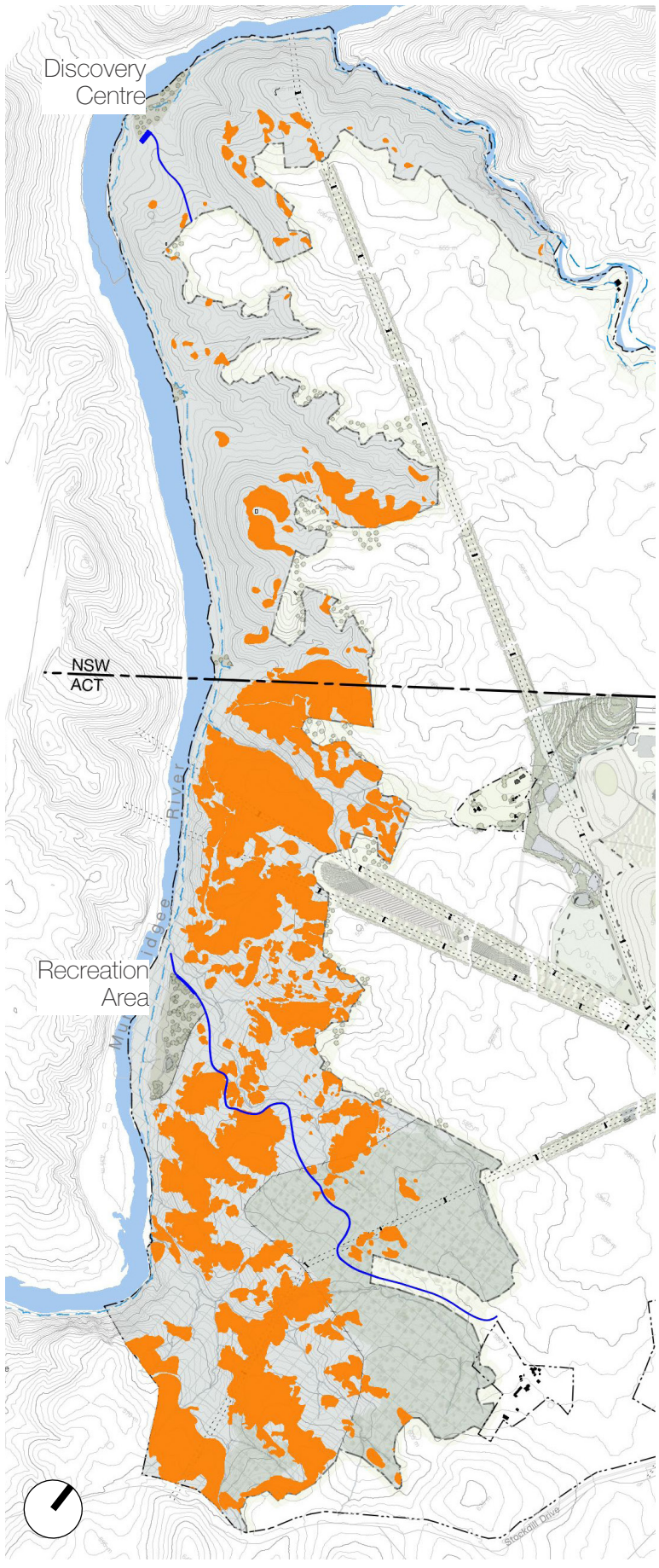
Two public vehicular access points are proposed within the corridor. The northern road will provide access to the Discovery Centre following an existing trail for the majority of its route.

The second vehicular access point will be to the main recreation area, which is described below. This road will also utilise the alignment of an existing vehicle track, however providing public access will require widening to approximately 6m and sealing of the road. This trail will also enable fire fighting and management access to the corridor. This trail traverses a section of lizard habitat and will require detailed planning to ensure impacts are appropriately managed.



Legend

- Existing track/trail
- Proposed Unsealed trail
- Proposed Sealed trail
- Utility Trail [Existing trail re-used]
- Proposed Utility Trail - Unsealed
- BNT/Equestrian Trail [refer section 3.9]
- Proposed Unsealed trail - external
- Existing Unsealed trail - external
- PTWL Habitat Area



Legend

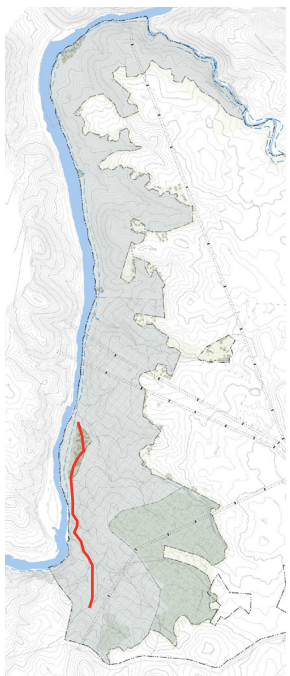
- Proposed Public Vehicular Access
- PTWL Habitat Area

Figure 3.03 - Proposed trail network
Figure 3.04 - Proposed vehicular access

Existing Vehicle Tracks

The images and key plans below and on the following page identify a number of the existing vehicle tracks, used for farming operations, proposed for re-use as part of the Conservation Corridor. As can be seen, the majority of these tracks are well worn and will require minimal additional works to make them fit for public access. The grades of the tracks vary significantly and will require signposting to identify potential risks, particularly for cyclists.

- Image 1. Vehicle track along Murrumbidgee River leading to Shepherds Lookout
- Image 2. Existing cutting proposed for use as vehicular access to recreation area. The proposed road will require widening of the existing track.
- Image 3. Track leading from top of Corridor down to the Murrumbidgee River
- Image 4. Track to picnic area on NSW/ACT border.
- Image 5. Track up valley connecting to proposed sealed access track.
- Image 6. Track providing access to northern most picnic area on Murrumbidgee River



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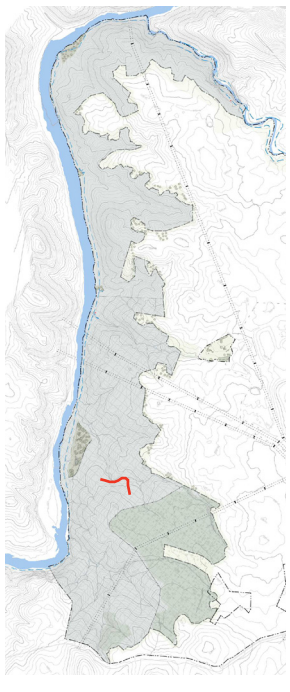

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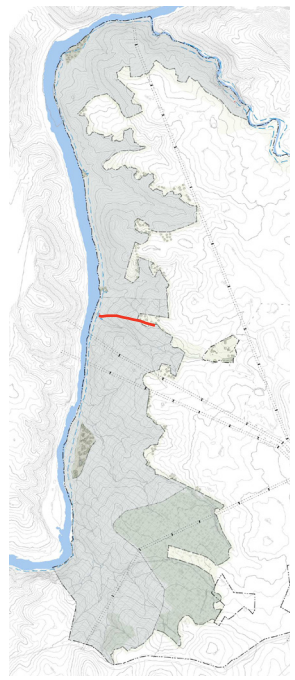

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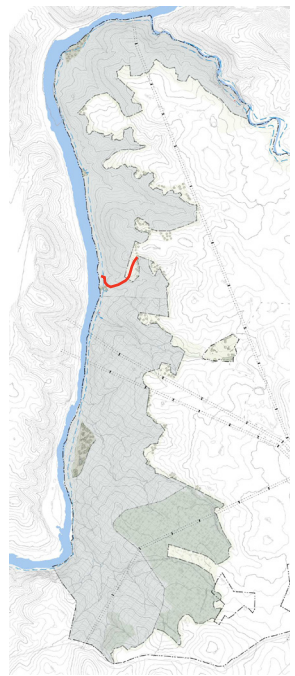

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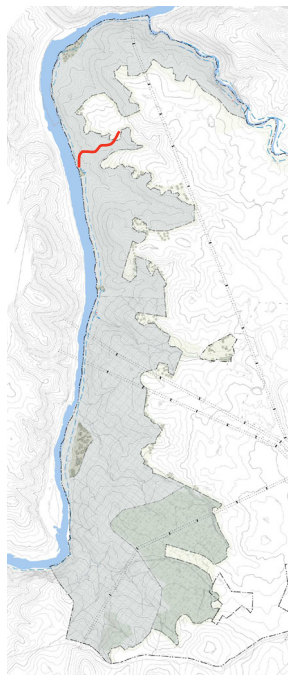

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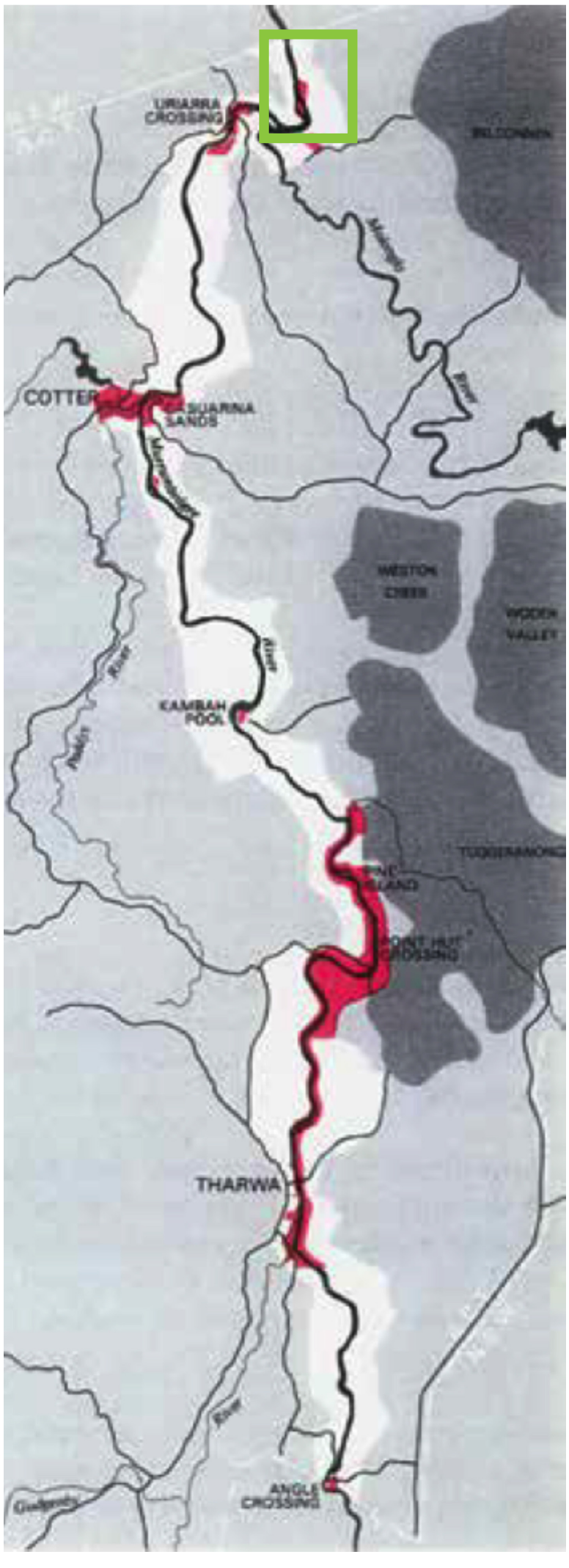


Figure 3.05 - Murrumbidgee River Corridor Recreation Areas [NCP]

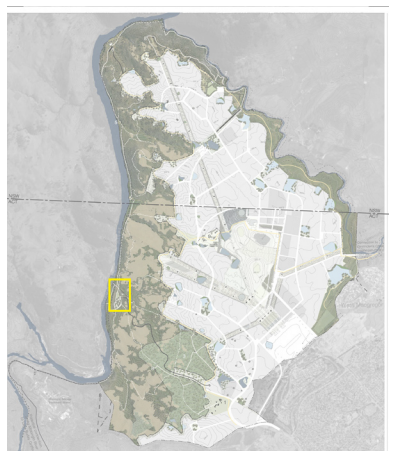
River Recreation Area

The river recreation area will be located in the ACT portion of the corridor. This area is identified in the NCP, shown opposite, and will provide a valuable resource for all Canberrans. The area will be accessible by road with a parking area catering for approximately 75 vehicles. The recreation area will enable local residents and the wider community to engage with the river at the heart of the conservation area. Proposed recreation activities are to include picnic facilities, interpretive play and free play areas and educational elements regarding the surrounding landscape. Due to limited ability to provide utilities to the site, composting toilets will be utilised. The recreation area will also provide a base for excursions into the Conservation Corridor and beyond.

Due to the steep topography and natural features of the site, access to the river's edge will be provided via a loop trail which will traverse the steep banks down to the river. This trail will enable interaction with the river's edge at points where the existing vegetation, particularly the River Oaks, will not be detrimentally impacted.

A deck structure is proposed to enable all users to engage with the River. The deck extends out over the steep bank to a height of approximately 10m. It is aligned with the confluence of the Murrumbidgee and Darling Rivers on the NSW/VIC border approximately 528km to the west. The deck will provide views up and down the river corridor and will be accessible to wheelchairs. Interpretive and educational signage outlining various aspects of the River including its cultural significance to indigenous and non-indigenous peoples will also be incorporated.

Image - View north over River Recreation Area



Key Plan

Figure 3.06 -River Recreation Area Concept Plan

Images - Recreation Area Character Images

Living River Discovery Centre & Conservation Corridor Head Quarters

A potential future location for the Discovery Centre has been identified at the northern end of the Corridor. This location has been used in the past by local landowners for river access and will be publicly accessible by road. Direct access to the river is possible at this location and the Discovery Centre is also proposed to provide equipment hire including kayak, canoe and fishing. The Discovery Centre will provide a learning and interpretation centre and act as a base for Conservation Corridor management activities.

Picnic Areas

Two additional picnic areas have been identified further to the north along the river, providing opportunities for visitors to take in the tranquil surrounds under the River Oaks on the banks of the Murrumbidgee River. The picnic areas are accessible from the sealed pathway as well as from a number of walking tracks down the hillsides from the development edge.

Ginninderra Falls

Ginninderra Falls provide a unique opportunity to engage with a stunning natural landscape of steep Native Pine clad valleys and magnificent rock formations. The potential for a commercial development associated with the falls, for example a wedding reception/ conference venue with restaurant & cafe, is currently being investigated. Such a development could become a destination for the local community and tourists alike, offering a number of recreational opportunities including rock climbing and abseiling.

WSUD strategies

A high standard of management of urban stormwater will be a critical factor in ensuring the continued health of watercourses within the project area and particularly through the Conservation Corridor. Of vital importance is ensuring quality and quantity of runoff is maintained at pre-development levels or improved. This will be achieved through a site wide integrated Water Sensitive Urban Design strategy that will include detention basins and wetlands along the edge of the development areas and Conservation Corridor. These elements will introduce a new type of habitat in the locations they are created.

Research opportunities

Baseline surveys are currently being designed, with field work to commence in spring 2014, to collect data before development begins. This will enable accurate analysis of the impacts of land

Image 1 - French River Visitor Centre, Ontario, Canada.
Image 2 - Ginninderra Gorge
Image 3 - Field Survey

use changes, delivery of design standards and to support improvements where needed in the future. Opportunities also exist for further research into the PTWL population, restoration of the Box Gum Woodland and other biodiversity and ecological values.

Community Engagement & Volunteering

Community engagement programs will be fundamental to the protection, conservation, and restoration of the Corridor. Creating a sense of custodianship within the local community will be key to ensuring it is protected into the future. The development of volunteering programs to aid land managers in maintaining and restoring the Conservation Corridor will be an important part of the ongoing management plan and community engagement strategy.

Part of the community engagement strategy will involve facilitating educational and information programs for local schools, residents and the wider community. These programs will cover the natural and cultural heritage values of the corridor.

The Conservation Corridor contains Indigenous heritage items, some of which can be explored and interpreted with the aid of members of the local indigenous community. The promotion and identification of sites of indigenous cultural value will be at the discretion of the local indigenous community. Other indigenous cultural practices can also be reflected in the Corridor, for example small scale patch burning by Aboriginal people working with the Corridor managers to achieve ecological outcomes as well as managing fuel loads. This initiative is being used in other parts of Australia and has recently been initiated at Jerrabomberra Wetlands Nature Reserve. [Ryan, 2013 p.10]

Outdoor Lifestyle

With such a magnificent landscape on their doorstep, West Belconnen's residents will have ample opportunity to live an outdoor lifestyle. As outlined above a wealth of options will be presented including walking, cycling, mountain biking, nature watching, kayaking, canoeing, fishing, rock climbing or abseiling. With the Murrumbidgee River on the western edge and Ginninderra Creek to the north, West Belconnen is well positioned to offer a range of experiences within an iconic natural setting.

