

Central Precinct Landscape Master Plan

Revision B
For Development Application





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Note:

This report should be read in conjunction with:

1. St Marys Central Precinct Open Space and Landscape Master Plan, July 2008.
2. Precinct Plan and Development Control Strategy, May 2009.
3. Wianamatta Regional Park Plan of Management, February 2011.
4. Wianamatta Regional Park Conservation Management Plan, March 2011.
5. Species Impact Statement for Development within the Central Precinct, St Mary's Property, February 2014.
6. State Sydney Regional Environmental Plan No. 30 - St Mary's, 2001Central Precinct (St Mary's Development) Vegetation Management Plan, 2014.
7. Archaeological Assessment for Maryland Development Company, 2008.
8. St Marys Development Site, Central Precinct: Aboriginal Cultural Heritage Assessment Draft Report, August 2013.
9. St Marys Precinct Plan: Water, Soils and Infrastructure Report, May 2009.
10. 10. Transgrid Easement Guidelines for Third Party Development.





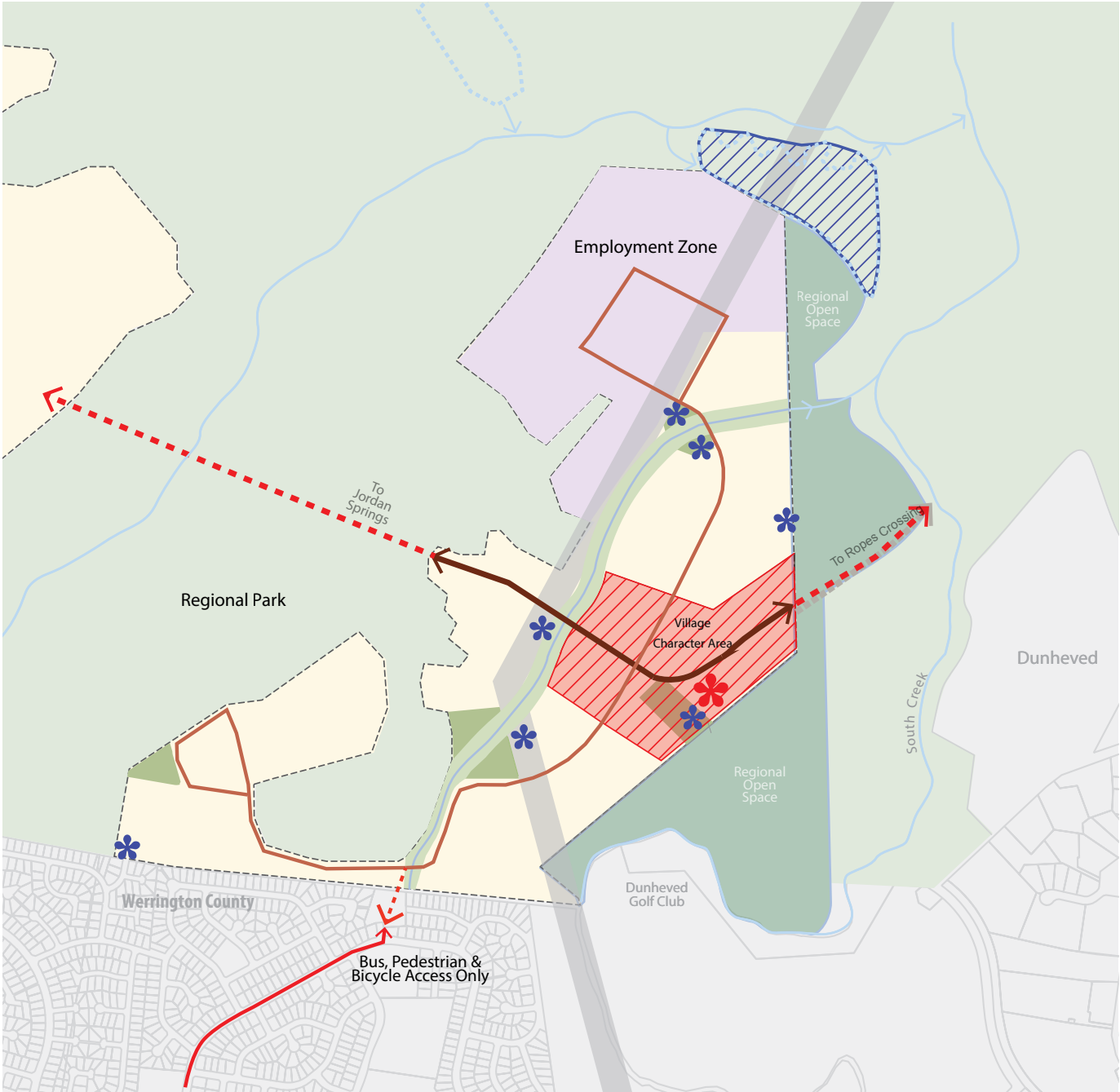
1 Site Context

1.1 Central Precinct Landscape Vision

Central Precinct will be a residential development with a distinctive character and sense of place that builds on the surrounding landscape character. To support the future community the development will provide open spaces, housing diversity, a village centre with facilities and amenities.

The following design principles developed in collaboration with Lendlease underpin the Master Plan. These principles have been put in place to realise the vision and inform the layout plan:

- Celebrate the sense of place, the abundance of the natural landscape and rich cultural heritage by ensuring the subdivision pattern, density, and scale are in keeping with the natural character of the site;
- Reinforce the natural landscape by incorporation through the Riparian Corridor, Wianamatta Regional Park, Regional Open Space and the open space network;
- Incorporate the natural character attributes of the site and reinforce its identity through the appropriate placement and location of its open spaces, built form and facilities;