Image 1 - Abseiling
Image 2 - Ropes course
Image 3 - Kayaking

Bushfire

Bushfire risk and management will be a key consideration within the overall management framework for the Conservation Corridor as well as for the urban open space network. Detailed investigations are being conducted by Ecological Pty Ltd for the West Belconnen project in consultation with ACT and NSW Emergency Services agencies. This work will result in specific recommendations for fire management within the corridor and the urban area which will be adhered to as the development proceeds. All of the recommended actions in this draft landscape strategy are compatible with the bushfire investigations conducted to date. Some modifications may be warranted when the bushfire recommendations are finalised.

Corridor Governance and Management

Riverview proposes setting up an environmental trust (the 'Trust') to manage the corridor and ensure its integration with the new community at West Belconnen and beyond in perpetuity. A Trust arrangement would enable effective community involvement in priority setting and management actions, while also allowing for management of the corridor to benefit from grants or private investment.

Pre-eminent objectives would be the conservation of natural values and bushfire management. The Trust would also oversee education, research, recreation, and community involvement. It would be run by a company with a skills-based board comprising government and community representation. Specific committees would be set up with the relevant expertise to ensure objectives pertaining to land management and community engagement are achieved.

Funding for the Trust would be sourced from the project revenue in NSW and in the ACT from ACT Treasury in lieu of funding that would otherwise be allocated to the reserve if it were managed by government agencies. Memberships, grants, bequests, access charges, and recreational use fees are other options for generating revenue that may be considered.

For further information on the Trust refer to Elton Consulting's Report "An Environmental Trust for West Belconnen".

Image 1 - View south along Murrumbidgee River

3.6 POWER TRANSMISSION EASEMENTS

The transmission easements that cross the West Belconnen community will become an integral part of the movement network across the site. The easements also present the opportunity to continue the agricultural legacy of the site by introducing a range of urban agriculture uses.

Guidelines for incorporating energy infrastructure into open space system

- integrate easements so they become valued parts of the open space network and not simply left over spaces dividing the community.
- develop a commercially viable Urban Agriculture network that will provide local food while reusing organic waste generated by the community.
- integrate the movement network into the easements enabling safe and efficient off road networks connecting the community.
- provide recreation areas where land is unsuitable for agricultural uses due to topographical constraints or access requirements for maintenance of the transmission assets
- provide windbreak and screen planting to reduce visual impacts of transmission towers.

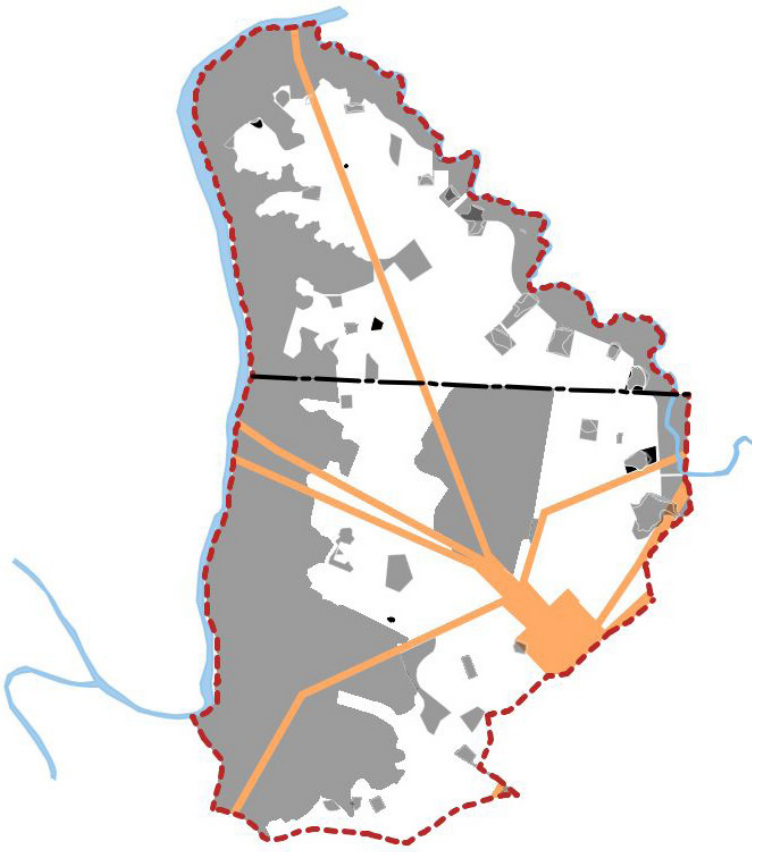
Electric & Magnetic Fields

Occasional concern is expressed from the public in regards to Electric and Magnetic Fields [EMF], such as those emitted from high voltage [HV] power lines, and the perceived links to increased health risks within the community, particularly for children. The Leukaemia Foundation of Australia has published a position statement on *"Powerlines and Childhood Leukaemia"* stating there is "no consistent evidence to prove childhood exposures are associated with brain or any other types of tumors" [LFA, 2007]. They do however promote 'prudent avoidance', the adopted policy of the Energy Supply Association of Australia [ESAA] the peak organisation for electrical companies in Australia.

The scientific evidence finds no association between EMF exposure and health risks. Introducing a variety of uses into the easements will bring many benefits to the community and make use of valuable land bank that often sits idle within residential communities.

Urban Agriculture Network

The easement corridors present an opportunity to integrate a valuable resource utilising what is generally perceived as waste land. Very little of the fresh produce consumed in Canberra is grown locally with only small amounts of herbs, vegetables and fruit. The majority of the agricultural activity in the ACT is related to beef and sheep farming [Turner et.al.,2012 p.12].



Key Plan

Image - Urban Agriculture under transmission lines in California, USA

Images - Urban Agriculture Character Images
Bottom Right image credit [http-//dirt.asla.org/2011/12/page/2/]

The 87.5ha of land contained within the easements therefore presents an opportunity to integrate intensive urban agriculture and produce local food for local consumption. Local food movements have become common place over the past decade as people become more conscious of 'food miles' [the environmental impacts of transporting food long distances] and also the risks associated with relying on food that is at the mercy of world markets, rising oil prices, increasing fertiliser costs and climate change.

It is proposed that a wide variety of urban agricultural production could take place at West Belconnen. Organic production would be seen as the best practice benchmark. One possibility is for the green waste generated throughout the development be collected and processed on the reused landfill site, setting up a 'closed loop' system that diverts waste from landfill and creates a sustainable local green waste network, see figure 3.11. The impacts of market preferences and commercial viability are the key factors that will govern what types of urban agriculture are ultimately carried out and how these could change with time. A preliminary list of potential activities includes;

- High value intensive perishable crops - herbs, vegetables, fruit.
- Broadacre or extensive cropping - subject to machinery height restrictions of 4.3m.
- Fish farming - many species of native and exotic fish can be farmed including murray cod, golden perch, silver perch and freshwater catfish.
- Tree crops maintained below 4m in height, eg. olives which are particularly suited to steeper areas.
- Greenhouse production - greenhouse structures enable extended growing seasons and increased yields for some species. They are permitted within the easements with a height limit of 4.3m and require earthing of metal components.

The biggest constraint to agricultural production will be soil fertility and water availability. Soil fertility can be addressed through introducing organic composts and soil conditioners and vast sources of these can be tapped through the development of a local green waste recycling system, this will be discussed further in the following section 'Landfill Reuse'. Water is the second limiting factor however, the WSUD strategy will enable stormwater captured throughout the development to be utilised for agriculture.

Community Supported Agriculture

The urban agriculture network also presents the opportunity for a Community Supported Agriculture [CSA] scheme. CSA develops a direct relationship between the grower and consumer with the consumer directly funding the farming operations in return for a weekly share of the produce. This type of enterprise is a relatively new socio-economic model of food production, sales and distribution and is particularly suited to small scale labour intensive organic/biodynamic/ecological farming. The benefits of CSA are numerous [www.organicfooddirectory.com.au];

- Encourage environmentally sustainable farming practices,
- Lower costs for consumers compared to fresh produce shops.
- Consumers connect to their food and producers of their food and know where their food comes from.
- Consumers gain an understanding of conditions of food production
- Protects agricultural diversity
- Reduces waste and cost created in marketing, packaging and distribution.
- Producers have improved economic security and share risk with consumers.
- Farmers have a guaranteed market for produce.

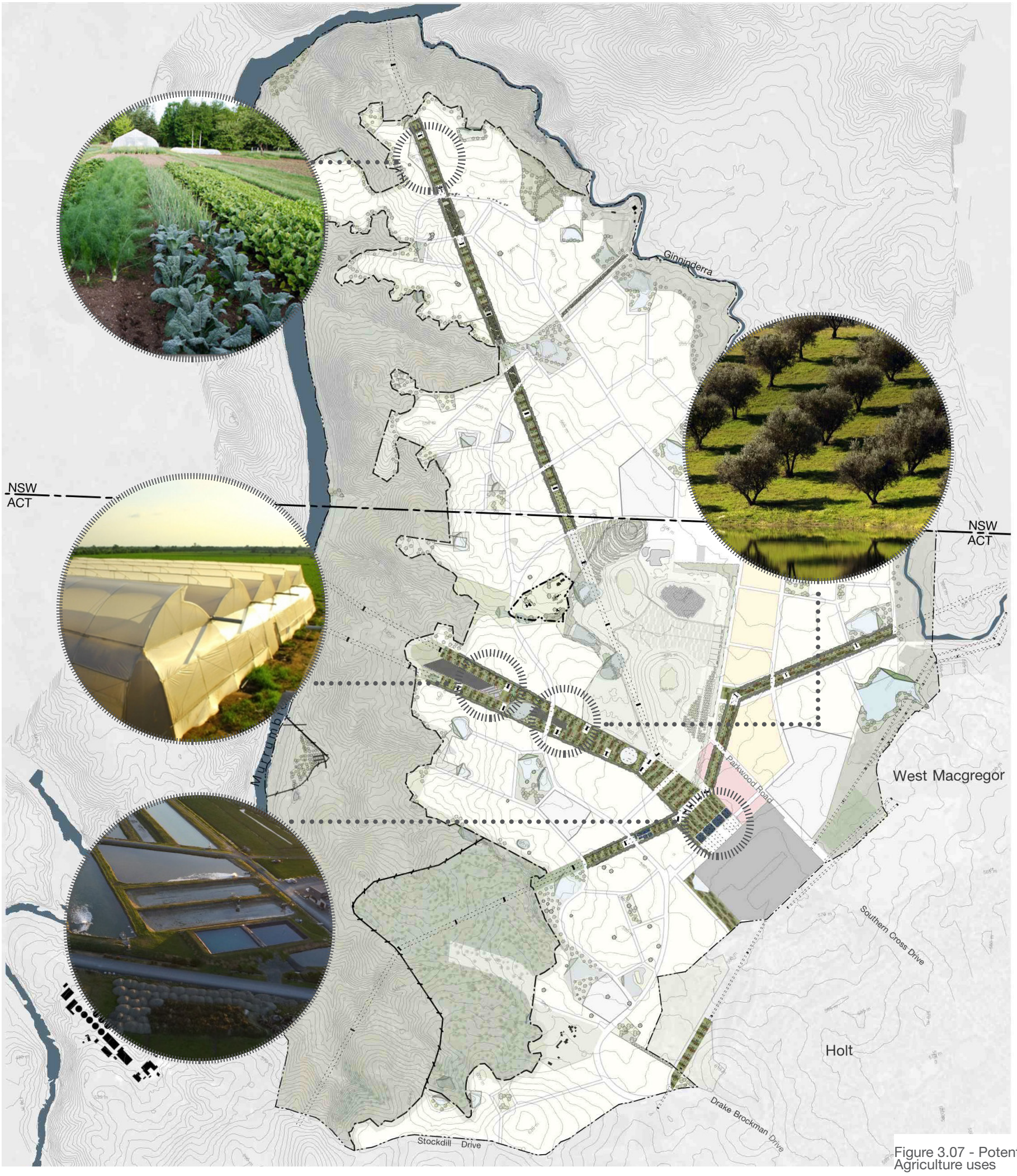


Figure 3.07 - Potential Urban Agriculture uses

Community Gardens

Suitable locations for Community Gardens will be identified during the detailed design process, including smaller scale areas created by roads or other infrastructure within the easements and those too steep for commercial urban agriculture can be utilised as community gardens. These steeper areas are better suited to the smaller plot sizes used by individual growers within community gardens.

Connections

Due to their linear nature the easement corridors become ideal connections throughout the site, providing safe and efficient off-road cycling and walking routes. All of the easements converge at the substation site which is adjacent to the proposed retail and commercial centre of the development and the reused landfill site which will become the heart of the development.

The easements also facilitate cross connections between the Murrumbidgee River and Ginninderra Creek and to the wider cycle and pedestrian network of the surrounding urban areas.

Screen Planting & Windbreaks

Due to the potential impact of the transmission towers on visual amenity it is proposed planting be used at the edge of the easements to provide screening. The screen planting will also act as windbreaks across the development and become an important part of the movement network for fauna that use tree canopies to move around the landscape. The potential impacts of the screen planting on the agricultural areas will need to be considered when selecting species in regards to shading, leaf fall etc. A preliminary planting palette is provided in later sections.

Recreation

The opportunity also exists to incorporate recreational uses within the easements. Potential uses could include bmx tracks and active recreation areas for frisbee etc. Dog off leash areas could also be included, particularly in the clearance areas required for maintenance access around the base of the transmission towers.

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Image 1 - Community Garden on steep terrain

Image 2 - Cycle path

Image 3 - BMX track trough easment

Image 4 - Screen/Windbreak planting

3.7 LANDFILL REUSE

A unique opportunity is presented by the re-use of the West Belconnen Landfill to create a flagship open space and sustainability precinct at West Belconnen. The opportunity to create a centre for recycling, sustainability and education on top of millions of tonnes of garbage is hugely symbolic and provides a valuable commentary on the vision for the West Belconnen community. The landfill reuse program would evolve over a period of many decades and be guided by the constraints of the landfill decommissioning process.

Sustainability Precinct

The main goal for the re-development of the landfill site will be its transformation into a Sustainability Precinct. The precinct could deliver a wide range of uses for the community however, a primary focus will be on developing strategies for urban and suburban areas to adapt and thrive into the future.

In the first instance, the precinct could provide recycling and re-use programs for the community as part of a proposed Ecology Business Park [EBP]. As the landfill site is gradually decommissioned and potentially opened up for redevelopment a number of other uses may be introduced including;

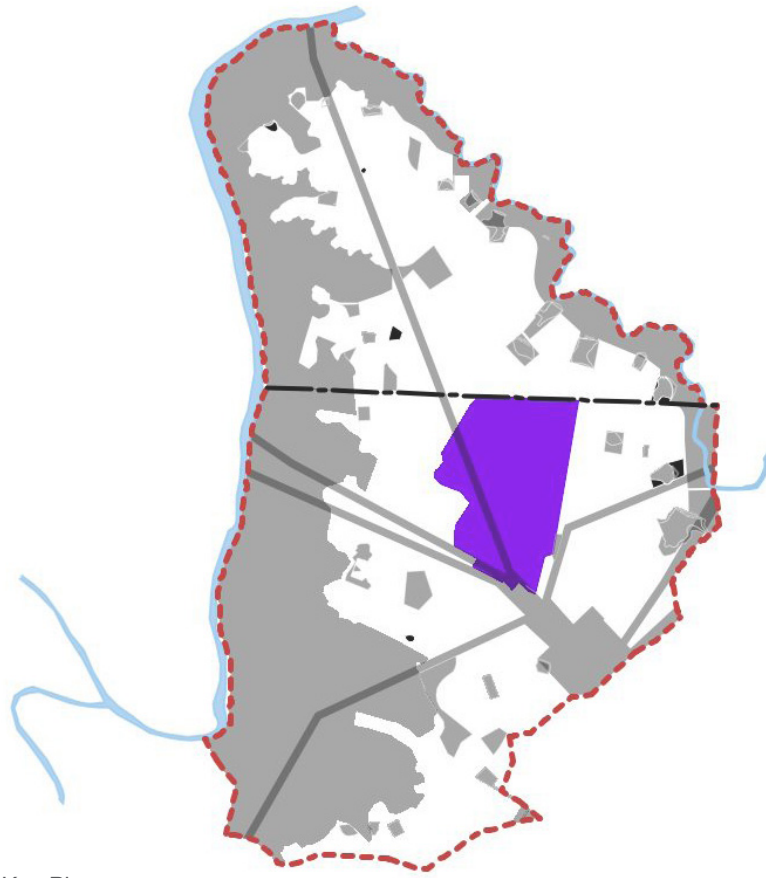
- Urban Farm
- Renewable Energy
- Community Spaces
- Ecology Park

Each of these uses will have individual goals and programs. However, all will form a part of a holistic and collaborative network of businesses and organisations disseminating knowledge across the community.

Education and training will form a large part of the precinct's role, providing education to schools, the local community as well as the greater Canberra population. The precinct has the potential to become an employment hub for West Belconnen and a destination for the wider community.

Each of the individual uses is described in further detail in the following section including a discussion on successful precedent projects.

The diagram on the following page outlines the range of potential uses that could be introduced to the landfill site.



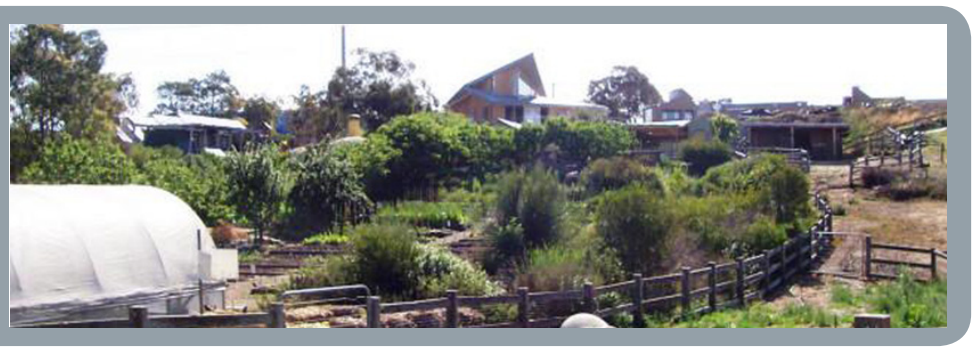
Key Plan

Drive Through Recycling Centre
Waste transfer station
Green waste recycling
Landfill resource recovery
Research & Development
Education and training
Office Space
Nursery

Ecology Business Park

Urban Agriculture
Food Forest
Animal husbandry
Education & training

Urban Farm



Solar Thermal
Photovoltaics
Biomass
Methane

Renewable Energy

Start-Up spaces
Pop-Up spaces
Men's Shed
Community groups
Events Spaces

Community Spaces

Wetlands
Native Grasslands
Education

Ecology Park

Mountain biking
Equestrian use
Walking trails
Lookouts
Passive recreation

Recreation

Figure 3.08 -Landfill site program

Precedents

CERES Community Environment Park, Melbourne, VIC

CERES [Centre for Education and Research in Environmental Strategies] is located on a disused landfill site in Brunswick East, Melbourne. It is a not-for profit sustainability centre which includes;

- an urban farm,
- Australia's largest environmental education program
- an event and conference centre
- green technology displays and buildings
- social enterprises including Organic Market, Cafe, Permaculture Nursery & Fair Food Organics delivery scheme.

A number of community groups also reside at CERES including the Bike Shed, Community Gardens and Chook Group. CERES offers a model for future sustainability, innovation and connectedness.

CERES provides a solid, economically viable foundation on which to model the Sustainability Precinct at West Belconnen. The community engagement and education elements of the model are particularly valuable and can enable the Sustainability Precinct to become an integral part of the West Belconnen community.

Centre for Alternative Technology, Wales, UK

CAT is an education and visitor centre that demonstrates practical solutions for sustainability. The centre has over 7 acres of sustainable technology installations and interactive displays including;

- Photovoltaics
- Solar thermal
- A micro-grid
- Biomass combined heat and power
- Hydro
- Air source heat pumps
- Wind turbines
- Reed bed effluent systems
- Organic gardens.

The Centre also runs a number of education programs including a graduate school in environmental architecture and renewable energy. They provide education for schools, teachers, trades/engineers and the general public.

CAT provides a second model for the Sustainability Precinct that contributes to the vision of a 'world leading' community. The key elements of the CAT model that can be integrated into the project are knowledge sharing and education through practical solutions that allow people to make positive changes in their own lives.

Sustainability Precinct Components

Ecology Business Park [EBP]

The EBP will utilise the principles of industrial ecology [IE] to develop businesses that are modelled on the functions of ecological systems. The primary goal is to identify waste products from one system/business that can be used as an input for another. These 'closed loop' systems reduce waste and also reduce the need for the input of virgin materials. With the world facing increases in the costs of extraction and shortages of many materials in the decades to come, the EBP offers a huge potential for finding ways to divert materials from landfill.

Drive-thru Recycling Centre

Drive-thru recycling centres have been used successfully across the world for many decades and are becoming increasingly popular as the value of raw materials increases. The drive through recycling centre is proposed as the 'front-door' to existing and new recycling businesses on site. It can become a 'one-stop' destination through co-location with other services including car-wash, domestic equipment hire [lawnmowers, whippersnippers, blowers etc.], nursery, community facilities of the Urban Farm & other community spaces.

Green Waste Recycling

The existing green waste recycling facility is proposed to be relocated, in consultation with the current operators, as part of the Master Plan to enable its integration into an indoor facility that can be co-located with a proposed on-site waste transfer station as a part of the EBP. The green waste facility will provide valuable compost products to the urban agriculture operations and the local community, ensuring waste generated on site is re-used on site for the purposes of food production. Green waste sources will include residential dwellings [food waste, garden waste], parks and open space maintenance, commercial kitchens etc.

Landfill Resource Recovery

The potential to recover resources from the landfill also presents many opportunities. Of particular interest is the large volume of tyres which are buried within the landfill and present a possible opportunity for excavation and recycling.

Research & Development

Many opportunities are presented for research and development within the EBP and the waste streams available as well as the Urban Agriculture program. It is proposed commercial office spaces may form a part of the park providing a revenue stream for the precinct.

The Woolworths Fresh Food Future Program is an example of a potential source of R&D funding. The program has two main objectives;

- Advancing farming innovation, productivity and long-term sustainability;
- Supporting the next generation of farmers and industry leaders.

The program promotes new projects that increase the sustainability of the food supply chain and could be married with the proposed urban agriculture activities across the project.

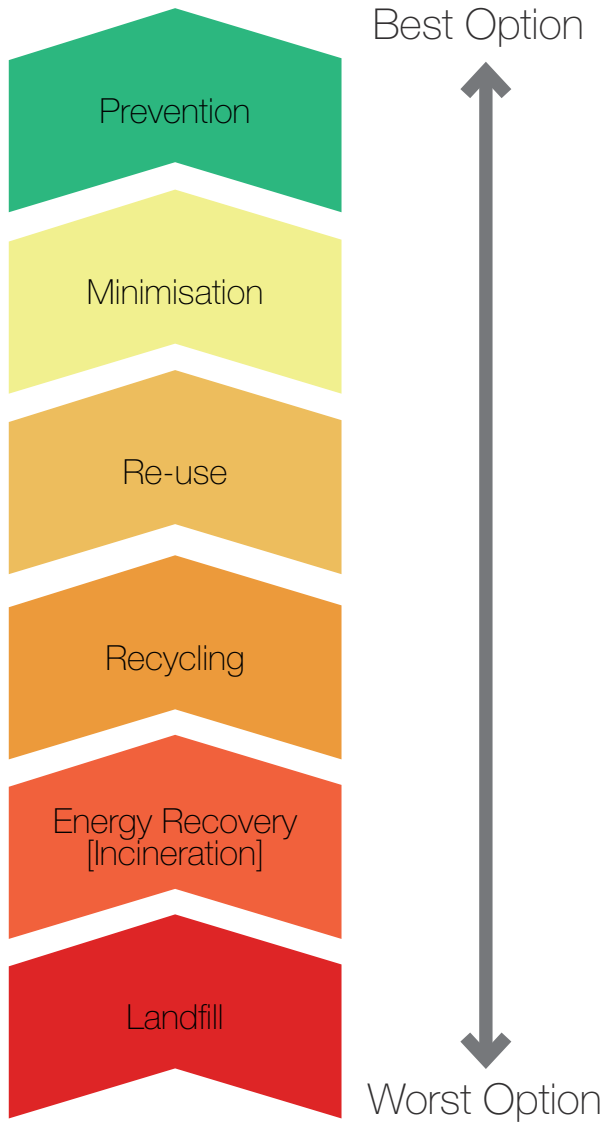


Figure 3.09 - Waste Management Spectrum

‘Closed Loop’ Urban Organics Cycle

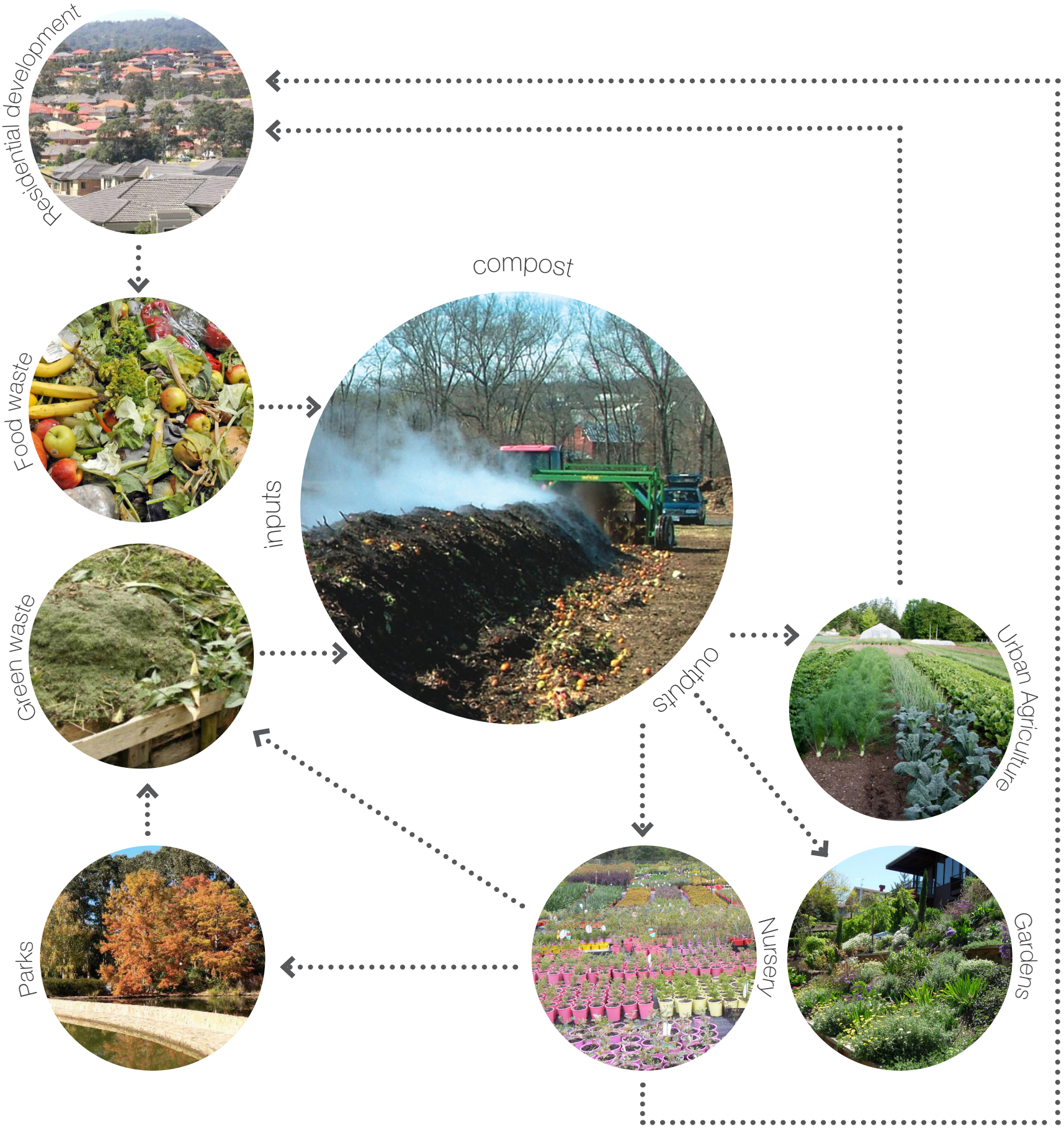


Figure 3.10 - Urban Organics Cycle

Nursery

A commercial production nursery may be a viable business, propagating plant material required for the open space system, including revegetation, parks and streets. It is also proposed the nursery could provide plants and landscape supplies to the local community. The nursery would also be a valuable part of the composting system, providing a point of sale for products while also returning green waste inputs to the system.

Urban Farm

Urban Agriculture

Urban agriculture holds many potential benefits for urban and suburban areas as discussed previously. The establishment of an Urban Farm, the first in Canberra, will bring many educational benefits and social outreach opportunities as is demonstrated by CERES. The Urban Farm could become a focal point of the community, an educational resource as well as a training ground for young urban farmers to gain experience through internships and other training programs.

Food Forest

The food forest and urban orchard will provide a valuable community resource enabling research of edible plant species suitable for the Canberra climate. This resource will also provide valuable passive recreation spaces incorporated throughout the forest. Guided walks and workshops will be a part of the educational program and the forest will become a valuable source of propagation material for edible species to be grown at the site nursery.

Education & Training

One of the primary roles of the Urban Farm will be educating school children and the general community on a range of topics surrounding sustainability, food, urban farming, environment & ecology, animal husbandry, horticulture etc.

Renewable Energy

The renewable energy component of the Sustainability Precinct will focus on education and research. A number of sustainable energy technologies will be included within the site providing valuable tools for both research and education.

Landfill Gas Production.

The existing landfill gas production unit, which is fed by the gas produced by the decomposition processes within the landfill will be maintained. This energy resource will slowly decline as the landfill ages and will eventually be decommissioned.

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Image 1 - Pop-Up Urban farm
Image 2 - Education programs
Image 3 - Urban farm in Detroit
Image 4 - Food Forest

Solar Farm

A Solar Farm site has been identified as a potential use for part of the landfill site. It is proposed the rooftops of large footprint commercial buildings can also be incorporated into the solar farm system increasing production capacity.

Renewable Energy Displays

Displays of residential scaled, practical renewable energy systems, including solar PV, solar hot water, wind etc. will provide valuable educational resources and provide a local source of renewable energy solutions for integration into the housing stock of the development.

Community Spaces

The Sustainability Precinct will not only focus on environmental issues but also social sustainability. Community spaces will be co-located with the Urban Farm and EBP to encourage a vibrant community heart to be established within the Precinct. It is proposed spaces for start up businesses, pop-up businesses and events and community rooms will be provided as well as space for community events. Potential also exists to include a Men's Shed which could be co-located or integrated with the machinery hire centre.

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Ecology Nature Park

Native Grasslands

ACT NoWaste has been working with Greening Australia to establish native grasses on the capped mounded areas of the landfill for a number of years. The landfill re-use master plan intends to continue this program.

The grassland areas will aid in increasing the biodiversity of the newly created parkland by providing habitat areas and potential seed sources for the site nursery, providing stock for revegetation programs and planting across the urban landscape.

Wetlands

The existing ponds collecting leachate and runoff from the landfill site will be retained and monitored for environmental safety. With time and appropriate remediation these water bodies will be transformed into a series of wetland habitat ponds which will boost the biodiversity values of the parklands and ensure the legacy of previous uses do not negatively impact the surrounding environment. The wetlands will provide valuable recreational spaces and will add great amenity value to the precinct.

Education

The Ecology Park will also provide a valuable educational resources and can be used in conjunction with the Conservation Corridor for a wide variety of educational topics.

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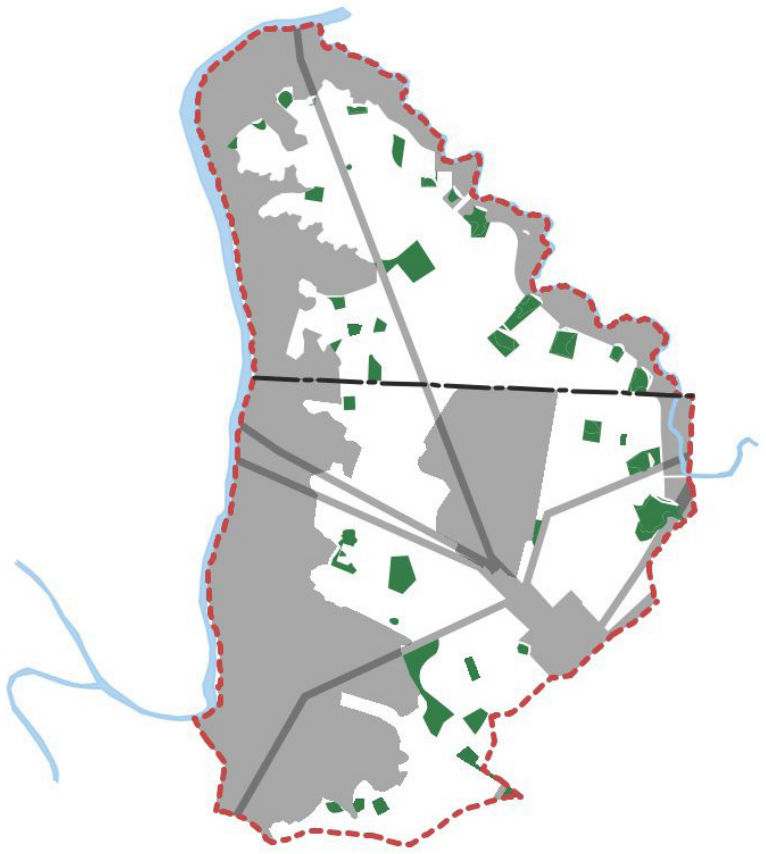
Image 1 - Ecological education
Image 2 - Grasslands
Image 3 - Solar Farm
Image 4 - Temporary community installation.