- Provide a range of edge transitions and interface treatments to the Wianamatta Regional Park, Regional Open Space, parkland areas and corridors/easements that deliver a high quality landscape treatment.
- Deliver a safe, walkable and well-connected Precinct development.



North



- Village Centre (tbc)
- Water Quality Basin/Lake
- Precinct Boundary

- Riparian Corridor & Drainage Reserve
- Neighbourhood Parks
- Collector Roads

- Local Streets
- Urban Zone
- Employment Zone

- Village Centre Character Area
- Proposed connection to existing Network

- Basin B (Size Approx. size)

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Precinct Plan: Framework Plan

Note: Plan taken from Lendlease Precinct Plan



1.2 Context

Central Precinct is part of the St Marys Development Site formerly known as the Australian Defence Industries (ADI) Site, located 45km west of Sydney CBD in the suburb of Llandilo. Central Precinct is bounded by the Wianamatta Regional Park on the northern, eastern and western edges, and is bounded by the suburb of Werrington County and Dunheved Golf Club on the southern edges. The suburb of Ropes Crossing is located to the east, and Jordan Springs is located to the west. In 1993 the ADI Site was endorsed by the NSW Government for inclusion in the Urban Development Program (UDP) for housing purposes in an environmentally sustainable framework.

A Regional Environmental Plan was prepared for the St Marys Development Site and this plan for St Marys SREP No.30 was gazetted in January 2001 as a guide for development control. Central Precinct is zoned for Employment, Urban, Road and Road Widening and Drainage. Wianamatta Regional Park and Regional Open Space is zoned outside Central Precinct. The Precinct is anticipated to accommodate approximately 1,260 dwellings and 3,000 residents, and will consist of retail, commercial, open space and residential uses. In December 2002, a Deed Agreement was established between the developers and the land owner. Six development precincts were identified in the SREP No.30 including Central Precinct. The Precinct Plan was approved in 2008 by Council according to the SREP No.30 requirement.