3.8 PUBLIC OPEN SPACE - PARKS AND RECREATION

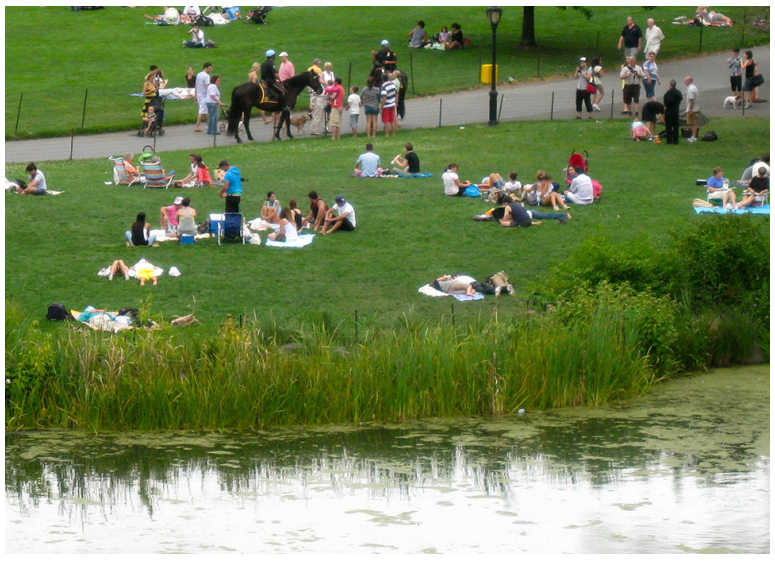
While there will be many recreational opportunities provided by the Conservation Corridor at West Belconnen, public parks will cater for the majority of everyday recreational needs of the community, especially children.

Section 2.3 outlines the various ACT Government Codes and Controls that govern urban open space. Additionally, the objectives below are outlined in DS23;

- creation of aesthetically pleasing landscape environments, increased community enjoyment of everyday life and a greater sense of meaningful connection between people and the environment
- development of desirable community living environments through microclimate modification, air quality improvement and noise attenuation
- fulfilment of the recreational and social needs of the wider and evolving community that reflect the values of the surrounding regional community
- minimisation of energy consumption and carbon dioxide production
- contribution to cost efficient urban stormwater systems and improved stormwater quality through the protection of stream flow and environments
- maximisation of ecological benefits through acknowledging wildlife habitat, soil conservation and enhanced biodiversity
- incorporation of heritage values through the protection of landscapes with recognised special significance
- contribution to the economic vitality of urban Canberra and its environs and its attraction of ecologically sound economic development, particularly tourism
- contribution to a stronger sense of community commitment to improvement and promotion of community environmental responsibility and ethics.



Key Plan



Images - Park character images

The West Belconnen park network will primarily comprise central and local neighbourhood parks. One of the primary considerations of the design of public open spaces is Crime Prevention Though Environmental Design [CPTED]. The primary goal of CPTED is to reduce the opportunity for crime particularly through clear, direct paths that encourage pedestrian movement through spaces. Other areas to be considered are outlined in section 2.3.

The majority of the development area meets the current standards requiring residential dwellings be within either 300m from a local neighbourhood park or 500m from a central neighbourhood park. Only 3% of dwellings will fall outside of these parameters with the maximum distance of any dwelling being approximately 600m from a park. These areas are primarily located on the periphery of the site, adjacent to the Conservation Corridor and open space along Ginninderra Creek. Close proximity to these assets will bring a variety of alternative recreational opportunities to this small number of dwellings.

WSUD Water Parks

Due to the complex nature of the site hydrology and the project aim of a best practice WSUD strategy, a number of 'Water' parks are proposed where WSUD wetlands and ponds are located in close proximity to other park types. Instead of providing full scale local neighbourhood parks which are additional to the community's requirements and will increase ongoing maintenance requirements, these parks will be smaller scale, primarily providing ecological services. The opportunity exists however, to insert additional uses in these parks. Community gardens are one proposed use for these spaces and the wetlands and ponds can also become valuable production areas. Other potential uses including jogging tracks with fitness station circuits around the ponds or small shelters and seating areas for meeting places and quiet reflection.

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2

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Image 1 - WSUD Pond
Image 2 - Urban Agriculture
Image 3 - Fitness Circuit

Playing Fields

Playing fields are to be co-located with schools across the development and will be available for public use. It is proposed a total of 11 playing fields will be provided and their locations are indicated on the following plan. Playing fields will be multi-purpose and cater for a wide range of sports including AFL, cricket, hockey, rugby, soccer and rugby league as required.

Other Recreation Facilities

It has been identified that tennis courts are required for the development due to a shortage in the surrounding community. It is proposed these facilities can be provided at the Central Neighbourhood Parks P8 & P25. It has been identified 8 courts may be required however this will be subject to further detailed design. The facilities are to include club rooms with the potential for a 4 court squash facility to be included at one of the sites.

The schedule and plan on the following pages outlines the types of parks and recreation facilities proposed as well as indicative sizing and locations within the development.

West Belconnen Parks & Recreation Schedule

Parks

ID	Area [Ha]	Category	Notes
ACT			
P1	1.70	Local Neighbourhood Park	Includes WSUD Bioretention pond
P2	0.61	Local Neighbourhood Park	
P3	2.16	Local Neighbourhood Park	Includes WSUD Pond
P4	1.06	Local Neighbourhood Park	Includes 1no. High quality tree
P5	9.18	Woodland Buffer	Incorporates a number of high quality trees & WSUD Wetland & Pond
P6	0.75	Local Neighbourhood Park	
P7	8.20	Water Park	Includes WSUD Wetland
P8	4.79	Central Neighbourhood Park	Incorporates 2no. Exceptional quality trees 2no. WSUD Wetlands + 5no. Tennis Courts
P9	0.53	Water Park	Includes WSUD Wetland
P10	0.92	Local Neighbourhood Park	
P11/12	2.77	Water Parks	Includes WSUD Wetland
P13	0.82	Local Neighbourhood Park	Includes WSUD Wetland
P14	0.49	Water Park	Includes WSUD Wetland
P15	11.70	Heritage Park	Belconnen Farm Precinct
P16	0.95	Water Park	Includes WSUD Wetland
P36	2.18	Central Neighbourhood Park	Includes WSUD Wetland
P37	3.61	Water Park	Includes WSUD Wetland
S38	1.20	Sports Field	Co-located with School
S39	1.20	Sports Field	Co-located with School
S40	7.00	Sports Fields - 5no.	Co-located with School
SUBTOTAL	61.82		
NSW			
P17	1.14	Local Neighbourhood Park	
P18	0.56	Water Park	Includes WSUD Wetland
P19	0.81	Water Park	Includes WSUD Wetland
P20	0.71	Water Park	Includes WSUD Pond
P21	1.00	Water Park	Includes WSUD Pond
P22	0.66	Water Park	Includes WSUD Wetland
P23	3.22	Local Neighbourhood Park	Includes WSUD Wetland
P24	0.92	Local Neighbourhood Park	
P25	6.21	Central Neighbourhood Park	Incorporates WSUD Wetland & Pond + 5no. Tennis Courts
P26	1.68	Local Neighbourhood Park	Includes WSUD Wetland
P27	1.10	Water Park	Includes WSUD Wetland
P28	1.85	Local Neighbourhood Park	Re-used quarry site
P29	1.62	Water Park	Includes WSUD Wetland
P30	1.10	Local Neighbourhood Park	
P31	0.93	Water Park	Includes WSUD Wetland
P32	1.67	Local Neighbourhood Park	Includes WSUD Pond
P33	3.62	Water Park	Includes WSUD Wetland
P34	1.02	Water Park	Includes WSUD Wetland
P35	2.45	Water Park	Includes WSUD Wetland
S41	4.00	Sports Fields - 4no.	Co-located with School
SUBTOTAL	36.27		
TOTAL	98.09		

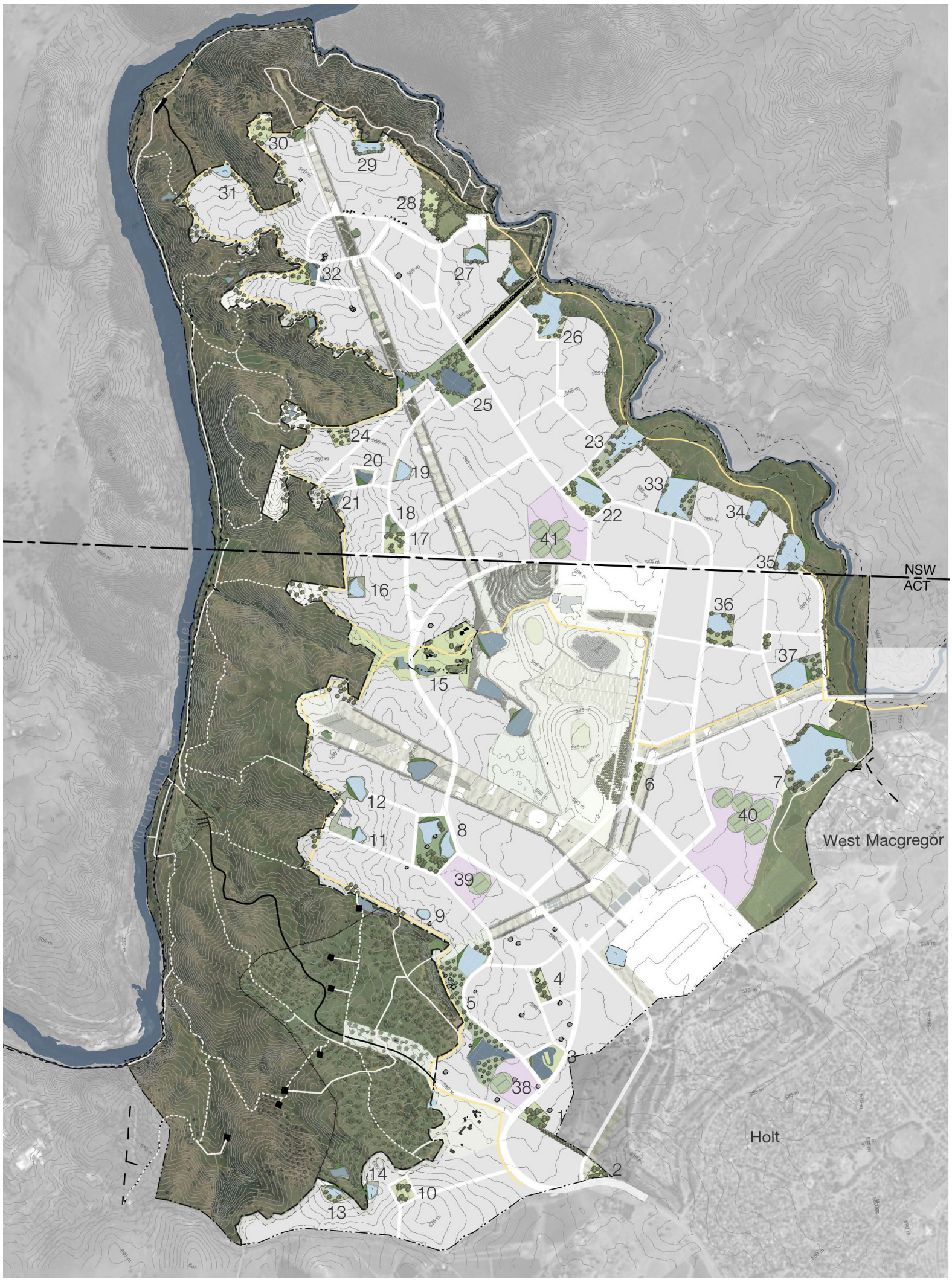


Figure 3.11 - Parks & Recreation Plan

3.9 WATER MANAGEMENT

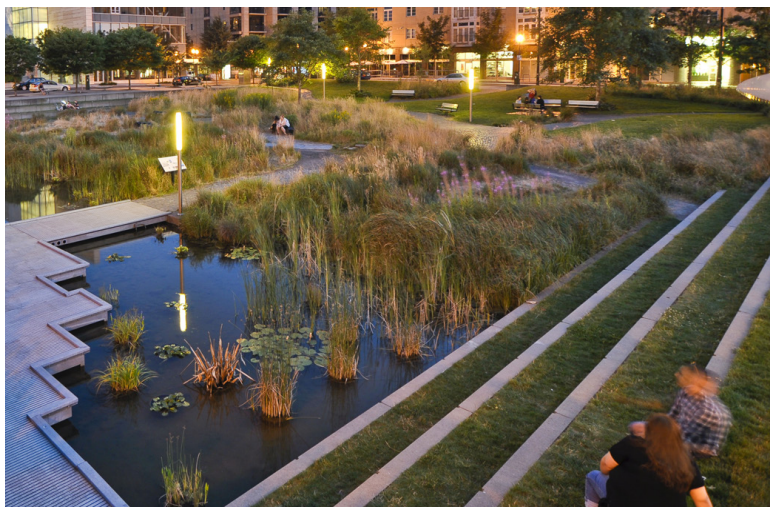
The water strategy for West Belconnen will play a vital role in the sustainability of the development into the future. A best practice model has been developed for the site that will ensure urbanisation does not have a negative impact on the adjacent Murrumbidgee River and Ginninderra Creek. The strategy will also result in an abundance of water for irrigation within the development. AECOM have prepared a detailed report - West Belconnen: A Water Sensitive Community - Water Sensitive Urban Design Report.

Guidelines for incorporating water infrastructure

- educate the community of the world leading strategy being employed within their community, engaging them with the water cycle and their impacts upon it.
- utilise storm water storage ponds and wetlands for recreation and visual amenity within the open space network.
- utilise storm water storages for the irrigation of urban agriculture, parks and open spaces.
- manage ponds, wetlands and bioretention basins for maximum ecological values and biodiversity.
- mitigate the impact of water storages and overflows on the existing ecological communities within the Conservation Corridor.
- utilise the water management system to control the impact of the development on the surrounding ecologically sensitive lands and waterways.

A combination of ponds, wetlands and bioretention basins will service the 60 separate sub-catchments across the site. This infrastructure will be incorporated into the open space system providing ecological services and many recreational opportunities for the community. The functions of each type of WSUD elements are outlined below.

Ponds



Stormwater quality control ponds are larger open water bodies where stormwater quality improvement is gained from the exposure to the littoral vegetation that would represent 10-30% of the surface area of the pond and a slow process of deposition of fine material to the bottom of the ponds where they become trapped.

Bioretention basins

Consist of an area of planted filtration media, typically organised in a series of cells that allow for larger flows to be treated. Water only pools in bioretention basins for a limited period of 24-72 hours and the basins are dry at the surface at other times.

Constructed Wetlands

Constructed wetlands are densely planted marshes with permanent to ephemeral waters. In most instances, constructed wetlands include a small area of open water representing 15-30% of their total area. In wetlands, the stormwater quality improvement is achieved by a combination of physical and biochemical processes associated with the high density of plants, plant rootzone and low flow hydrodynamic conditions found in the shallow depths of water. Constructed wetlands have also been known to offer significantly habitat and ecosystem values by forming urban refuges for wildlife, particularly amphibians, birds, and some terrestrial fauna.

The integrated water management system will ensure the development of the site has a positive impact on the surrounding environment. The rehabilitation of existing watercourses within the Conservation Corridor will be facilitated by the WSUD strategy. This will be necessary to enable additional flows and emergency overflows, increasing the biodiversity and habitat values of the watercourses, many of which are degraded after decades of pressure from grazing and other land uses.

Images - WSUD ponds character images

3.10 MOVEMENT NETWORK

Public Transport

The proposed public transport strategy will consist of 2 bus routes with a coverage of over 90%. The elongated shape of the project site enables a high passenger to route ratio of up to 15000:1. M R Cagney have prepared a detailed report outlining the public transport strategy - *West Belconnen Integrated Sustainable Transport Plan.*

Pedestrian & Cycling

A substantial on and off road pedestrian and cycle network is to be developed across West Belconnen. The network will adhere to the heirarchy set out in DS13 Pedestrian and Cycle Facilities to ensure maximum legibility of the network. The potential network shown opposite will provide extensive coverage across the project area.

The largest part of the network will be the streets which will provide either on-road cycle lanes and/ or off-road shared paths to meet demand. The streets network will provide the primary access to all schools, community centres, parks and sports fields as well as retail and employment areas. This network will be supplemented by an off-road network through open spaces and parks, around the periphery of the site and along transmission easements where topography permits.

The Conservation Corridor will provide predominantly unsealed paths. Due to the nature of the terrain, these trails will not meet the standards set out in DS13 and will instead be part of a walking and mountain bike trail network that will be clearly signposted regarding the potential dangers.

The trails within the Conservation Corridor are discussed in detail on pages 62-63.

A shared equestrian trail [unsealed] is proposed along the length of the Conservation Corridor and development interface. This trail will be contained within the inner APZ, outside of the Conservation Corridor and will be shared with pedestrians and bicycles while also facilitating bushfire access. Due to topographic constraints sections of this trail will also be noncompliant with DS13.

Where required, sealed off-road paths may be provided in addition to the unsealed shared equestrian trail with the equestrian trail. The location of these paths including separations will be subject to further detailed design investigations.

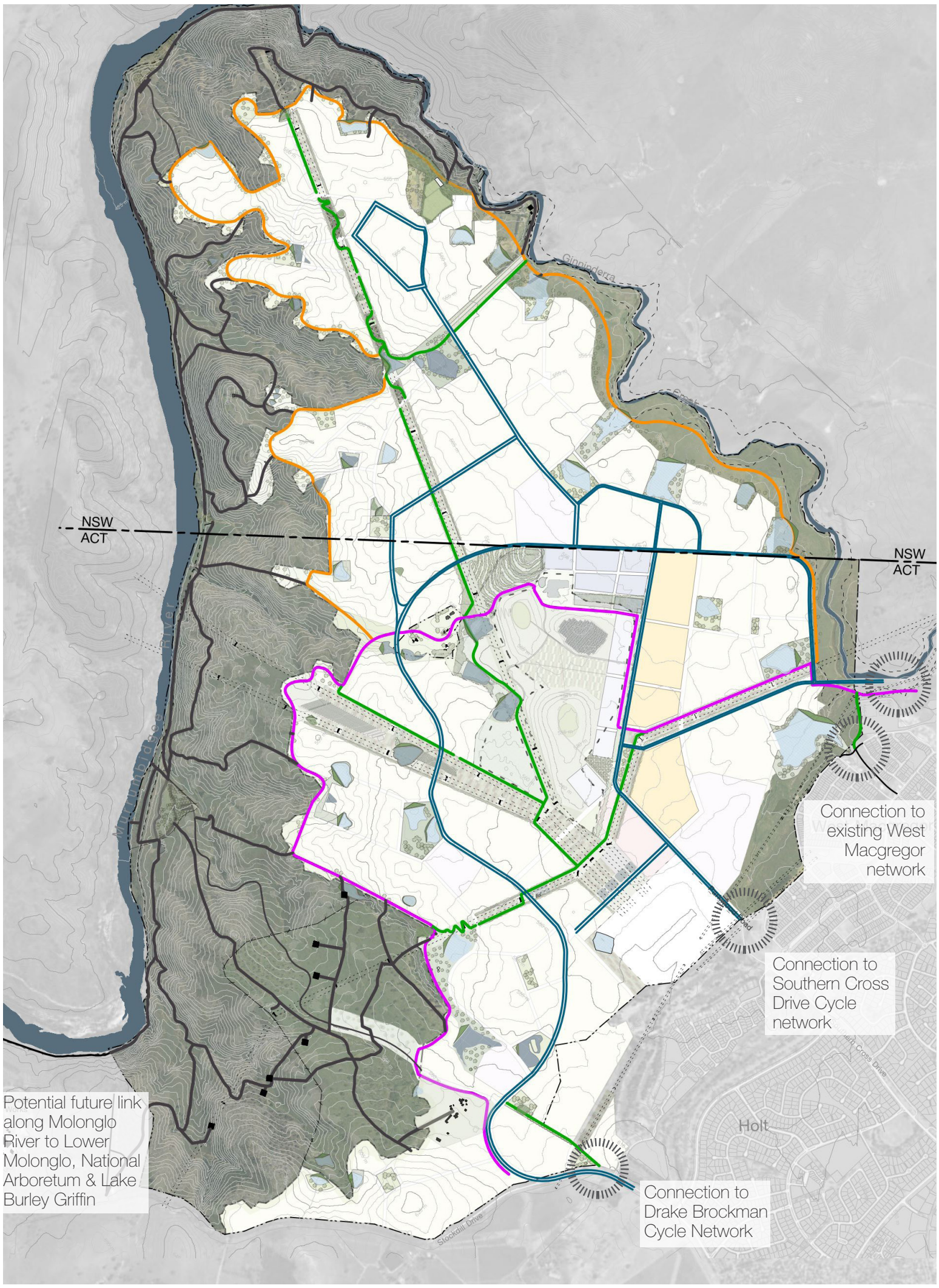
A sealed shared path network is also proposed along each of the Transmission easements as these corridors provide excellent, direct access to and from the centre of the site and in particular the proposed retail & employment centre on Parkwood Road. Topographic constraints will again lead to certain parts of the easements not meeting the standards set out in DS13 for cycle facilities.

Key Plan

The cycle network will also provide links to and from the surrounding suburbs including a link into the West Macgregor network and a link along Ginninderra Creek to join the existing network.

Refer to MR Cagney's *West Belconnen Integrated Sustainable Transport Plan* report for additional information on the proposed pedestrian and cycling network.

Images - Off-road cycle trail



Connection along Ginninderra Creek to existing open space and path network & potential Ginninderra Drive extension

Figure 3.12 - Proposed Site Wide Movement Network

Equestrian

Bicentennial National Trail

The project team is consulting with the local members of the BNT council and equestrian community to achieve an agreement to amend and implement a new BNT route through the West Belconnen site. Initial consultations with the equestrian community have provided the following guidelines for the BNT relocation;

1. A final BNT to be designed in consultation with equestrian groups. Initial planning is to align the route along the top of the conservation corridor, to Belconnen farm heritage precinct which would be a major stopping point possibly including camping (the sheltered land east of the Elm trees has been suggested) and thence through the landfill site (to be developed as a recreation park) to rejoin the existing BNT near Ginninderra creek.
2. The BNT route to be maintained as a continuous route through the development process, temporary routes may be used prior to the establishment of a final alignment. Avoid disruption that will be caused by frequent temporary route realignment during construction, noting that BNT maps will be outdated when route changes.
3. The current location of the Belconnen Pony Club to be reviewed with a view to possible relocation to a site with more long term lease tenure.
4. Note that the Pony Club must have a trail connection to the BNT when and if either the club or the BNT is relocated.
5. Opportunities for Pegasus activities to be accommodated in any new facilities to be factored into planning.
6. Note the potential of the line of trees along Parkwood road landfill boundary as a potential trail route, and more generally, the need for trails to be located to take advantage of natural and landscape assets. In addition to the BNT incorporate shorter “loop” trails for local riding. Possibly to Ginninderra Falls and Ginninderra creek. These trails may be multi use.
7. Assess the opportunity of incorporating equestrian facilities in the landfill buffer area (ensure that potential contamination has been fully dealt with)
8. Include agistment paddocks in proposed open space areas west of West Macgregor (where some are currently located). Agistment paddocks need a link trail to the local pony club as well as to the BNT.
9. Any agreed new route for the BNT would link with Strathnairn which then provides access to the BNT southwards to South Belconnen.

These guidelines have resulted in the accompanying plan, which responds to the guidelines and produces an outcome that is agreeable to all parties.

The proposed final BNT realignment results in an overall increase in length of approximately 3km.

Horse Agistment Paddocks

THe land north and east of Parkwood Raod currently accommodates approx. 100ha of horse agistment paddocks known as the ‘Parkwood Paddock Complex’. These currently provide agistment for 68 horses, which equates to about 43 owners. It is important to note that, particularly due the Parkwood Egg Farm, the bulk of this land would not be programmed for development within a twenty year period.

On an ACT wide basis there are a total of 1500ha of paddocks, providing for about 300 horses, owned by approximately 200 owners. The paddocks are managed by a private company under contract from TaMS. Future planning for the horse paddocks is intended to be defined through a strategic review process that has been agreed between the ACT Government and Equestrian Stakeholder groups. The long term future for horse agistment in the ACT and in Belconnen will be resolved as part of this strategic review.

Proposed Pony Club

The proposed Pony Club location is approximately 200m to the east of the existing Pony Club. This site can be linked to the re-aligned BNT near Ginninderra Creek via a 1.3km trail running along an existing water course and around the edge of a proposed wetland. The size of the facility would be at least equal to the existing club at 4.2ha.

Equestrian Loop

Additionally, it is proposed an Equestrian loop route be incorporated along the top of the conservation corridor and Ginninderra Creek riparian zone within the inner asset protection zone. The path would continue north from Belconnen Farm and rejoin the BNT where it exits the transmission corridor near Ginninderra Creek. This 10.8km trail will be a shared trail with cyclists and pedestrians.

Image: BNT Marker

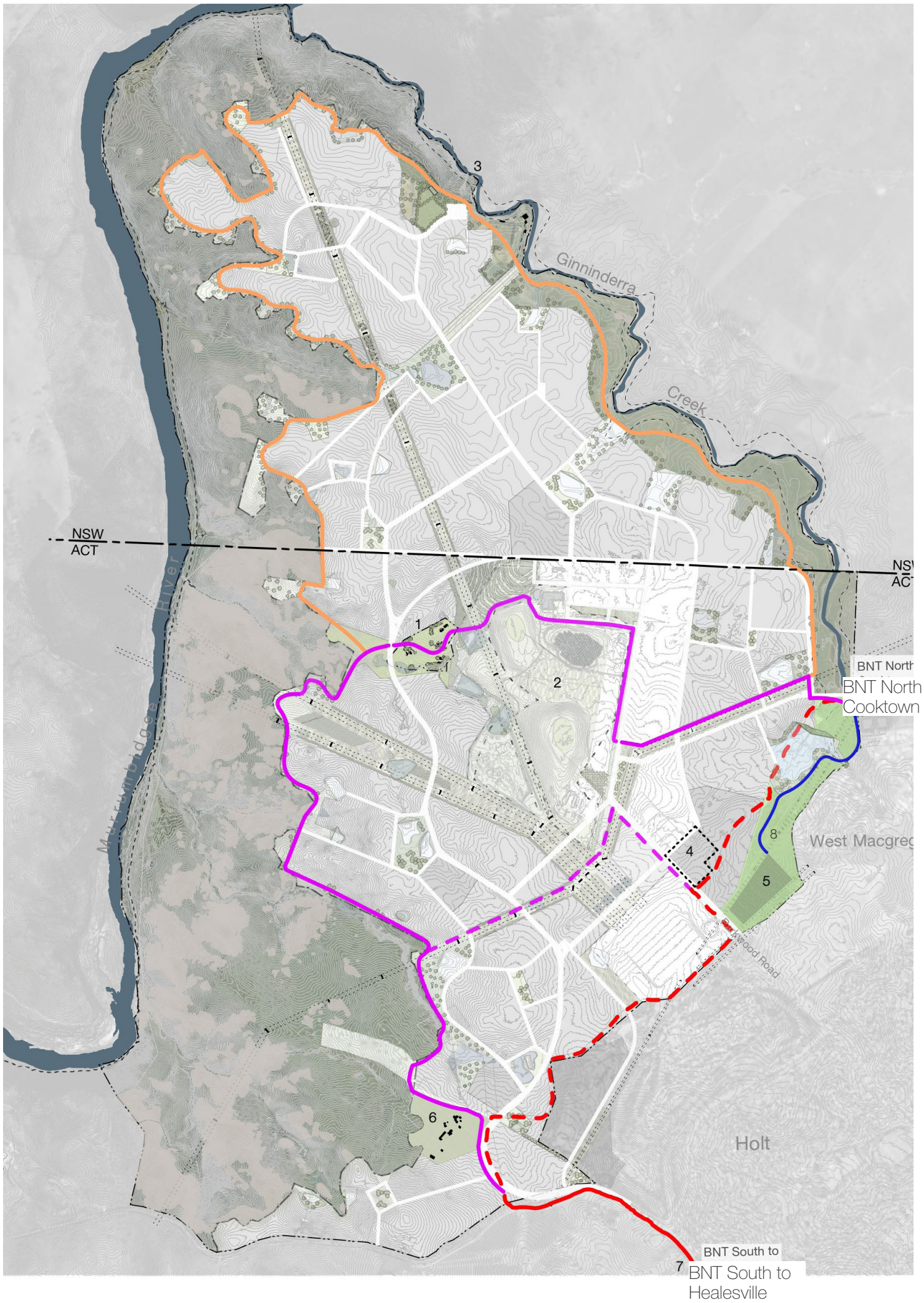


Figure 3.13 - Equestrian Plan

Nature & Heritage Trails

Opportunities exist to incorporate sign posted nature & heritage trails into the open space system. Many of the trails will incorporate both nature and heritage elements. The Conservation Corridor will offer the best opportunities with the PTWL, YBRGGW and River Oak Forest habitat providing a range of trails of varying lengths and difficulties. Ginninderra Gorge also offers a particularly stunning trail opportunity with a unique landscape harbouring a community of Native Pines amongst a steep rocky habitat.

Opportunities also exist to introduce indigenous and non-indigenous heritage trails. Indigenous trails would focus on the Conservation Corridor particularly along the river edge where a number of archeological sites have been identified. Experiences of these trails would be facilitated by local indigenous community members as many of the sites are unable to be signposted for a number of cultural and policy reasons.

Belconnen Farm presents an opportunity to interpret the long agricultural legacy of the site, which has been in use since the late 1830's. The Farm has the potential to become a major attraction for the local community and will be preserved and restored in line with the Conservation and Management Plan prepared for the Precinct. Many of the trails being incorporated into the Conservation Corridor are also existing farm tracks which have potentially been in existence for many decades or longer.

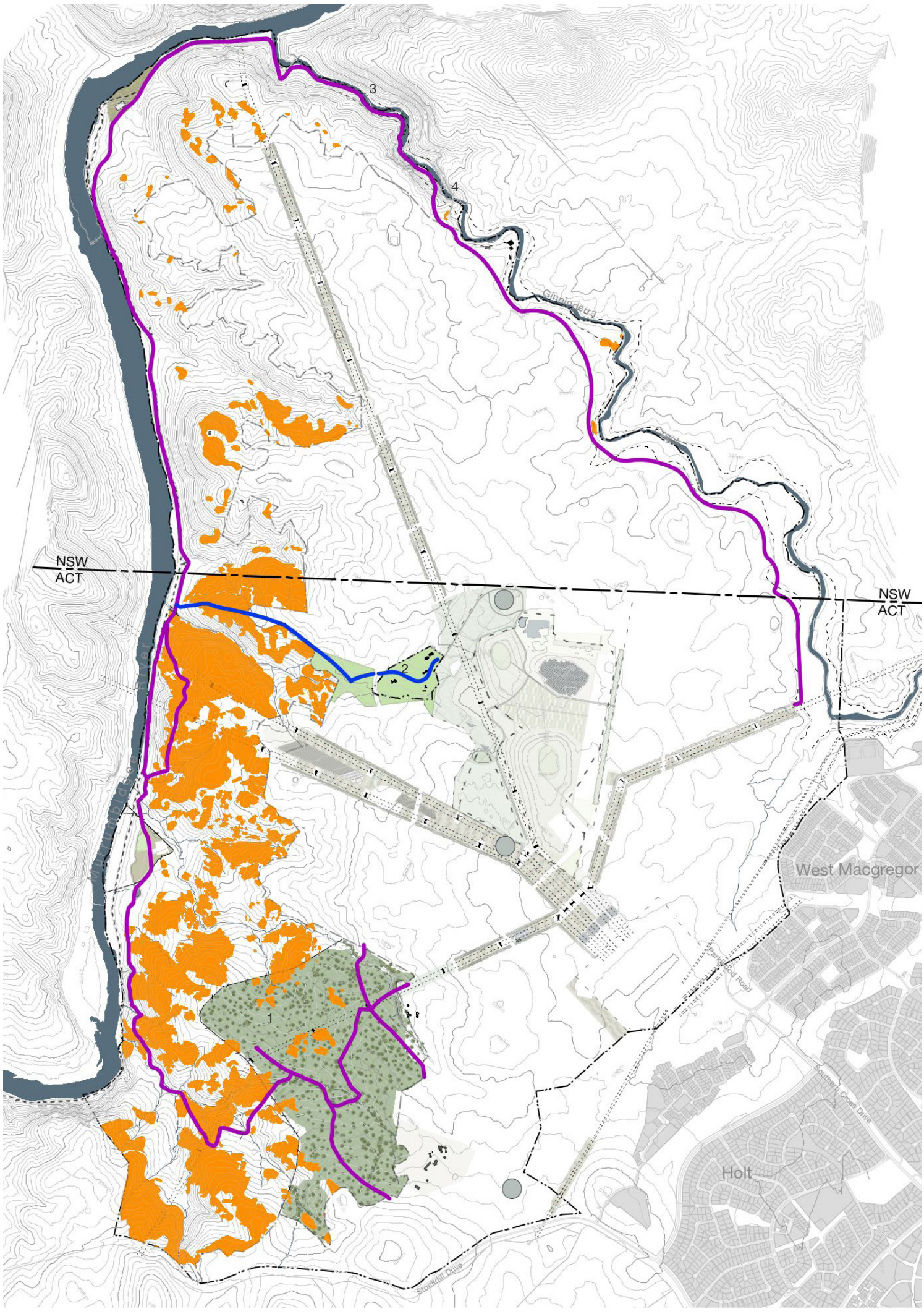


Figure 3.14 - Nature and Heritage Trail

3.11 URBAN INTERFACE

The urban edge of West Belconnen will be critical to the success of the project due to the diversity and significance of the ecological communities present in adjacent land. DS20 Urban Edge Management Zones identifies two main requirements within the urban edge zone;

- access for authorised vehicles from the suburban road network to public land
- a management zone running along the boundary providing management access, fire breaks, a service easement, drainage, a wildlife buffer, environment protection and other related requirements.