A Landscape Master Plan and a Landscape Master Plan Handover and Maintenance Plan (Environmental Partnership 2008) were developed as part of the approved Precinct Plans for Western and Central Precincts. This Landscape Master Plan supersedes this previously approved Landscape Master Plan for Central Precinct. The Maintenance Plan will be updated accordingly and resubmitted to Council in accordance with this landscape masterplan.

Other documents to support this Landscape Master Plan include:

- Penrith Open Space Action Plan, 2007; and
- Penrith Accessible Trails Hierarchy Strategy (PATHS), 2012.



St Marys Development Site



1.3 Landform

Central Precinct is located on a creek floodplain and is predominately flat with minor undulations. The site consists of several natural high points varying from 29m AHD to 40m AHD with vistas to the Wianamatta Regional Park and Regional Open Space. There are also several smaller visual catchments within the Precinct. Extensive filling is required within Central Precinct to facilitate residential development as some areas of the site are currently below the 1 in 100 year ARI (Average Recurrence Interval) flood event in South Creek. Highpoints throughout the Wianamatta Regional Park and Regional Open Space enable views and visual connections to the surrounding landscape.

1.4 Soils

Central Precinct consists of Wianamatta shale clay soils being Luddenham and South Creek Soil types prone to poor drainage and with waterlogging characteristics. These clay soils support the typical Cumberland Plain Woodland vegetation community. This community consists of plant species including *Eucalyptus moluccana* (Grey Box), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus crebra* (Narrow-Leaved Ironbark) (Benson & Howell 1995). The overall Precinct has low salinity, although salinity problems may occur caused by a rising water table, land clearing or increased infiltration. Refer St Marys Project Central Precinct Plan: Water, Soils and Infrastructure Report 2009.



Wianamatta shale clay soils

Existing soil profiles and vegetation will be retained where possible within Central Precinct to retain the existing landscape character. This retention will also assist with erosion and sediment control minimising salinity (Refer to section 5.2 for recommended site soil treatment).



Landform

1.5 Vegetation Character

Tree preservation objectives are identified in the SREP No.30. Central Precinct has been extensively cleared in the past, with intensive land uses and practices. Central Precinct currently consists of five main vegetation communities:

- Cumberland Plain Woodland
- Shale Gravel Transition Forest
- River-flat Eucalyptus Forest
- Swamp Oak Forest
- Grasslands (native and exotic)

Central Precinct’s vegetation character is dominated by Grasslands, with River-flat Eucalyptus Forest and Swamp Oak Flood Plain Forest to the centre of the site. There is also a combination of mature trees, extensive regeneration and regrowth from past disturbed land uses. Grasslands generally separate stands of established Forests and Woodlands. For further information refer to Central Precinct (St Marys Development) Vegetation Management Plan (JMDdesign 2015).

The adjacent connection of the Wianamatta Regional Park and Regional Open Space to Central Precinct provides a strong interface between the existing and proposed vegetation communities and South Creek Riparian Corridor. Maximising the retention of existing levels will enable the protection of existing tree species for immediate visual amenity and identity. This however will be localised to small pockets given the filling requirements of the site.