DS20 also notes that edge zones need to be assessed on a case by case basis. In the case of West Belconnen a number of key issues will influence the design of the 'edge' including;

- Conservation of PTWL and YBRGGW habitats
- Asset Protection Zones & access for bushfire management and control
- Provision of uses to ensure the edge is seen as an asset for the community and an integral part of the open space system.

The edge treatment will vary along the approximate 18km length. The western edge facing the Murrumbidgee River is typified by steep and rocky terrain and contains the ecological habitats to be conserved. In contrast the predominantly gently undulating topography, east of Ginninderra Falls, along the northern edge presents fewer challenges and does not face the same fire risk as the west.

Edge Neighbourhoods

Edge Neighbourhoods are the lowest density neighbourhoods of West Belconnen and are located towards the north-western and south western corners of the development footprint where topography is steeper.

With lower densities and a more naturalistic character, these neighbourhoods provide an appropriate transition from the human habitat into nature.

Further, the steeper topography of the Edge Neighbourhoods provides the opportunity for a range of innovative design responses, including pole homes and skinny streets to avoid unnecessary earth works and site re-contouring. Edge Neighbourhoods will range in density from 10 to 20 dwellings ha per hectare.

Over time the succession or evolution of the Neighbourhood Types to become more urban in response to market demand is highly desirable and can be elegantly accommodated by the Neighbourhood Unit.

Eco Living Character Zone

The Eco Living Character Zone provides a lifestyle choice within the Edge Neighbourhoods as they transition into the Conservation Corridor.

Eco Living is an additional "layer" of character aimed at ensuring that the benefits of being located on the interface of the Conservation Corridor are optimised for landowners in a manner that protects and enhances the values underpinning the Conservation Corridor.

The public realm is characterised by a landscape where native trees are retained, and drainage occurs by open percolation in swales. The opportunities for edible public domain components contributes to the overall character.

The private realm is defined by detached building types on large lots with deeper front setbacks. Lots can accommodate food production and water tanks. Houses may be raised on piers to retain existing vegetation and minimise earthworks [subject to design for bushfire controls].

Eco Dwellers and Nature Lovers

The Eco Living Character Zone provides for environmentally sustainable development and larger blocks of land. It meets the documented market demand for a 'sense of space', a naturalistic treed setting, energy saving design measures and on- site food production opportunities providing a unique Canberra offering and lifestyle choice.

Image - Ithaca Ecovillage, NY, USA

3.12 DESIGN LANGUAGE

Wayfinding

Due to the scale of the West Belconnen open space system a comprehensive wayfinding strategy will be required to ensure residents and visitors alike are able to navigate their way efficiently and safely throughout the site. Equally important to internal wayfinding will be ensuring links to and from existing features of the surrounding community are identified.

A number of key sites within the development will feature on the high order signage including;

- Retail Centre
- Belconnen Farm Precinct
- Ginninderra Falls
- Strathnairn Arts Precinct & Woodland
- Landfill site
- River Recreation Area
- BNT

Lower order precinct/village signage will identify key elements including;

- Central Neighbourhood Parks
- Key Conservation Corridor Access Points
- Equestrian routes
- Community Gardens
- Lookouts/view points

Interpretive signage elements will also be used to educate the community about specific elements within the open space system including;

- Nature Trails
  River Oak Riverside Walk
  PTWL habitat
  YBRGGW
  Ginninderra Gorge
- Heritage Trails - Indigenous/Non-Indigenous
- Landfill
- Belconnen Farm

Key features outside of the site that are to be identified include;

- Belconnen Town Centre
- Kippax Shopping Centre
- Lake Ginninderra
- Shepherd's Lookout

Images - Signage precedents

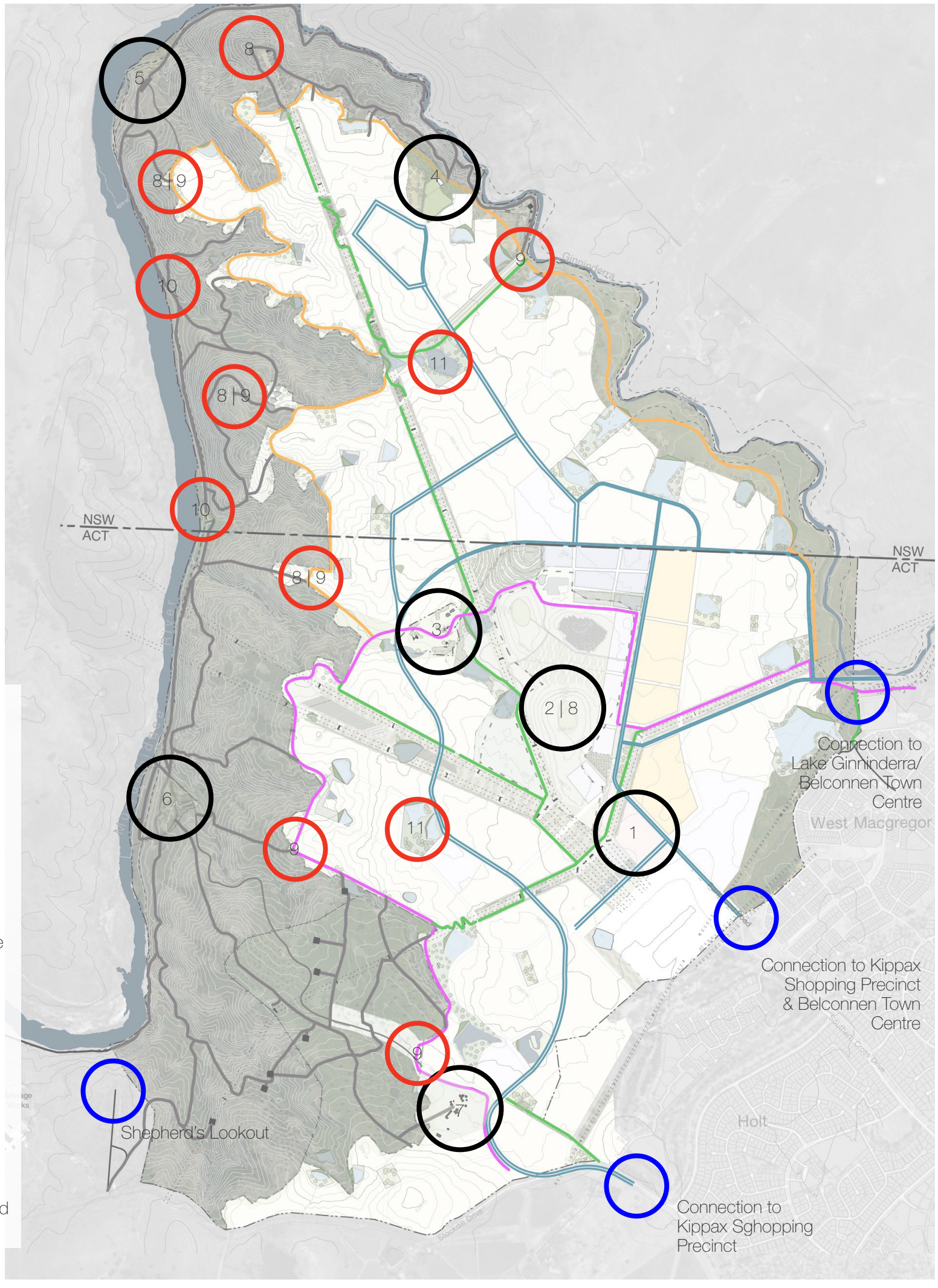


Figure 3.15 - Significant Sites

Materials

Key to decisions surrounding material use at West Belconnen will be their environmental impact and life cycle costs as well as their ability to create a sense of place across the development.

First preference shall be given to locally sourced materials, particularly when using virgin materials. Recycled or upcycled materials shall also be considered as alternatives to virgin materials where suitable alternatives are available. In particular, materials used for non-aesthetic purposes, eg. subbases, drainage or materials hidden from view should be from recycled sources where practicable.

Durability, maintenance and longevity of the product shall also be considered, with preference given to those materials that have the longest life spans with minimal maintenance requirements.

Local Stone

Where retaining walls, gabions and landscape stones are required within the open space system local stone shall be used to continue the historic material vernacular found across Canberra. Note: No material will be sourced from the Conservation Corridor.

Agricultural Materials

In response to the historical use of the site, it is proposed a palette of materials is utilised that evokes a sense of rural Australian buildings, such as those found at Belconnen Farm. Materials for consideration include;

- Corrugated iron
- Hardwood timber
- Stone
- Weathering steel [corten steel]

Material selections shall not be limited to these four materials alone however, where prominent landscape elements are being constructed these materials shall be utilised in some way to create a coherence across the open space network.

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Image 1 - Corrugated Iron

Image 2 Recycled hardwood timber

Image 3 - Local Canberra stone

Image 4 - Weathering [corten] steel

3.13 TRUNK SERVICES

Sewer

Various options are being explored for the provision of trunk sewer services. These are discussed in detail in other reports and may result in a sewer alignment passing through the Conservation Corridor. In some cases either trenching or tunnelling solutions are proposed.

In the case of a tunnel solution, access shafts would be required. Where a trench easement is required this will be combined with an access trail available for recreational walking, this will also be the case with access tracks to tunnel shafts.

Figure 3.16 shows a possible design solution that includes a tunnel with access shafts which have been located to avoid all habitat areas and a trench alignment which passes through a YBRGGW area. This alignment utilises existing tracks where possible and as noted above, would have a dual use as a recreational walking trail.

Final resolution of these matters will be subject to a process of assessment and review under the provision of the Commonwealth Environment Protection and Biodiversity Conservation Act.

Image - View across proposed YBRGGW conservation area on approximate alignment of sewer access track

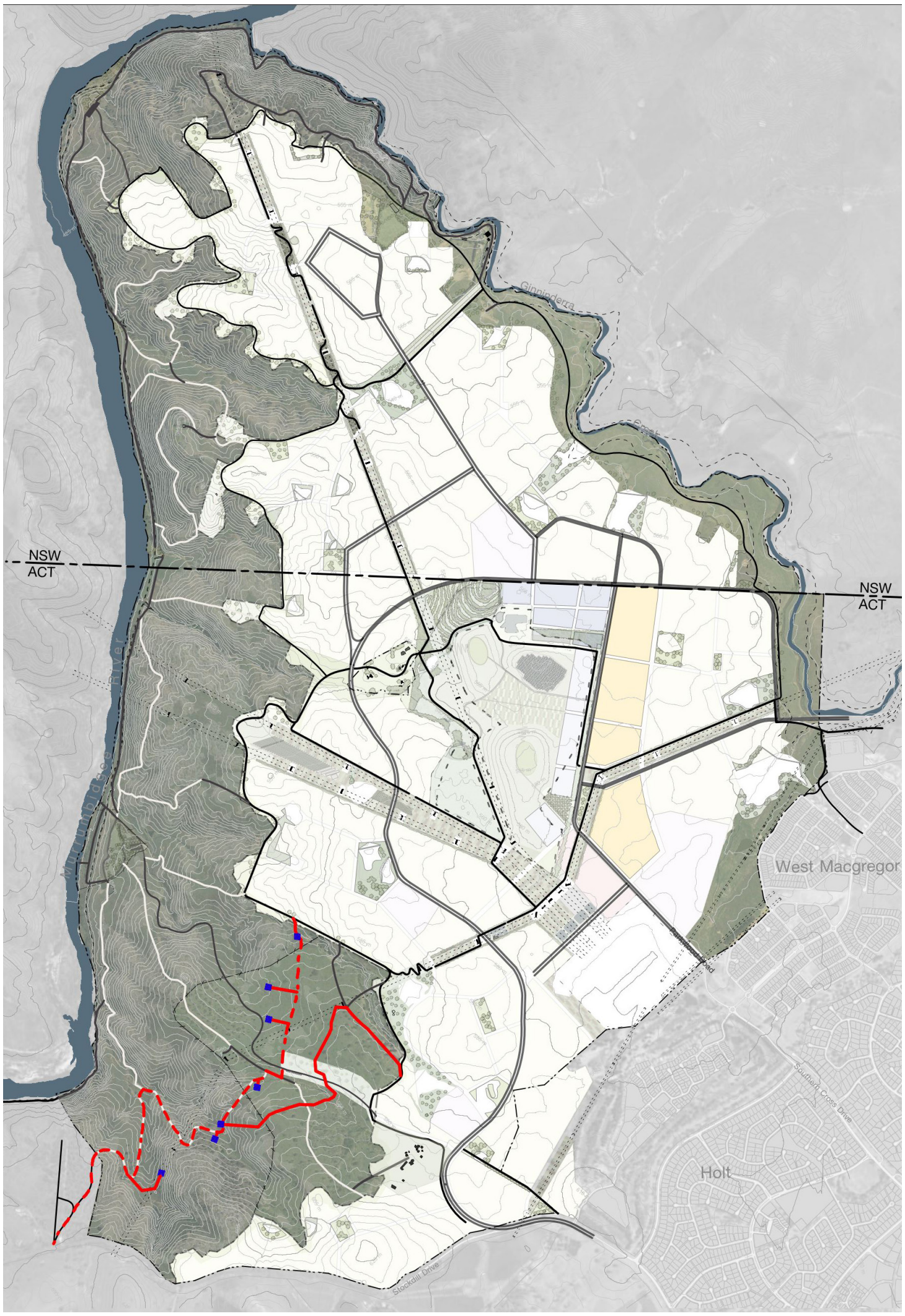


Figure 3.16 - Trunk Services

3.14 LANDSCAPE PLANTING

The planting strategy for West Belconnen is founded on the following core principles;

- Contribute to the 'urban forest' of Canberra and develop a micro-climate across the site that reduces temperatures through shading hard surfaces, particularly roads.
- Utilise locally endemic species where appropriate to increase biodiversity, particularly for understory and ground cover planting
- Enable passive solar access for dwellings through use of deciduous tree species.
- Introduce edible species to parks and open spaces where practical
- Meet asset protection zone standards to reduce bushfire risk, especially along the urban edge.
- Investigate the opportunity for an on-site nursery to grow all plant material for the project using site and local seed sources where available.
- Ensure park and open space planting responds to CPTED principles.

Canberra's Urban Forest

One of the defining features of Canberra is the urban forest that exists thanks to the legacy of Walter Burley Griffin, Marion Mahony Griffin, Charles Weston & Lindsay Prior among others. An aerial view across the older suburbs of Canberra presents a sea of green canopies. These large canopies along streets and over hard surfaces have many benefits particularly in regulating micro-climates. It has recently been found that Canberra's older, leafy suburbs are up to 7ºC cooler when compared to new suburbs with little tree cover [New Scientist, 14 Jan 2014]. Trees also provide other benefits including pollutant filtering, with a recent study suggesting just a few trees can reduce air pollution in nearby dwellings by 50-60% [www.trees.org.uk/]. These ecosystems services have been valued in New York City at approximately US$5300 per tonne of pollutants removed [www.trees.org.uk/].

Image - Aerial view to south over Lake Burley Griffin

It is proposed the street tree planting at West Belconnen will utilise species whose canopies will touch both along and across streets. This planting strategy in particular will ensure the urban forest of Canberra continues to its outer edges.

Locally endemic species

The ability of the landscape to adapt to change, particularly a changing climate, will be especially important in the coming decades. The plant species that are found at West Belconnen and throughout the surrounding region are adapted to the local conditions and have adapted to the changes that have taken place over the past millennia. It is proposed understorey and ground cover planting in parks, open spaces and streets will utilise local species, unless particular site conditions mean exotic species would be more appropriate. A large number of the proposed species are found on the TaMS approved species lists. Others that are not, but have been identified on site or are commonly associated with the YBRGGW community are also included in the following species lists. Tree planting, in particular street trees, will be one area where exotic species will be utilised for reasons outlined below.

Passive Solar Access

Passive solar access will be an integral component of the energy efficient dwellings to be developed at West Belconnen. One of the contributing factors to poor solar access into properties is the location of street trees. Due to the hot summers and cold winters experienced in Canberra it is proposed that deciduous tree species are utilised as street trees particularly on the north and west facing sides of residential blocks.

Edible Species

The benefits of including edible species in urban planting strategies have become more widely recognised in recent times. Perceived additional maintenance cost can be far outweighed by the social and health benefits that are introduced. Many communities around the world have begun to produce “foraging’ maps to enable productive trees to be utilised by the community. One organisation called Falling Fruit provides maps for cities around the world locating productive urban trees. The image below shows a map identifying the urban harvest within central Canberra

Bushfire Risk

Tree planting will be an important part of the bushfire management strategy, particularly at the most critical points of bushfire entry. The greatest bushfire risk is from the north around to the south west along the Murrumbidgee River [refer figure 1.21]. An asset protection zone is located along the edge of the Conservation Corridor and will be managed according to the relevant guidelines. Tree planting within this area in particular will be limited to a maximum 20% coverage as required by RFS & ACTRFS and with canopies 2-5m apart. The APZ shall not contain species that are known to promote fire including Eucalypts with stringy, rough or flaky bark and conifer species.

Site Nursery

Refer to section 3.6 Landfill Reuse for detailed discussion on the site nursery.

CPTED Principles

All park and open space planting shall respond to CPTED principles to ensure a safe environment is created for the community of West Belconnen. Shrub planting in particular needs to be carefully considered to ensure sight lines are maintained and potential hiding places are avoided.

DS23 Plant Species for Urban Landscape Projects

DS23 provides a comprehensive list of plants suitable for use in public landscapes in Canberra. It also outlines a number of factors that may limit a particular species use in a certain location.

Tree setbacks within verges are one area where this project will be seeking a departure from the specified standards. This issue is discussed in the Street Typologies section.

Tree planting within the parks and open spaces will largely adhere to the specified standards with species identified by DS23. The exception being the proposal of a number of edible fruiting species as discussed earlier in this section.

All shrubs, groundcovers, herbs, forbs and ferns proposed are species either endemic to the site or found within the local region. This palette will create a resilient urban landscape capable of adapting to future climatic changes and reduce external inputs particularly of fertilisers and other chemicals. Many of the species are found within DS23, however a number of the species proposed, particularly those endemic to the site are not included in DS23.

Species Lists

The species lists on the following pages outline the proposed planting palette for West Belconnen. These lists are intended to provide a palette from which species can be chosen for various uses across the project. Detailed design considerations may however, identify further species that warrant inclusion. The lists identify a number of characteristics of the proposed species including;

- if the species in endemic to the site or local region
- whether it is included in the TAMS DS23 planting lists
- proposed uses

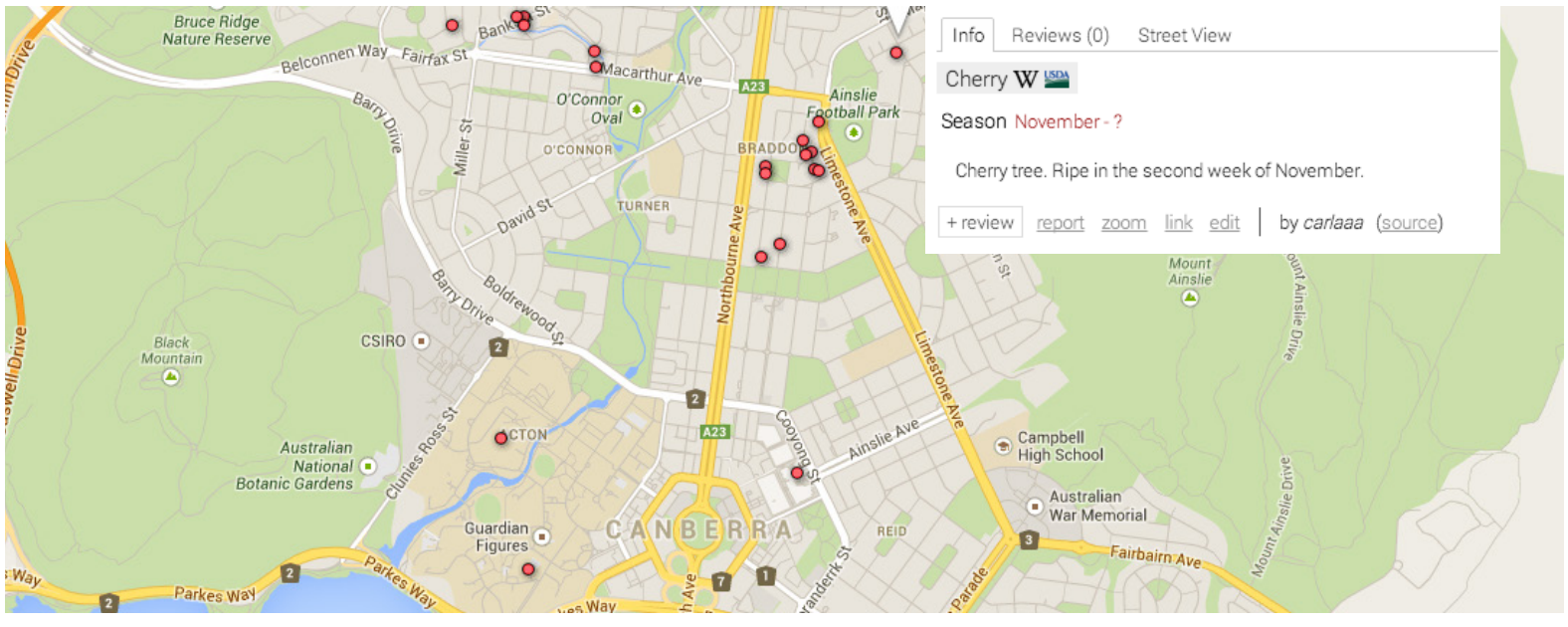


Image - Falling Fruit foraging map of central Canberra

Trees

Botanical Name		Site Endemic	Regionally Endemic
Acer platanoides*	Norway Maple		
Brachychiton populneus	Kurrajong	✔	
Callitris endlicheri	Black Cypress Pine	✔	
Casuarina cunninghamiana subsp. cunninghamiana	River Oak	✔	
Eucalyptus blakelyi	Blakely's Red Gum	✔	
Eucalyptus dives	Broad-leaved Peppermint	✔	
Eucalyptus macrorhyncha	Red Stringybark	✔	
Eucalyptus melliodora	Yellow Box	✔	
Eucalyptus pauciflora subsp. Pauciflora	Snow Gum	✔	
Eucalyptus rossii	Inland Scribbly Gum	✔	
Eucalyptius scoparia	Wallangarra White Gum		
Fraxinus oxycarpa*	Desert Ash		
Fraxinus velutina*	Velvet Ash		
Gleditsia triacanthos ‘Shademaster’*	Honey Locust		
Melaleuca linariifolia	Narrow Leaved Paperbark		
Platanus x acerifolia*	London Plane		
Platanus orientalis ‘Digitata’*	Cut Leaf Plane Tree		
Quercus coccinea*	Scarlet Oak		
Quercus palustris (grafted form)*	Pin Oak		
Quercus robur ‘Fastigiata’*	English Oak		
Quercus ilex*	Holm Oak		
Ulmus parvifolia (seedling form)*	Chinese Elm		
Zelkova serrata*	Keyaki		
Fruiting Trees			
Citrus limon*	Lemon		
Citrus reticulata*	Mandarin		
Citrus sinensis*	Orange		
Ficus carica*	Fig		
Malus domestica*	Apple		
Olea europa*	Olive		
Prunus avium*	Cherry		
Prunus domestica*	Plum		
Prunus persica*	Peach		
Pyrus communis*	Pear		

* denotes exotic species

TAMS List	Parks & Open Space	Revegetation	Riparian	Streets
✔				✔
	✔	✔		
✔	✔	✔		
✔	✔	✔	✔ Edge	
✔	✔	✔		
✔	✔	✔		✔
✔	✔	✔		✔
✔	✔	✔		
✔	✔	✔		
✔	✔	✔		
✔	✔			✔
✔				✔
✔				✔
✔				✔
✔	✔		✔ Edge	
✔	✔			✔
✔				✔
✔				✔
✔				✔
✔				✔
✔				✔
✔				✔
	✔			
	✔			
	✔			
	✔			
	✔			
	✔			
	✔			
	✔			
	✔			

Native trees

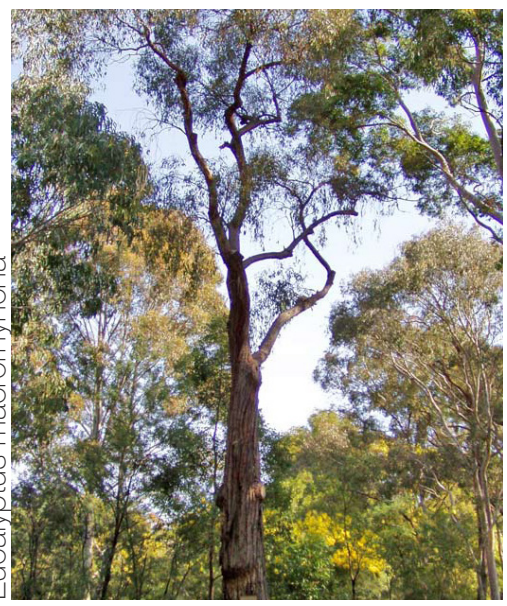

Brachychiton populneus


Callitris endlicheri


Casuarina cunninghamiana


Eucalyptus blakelyi


Eucalyptus dives


Eucalyptus macrorhyncha


Eucalyptus melliodora


Eucalyptus pauciflora ssp pauciflora


Eucalyptus rossii

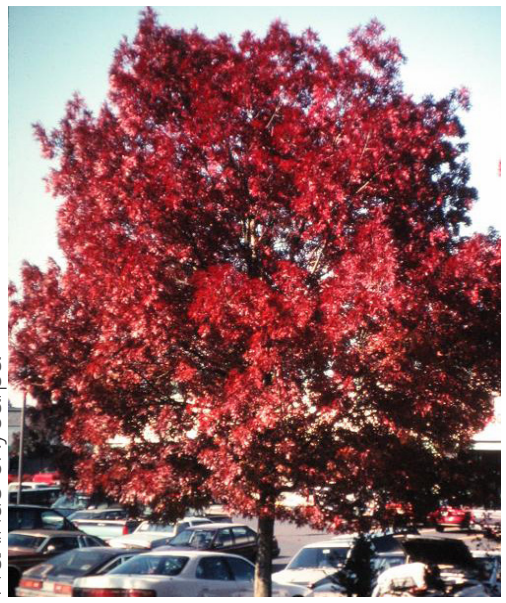
Native trees cont.

Eucalyptus scoparia

Melaleuca linariifolia

Exotic trees

Acer platanoides



Fraxinus oxycarpa

Fraxinus velutina

Gleditsia triacanthos ‘Shademaster’

Platanus x acerifolia

Platanus orientalis ‘Digitata’

Exotic trees cont.


Quercus coccinea


Quercus paulustris


Quercus robur 'Fastigiata'


Quercus ilex


Ulmus parvifolia


Zelkova serrata

Fruiting trees


Citrus limon


Citrus reticulata


Citrus sinensis

Fruiting trees cont.

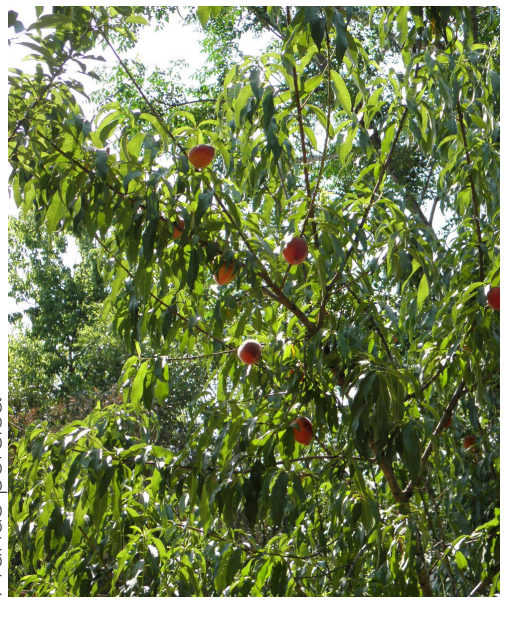

Ficus carica


Malus domestica


Olea europa


Prunus avium


Prunus domestica


Prunus persica


Pyrus communis

Shrubs

Botanical Name	Common Name	Site Endemic	Regionally Endemic
Acacia buxifolia	Box-Leaf Wattle		✔
Acacia dealbata	Silver Wattle	✔	
Acacia implexa	Hickory Wattle	✔	
Acacia rubida	Red-leaved Wattle	✔	
Brachyloma daphnoides	Daphne Heath	✔	
Bursaria lasiophylla	Blackthorn		✔
Cassinia longifolia	Shiny Cassinia	✔	
Cassinia quinquinquefaria	Rosemary Cassinia	✔	
Crowea exalata ‘Ginninderra Falls’	Small Crowea		✔
Daviesia mimosoides	Narrow-leaf Bitter Pea		✔
Dillwynia sericea	Showy Parrot Pea	✔	
Grevillea diminuta	Grevillea		✔
Grevillea juniperina subsp. fortis	Prickly Grevillea	✔	
Grevillea juniperina ‘Molonglo’	Juniper leaf Grevillea		✔
Grevillea lanigera	Woolly Grevillea		✔
Indigofera australis	Austral Indigo	✔	
Kunzea ericoides	Burgan	✔	
Kunzea ericifolia	Spearwood		✔
Leptospermum multicaule	Tea Tree	✔	
Melichrus urceolatus	Urn Heath	✔	
Micrantheum hexandrum	Box Micrantheum		✔
Pimelea curviflora	Curved Rice-flower	✔	
Podocarpus lawrencei	Mountain plum pine		✔
Prostanthera lasianthos	Victorian Christmas Bush		✔
Pultenaea cunninghamii	Bush Pea	✔	

TAMS List	Parks & Open Space	Revegetation	Riparian	Streets
✔	✔			
✔		✔		
	✔	✔		
✔		✔		
	✔	✔		
✔		✔		
✔		✔		
✔	✔			
✔	✔			
		✔		
✔	✔			
✔	✔	✔		
✔	✔			
✔	✔			
		✔		
✔	✔	✔		
✔	✔			
	✔	✔		
		✔		
✔	✔			
	✔	✔		
✔	✔			
✔	✔			
		✔		


Acacia buxifolia


Acacia dealbata


Acacia implexa


Acacia rubida


Brachyloma daphnoides


Bursaria lasiophylla


Cassinia longifolia


Cassinia quinquefaria


Crowea exalata 'Ginninderra Falls'


Daviesia mimosoides


Dillwynia sericea


Grevillea diminuta

Grevillea juniperina subsp. fortis

Grevillea juniperina 'Molonglo'

Grevillea lanigera

Indigofera australis

Kunzea ericoides

Kunzea ericifolia

Leptospermum multicaule

Melichrus urceolatus

Micrantheum hexandrum

Pimelea curviflora

Podocarpus lawrencei

Pultenaea cunninghamii

Groundcovers, Herbs, Forbs & Ferns

Botanical Name	Common Name	Site Endemic	Regionally Endemic
Asperula conferta	Common Woodruff	✔	
Asplenium flabellifolium	Necklace Fern	✔	
Bracteantha viscosa	Sticky Everlasting		✔
Calotis lappulacea	Yellow Burr-daisy	✔	
Cheilanthes austrotenuifolia	Rock Fern	✔	
Cheilanthes distans	Bristly Cloak Fern	✔	
Cheilanthes sieberi	Mulga Fern	✔	
Chrysocephalum apiculatum	Common Everlasting	✔	
Chrysocephalum semipapposum	Clustered Everlasting	✔	
Convolvulus erubescens	Australian Bindweed	✔	
Daucus glochidiatus	Native Carrot	✔	
Einadia nutans	Nodding Saltbush	✔	
Geranium solanderi	Native Geranium	✔	
Glycine tabacina	Vanilla Glycine	✔	
Goodenia hederacea	Ivy Goodenia	✔	
Hibbertia obtusifolia	Grey Guinea Flower	✔	
Leptorhynchos squamatus	Scaly Buttons	✔	
Leucochrysum albicans	Hoary Sunray		✔
Rubus parvifolius	Native Rasberry	✔	
Tricoryne elatior	Yellow Rush-lily	✔	
Viola hederacea	Native Violet		✔
Vittadinia muelleri	Narrow-leaf New Holland Daisy	✔	
Walhenbergia communis	Tufted Bluebell	✔	

TAMS List	Parks & Open Space	Revegetation	Riparian	Streets
	✔	✔		
		✔		
✔	✔			
	✔	✔		
		✔		
		✔		
		✔		
✔	✔	✔		
✔	✔	✔		
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	✔	✔		
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✔	✔			
		✔		
	✔	✔		
✔	✔			
	✔	✔		
✔	✔	✔		

Asperula conferta

Asplenium flabellifolium

Bracteantha viscosa

Calotis lappulacea

Cheilanthes austrotenuifolia

Cheilanthes distans

Cheilanthes sieberi

Chrysocephalum apiculatum

Chrysocephalum semipapposum

Convolvulus erubescens

Daucus glochidiatus

Einadia nutans


Geranium solanderi


Glycine tabacina


Goodenia hederacea


Hibbertia obtusifolia


Leptorhynchos squamatus


Leucochrysum albicans


Rubus parvifolius


Tricoryne elatior


Viola hederacea


Vittadinia muelleri


Walhenbergia communis

Grasses

Botanical Name	Common Name	Site Endemic	Regionally Endemic
Austrodanthonia carphoides	Short Wallaby Grass	✔	
Austrodanthonia racemosa	Wallaby Grass	✔	
Austrostipa densiflora	Brushtail Speargrass	✔	
Austrostipa scabra	Corkscrew	✔	
Bothriochloa macra	Red Grass	✔	
Dianella revoluta	Blue-Flax Lily		✔
Dichelachne micrantha	Short-hair Plume-grass	✔	
Lomandra filiformis	Wattle Mat-rush	✔	
Lomandra longifolia	Spiny-headed Mat-rush	✔	
Microlaena stipoides	Weeping Grass	✔	
Poa labillardierei	River Tussock	✔	
Poa sieberiana ‘Aranda’	Poa Tussock	✔	
Themeda australis	Kangaroo Grass	✔	
Stypandra glauca	Nodding Blue Lily	✔	

TAMS List	Parks & Open Space	Revegetation	Riparian	Streets
	✔	✔		
	✔	✔		
✔	✔	✔		
✔		✔		
✔	✔	✔		
✔	✔	✔		
	✔	✔		✔
✔	✔	✔		✔
✔	✔	✔		
✔	✔	✔		✔
✔	✔	✔		✔
✔	✔	✔		
	✔	✔		

Austrodanthonia carpholides

Austrodanthonia racemosa

Austrostipa densiflora

Austrostipa scabra

Bothriochloa macra

Dianella revoluta

Dichelachne micrantha

Lomandra filiformis

Lomandra longifolia

Microlaena stipoides

Poa labillardierei

Poa sieberiana 'Aranda'

Themeda australis

Stypandra glauca

Riparian

Botanical Name	Common Name	Site Endemic	Regionally Endemic
Azolla filiculoides	Pacific Azolla	✔	
Baumla articulata	Jointed Twig Rush		✔
Bolboschoenus caldwellii	Salt-club Sedge		
Carex appressa	Tall Sedge	✔	
Carex bichenoviana	Bichenov's Sedge		
Carex inversa	Knob Sedge	✔	
Carex fascicularis	Tassel Sedge		✔
Cotula coronoipifolia	Water Buttons		
Crassula helmsii	Swamp Stonecrop		
Eleocharis acuta	Common Spike Rush		
Juncus australis	Austral Rush	✔	
Juncus usitatus	Common Rush	✔	
Persicaria decipiens	Slender Knotweed	✔	
Phragmites australis	Phragmites		
Schoenoplectus validus	River Club-rush	✔	
Typha domingensis	Cumbungi		✔
Typha orientalis	Cumbungi	✔	

TAMS List	Parks & Open Space	Revegetation	Riparian	Streets
✔			✔ Water	
✔			✔ Margin	
✔			✔ Margin	
✔			✔ Edge	
✔			✔ Edge	
			✔ Edge	
✔			✔ Margin	
✔			✔ Margin	
✔			✔ Edge	
✔			✔ Edge	
			✔ Margin	
✔			✔ Margin	
			✔ Edge	
✔			✔ Water	
✔			✔ Margin	
✔			✔ Water	
			✔ Water	

Azolla filiculoides

Baumla articulata

Carex appressa

Carex bichenoviana

Carex inversa

Carex fascicularis

Cotula coronoipifolia

Crassula helmsii


Eleocharis acuta

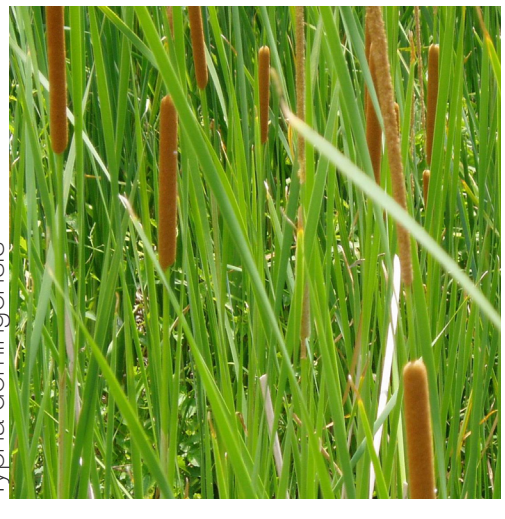

Juncus australis


Juncus usitatus

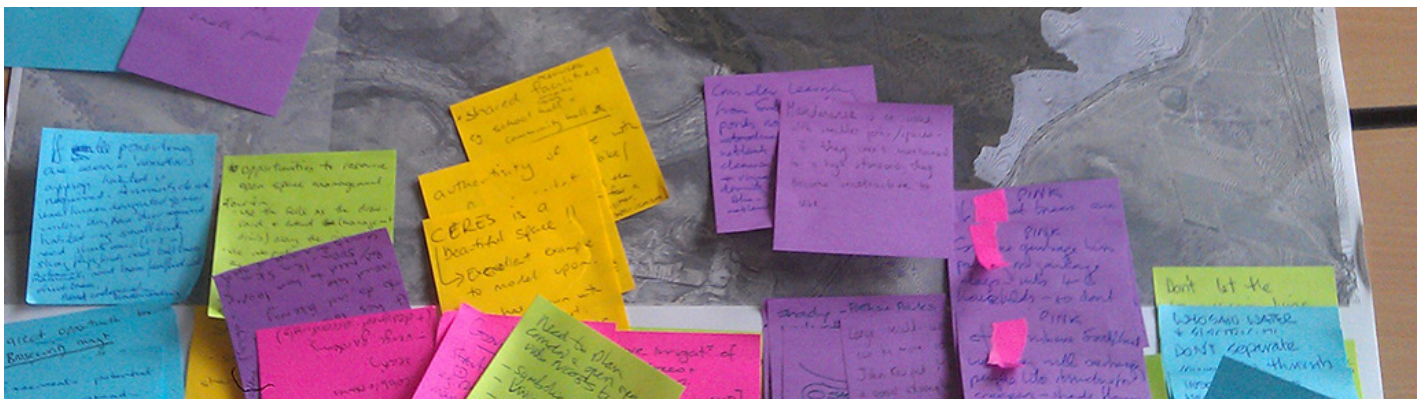

Persicaria decipiens


Phragmites australis


Schoenoplectus validus


Typha domingensis


Typha orientalis



Appendix A: Community Consultation Summary

Appendix A: Community Consultation Summary

COMMUNITY ENGAGEMENT

A great deal of community consultation has been conducted throughout the Masterplanning process for West Belconnen, facilitated by various members of the project team.

The largest of the consultations was conducted between the 12-14 November 2013 involving a large number of local residents and community groups as well as representatives from various ACT & NSW Government organisations.

McGregor Coxall facilitated two workshops covering the Conservation [River] Corridor, Transmission Easements, Parks and Open Space, Landfill & Streets. Out of these workshops we recorded participants feedback through sticky notes placed on the site map. The points, comments and ideas raised are found on the following pages.

The ideas put forward by the participants of the workshop have provided valuable insights into the site and requirements of the local community. Many of these have been incorporated into the Landscape and Open Space Strategy for West Belconnen.

1

2

3

Image 1 - Workshop comments, points and ideas.

Image 2 - PDF presentation by Roberts Day

Image 3 - PDF Workshop

PDF Workshop Community & Stakeholder Ideas

River Corridor

- What limitations are the on installation of space infrastructure into the landfill site e.g. shelters/seating/toilets.
- Decentralised system of community gardens: more than one site. Locate gardens on best soils, or relocate soils from housing areas.
- Identify a suitable area for a community irrigated Recreation Parks (Crip) same as in Crace
- Incorporate aboriginal culture + education in river corridor developments.
- Minimum 40m riparian zone (NSW Office of Water) vs. 30m currently along Ginninderra ck.
- There's a lot of water available. POS may be irrigated with harvested stormwater. (Not necessarily dry landscape). Urban Oasis?
- Ephemeral creek lines to be restored/rehabilitated and stabilised.
- Integration of WSUD measures with edge, POS network.
- Public education ND Purchaser Awareness: urban edge – feral pests (animals, plants, vandalism). Need to advertise, promote propagandise ad infinito
- Need to plan open spaces, symbolise spaces, living space, connecting space
- Identify access (foot, vehicle) early in project
- Plan access to roads across corridor early
- Sacrifice habitat to contribute to Urban edge + Development, Sacrifice Development to River Recreation Corridor, Reverse ideology of volunteers managing labour intensive landscapes e.g. PTWL Habitat, land care water watch etc. Target + co-ordinate retirees (marginalised people) + others to mow + maintain 'easy' green space e.g. ovals, play grounds, land beneath power lines.
- Utilise River Corridor to encourage tourism and generate income for ongoing maintenance of River Corridor.
- Activities + plant control access (river, mtn. bike, walk, fun runs, swim?)
- Keep BNT route operational during construction but link current BNT route from Strathnairn to Belconnen Farm with a link back to Belconnen Pony Club + BNT at that point.
- First step to define Murrumbidgee corridor (critical) Not only habitat line also product/slope view shed cultural land use (300m in other places)
- Conservation Area will require active restoration it will require community land-care activities particularly weed control and conservation grazing.
- Map showing high value assets, different management types, wildlife corridor, birds of prey (nesting sites), educational.
- Edge effect (open space boundary as 'flat' as possible, fencing, weed mgmt.
- Weed control
- Create a River Park Concept (identify conservation/recreation park and thus protection areas or recreation areas)
- Prepare a separate riverbank corridor for study
- Separate woodland areas from lizard/River corridor areas requires management
- Recognise there will be multiple uses and potential for damage to area of cons. Value definition of levels of use required.
- What uses complementary with conservation? Can be located within 'Habitat Areas'. Stormwater treatment facilities located in streams - improve condition or degraded gullies, public facilities in degraded areas with activites (tracks in Bushfire OPZ.
- Grazing – long shared boundaries b/w residential and grazing. Create mgmt. issues with noise/ odour. Design of urban nature corridor has blending or urban into nature conservation therefore requiring mgmt.
- More money needed to manage the whole area!

- Tourism: use the Falls as the draw card, extend trails along river, define distances e.g. 5km, 10km, create a marathon/fun run use interpretive signage along the trial.
- Managing + restoring of 500ha: solutions = tourism, environmental ed., unique experiences, willingness to pay.
- Creative, practical restoration of more degraded areas + multiple use
- All WSUD ponds to double as habitat and recreational areas
- Parkwood Historic Site (Just across ACT border in NSW) has not been listed!
- Manage Ginninderra Falls visitation
- Woodland reserve need to be extended to cover the Murrumbidgee corridor in the ACT (eastern side)
- Trends + opportunities, access areas + areas that should not be accessed vary on management options.

Transmission Easements

- Who said water and electricity don't mix? Hatchery for native species is a good idea.
- Native fish: restocking program
- Yabbies, Trout, Bushtucker in corridor
- Walking track has a river walk
- River links requires horse/bike access/pedestrian corridor (Belco. Pony Club), maintenance access. Shared paths (20m optimum, 10m acceptable)
- Hall – campsite, campsite at Farmhouse, current route maintained during construction
- Interaction b/w cattle + human pets
- Parkwood paddocks important horse grazing
- Utilising native shrub landscaping would enhance wildlife movement across the site.
- Biosecurity mgmt.: also create a 'highway' for pests and weeds to move from urban areas into river corridor.
- Easements has potential for weed spread and will require careful and regular inspection and control.
- Grazing not compatible adjacent to residential in long-term. Useful to transition during development.
- Grazing on the edge of urban during interim
- Pedestrian/cycle corridor – scenic + artwork (sculptures), Fitness Stations
- Urban agriculture: EMF field strength diagrams helpful in shaping public perceptions, esp. organic growers.
- Great opportunity to link bike/foot/ Horse site (café etc.) to river corridor along river + back up a power easement + café loop (too steep?)
- Interpretive signage along the pathways, energy production + transmission, energy efficiency
- Don't separate community physically or visually from the linear nature of the transmission line easement. Integrate the edge and access Road installation of new power lines (e.g. switching line). Should not necessarily be straight linear corridor, curve the easement to compliment (assist) urban integration.
- Tharwa Sands Quarry to continue for 20-30 years moving in the direction towards Power lines. Back filling holes with clean fill and re-profiling.
- If Power lines are seen as corridors appropriate habitat is required. Animals do not use human designated spaces unless they have required habitat.
- Powerline Land scape: nature, shrubs assist small movement of pest control
- Don't let the transmission lines separate communities ensure land uses, e.g. roads open spaces and community facilities transition smoothly site suitable for horse paddocks?

Parks and Open Space

- Albury Wodonga Parklands has been doing a somewhat similar job of managing open space for 30 years.
- Large trees important, use groups
- Pocket-park potential w/b 400m
- Pull back population density for promoting open space
- Need for something outstanding, no standard playground equipment but something more adventurous. Arboretum play space is a good example.
- Link in with existing network i.e. Macgregor
- 'Urban Agriculture' becomes a new statutory category of land use. (ESDD starting to think along those lines.)
- Need to look at recreational facilities in corridor, part of EDP process for residential.
- Urban agriculture: gardens can be allocated with parks. Need design to deal with public perception of alienation of growth areas.
- Parks and gardens site to minimise wind effects. Do we know what aerodynamics of the study site look like?
- Community/communal gardens: likely need up to 3 or 4 across entire area
- Dual use of POS, Pocket Park, link to Bus/Public Transport, community garden, CRIP within Suburbs
- Pocket Parks dependent on use
- CRIP's
- You need to determine whether the environment trust is a not for profit environmental organisation which could be registered as such and allow tax deduction of levy + contribution to Trust.
- Local loop for BNT
- Asset protection zone, link to Belco. Pony club
- Smaller area district sporting complex is possible, providing that playing surfaces can accommodate higher usage.
- Audit sports ground in Belco. District to determine usage + capacity in West Belco?
- Wetland, new park typology, nature
- Mixed use instead of single use, small parks
- Maintenance is an issue with smaller parks/spaces if they aren't maintained to a high standard they become unattractive for users.
- Consider Sullivan's Ck ponds now being introduced in O'conner wetlands, habitat + water cleansing + play equipment + visual asset to medium density housing. Also Dickson wetlands.
- Open space for paths (bikes, rollerblades, jogging, walking, BMX, Skating, boot camps)
- Shady paths, parks (well watered), high quality playing surfaces
- Path that goes past storm water/wetlands on one side and park on the other
- Large multi-use spaces can be more attractive. John Knight Memorial Park is a good example (basketball courts, gym equipment, nature, playgrounds, open spaces, BBQ's) more attractive for everyone.
- Plant playgrounds with native grasses (less mowing, less maintenance, less costs)
- Use the Yerabbi Ponds (Gunghalin as example (bike around lake, use loops e.g. 500m, 100m, 5km, therefore providing for all age groups)
- Pedestrian parklands, trees (deemed to be kept) that create pocket parks need to be rethought
- Incorporate small park users into larger public open space, development has too much public open space which is expensive to maintain.
- Stormwater is not part of Murray Darling Water Cap. Discharge from LMTP is part of the water cap. Therefore reuse of efficient from LMTP impacts on ACT Cap (Negative). ACAC have demanded the availability of ACTEW water more efficient ($) than reuse + recycle of stormwater. This is a conundrum. In essence stormwater reuse is subsidised by residence.

Landfill

- Link landfill site with open space, e.g. bike/footpaths (extend the willingness to pay for a broad range of visitor experiences. Shared resources facilities e.g. computers, library, school hall = community hall etc.
- Recreational opportunities (dry slopes skiing) educational + productive (city farm/solar, waste/Resource Recovery)
- Authenticity of a farmers market by locating it on/in an urban farm (e.g. Collingwood), willingness to pay for authenticity
- Ceres is a beautiful space, excellent model But it has grown with community support and this project will only be successful if community has a strong sense of ownership/emotional investment
- Cap + grade and use for a variety of community purposes including retail, central parklands, urban agriculture, riding school (commercial like central park in Sydney) and education centre.
- Investigate relocation of Chook farm. Urban encroachment will most probably force its closure. It is not compatible with residential develop.
- Development/Developer to fund co-ordinator/manager – Tender project manager out – to respond with vision + how to do it (Funding Req: 5-8 years) + infrastructure support, great progressive sustainable projects don't happen on their own – need professional mgmt. + leadership.
- Bio-diversity: ensure alternative place are available for more active recreation, e.g. Brix Biking.
- Consideration of demographics – likely to be young families? Use could be child focused: adventurer playground, safe cycling are, children's farm
- Biodiversity: Resident Carers – stewardship INDUSTRIAL 'GRAND' SYSTEM. Bush crew-trained on ground managers to work with volunteers.
- Shared office space – small business sharing facilities.
- Landfill buffers Poultry Farm buffers Biosecurity buffers Cranbourne experience.
- Major pedestrian cycling links
- Community Recreation Irrigated Park or District Park
- Retention of landscaping materials – particularly during dev't – ongoing business
- City services maintenance Depot – deliver core maintenance services to Region
- Tharwa sales Quarry accepts clean Fill into the hole, lay the Red Granite.
- Urban Agriculture: need reassures and day-cap, some organic growers are very sensitive.
- Don't confine community agriculture to landfill area. COGS garden system succeeds because of decentralisation.
- City Farm + Community Garden, similar to CERES
- Skippy Bins integrated with future construction waste for project
- Lets get rid of the so-called recycling estate (Parkwood)
- Climate adaption + need for detour farming – lighter colour houses reduce heat sink

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