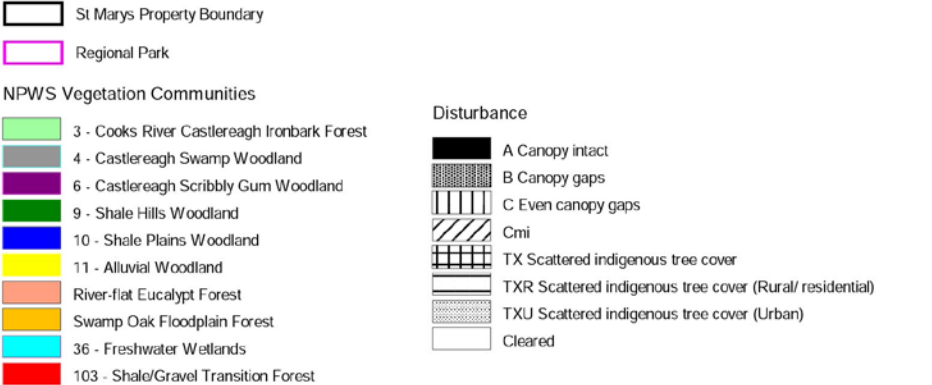
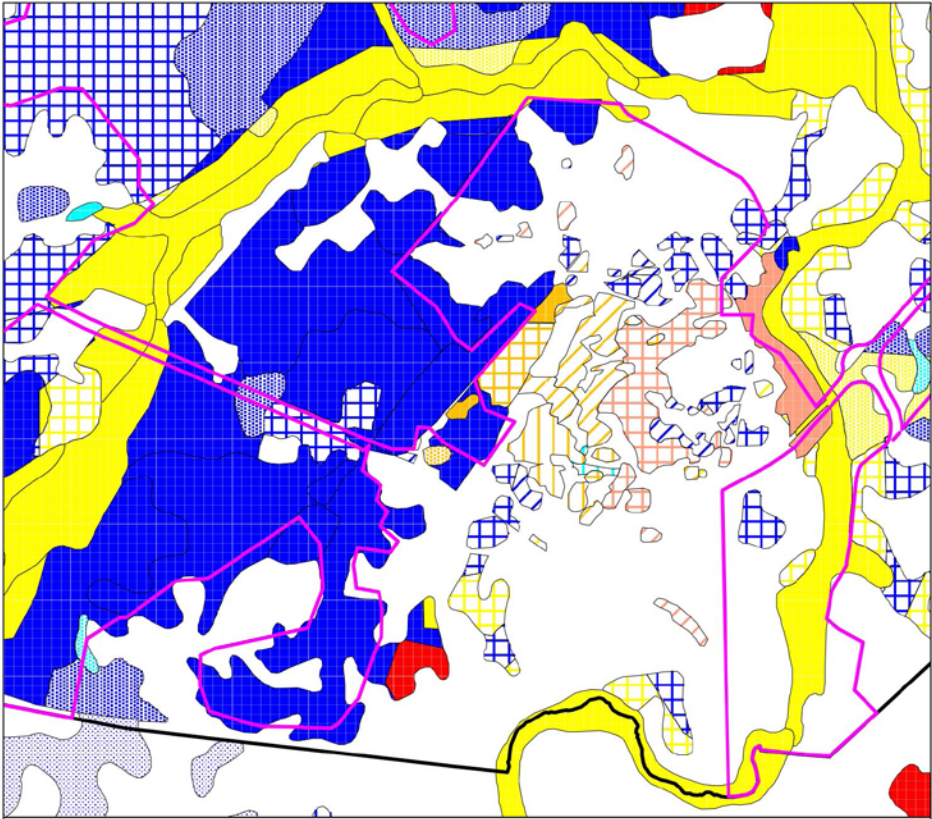
Cumberland Plain Woodland



Grasslands



Historical aerial photos (1940s, 1955 and 1965)



Vegetation Communities and disturbance of Central Precinct (Cumberland Ecology)



1.6 Drainage and Hydrology

Watercycle objectives are identified in the SREP No.30. Key objectives include:

- Incorporating stormwater management measures to ensure there is no net adverse impact upon the water quality in South Creek and Hawkesbury-Nepean catchments.
- Ensure that there is no significant increase in the water table level or adverse salinity impacts.
- Minimal impact upon flood levels upstream or downstream.
- Minimise flood risk to both people and property.

Central Precinct is currently predominately below the 100 year ARI flood event in South Creek and a concurrent 20 year ARI flood in the Hawkesbury Nepean River. The Precinct is currently affected by the Probable Maximum Flood (PMF) level. Proposed development is to be above the PMF Level requiring site filling. The site predominately drains to the catchment of South Creek to the east via two drainage corridors which are vegetated by regrowth.

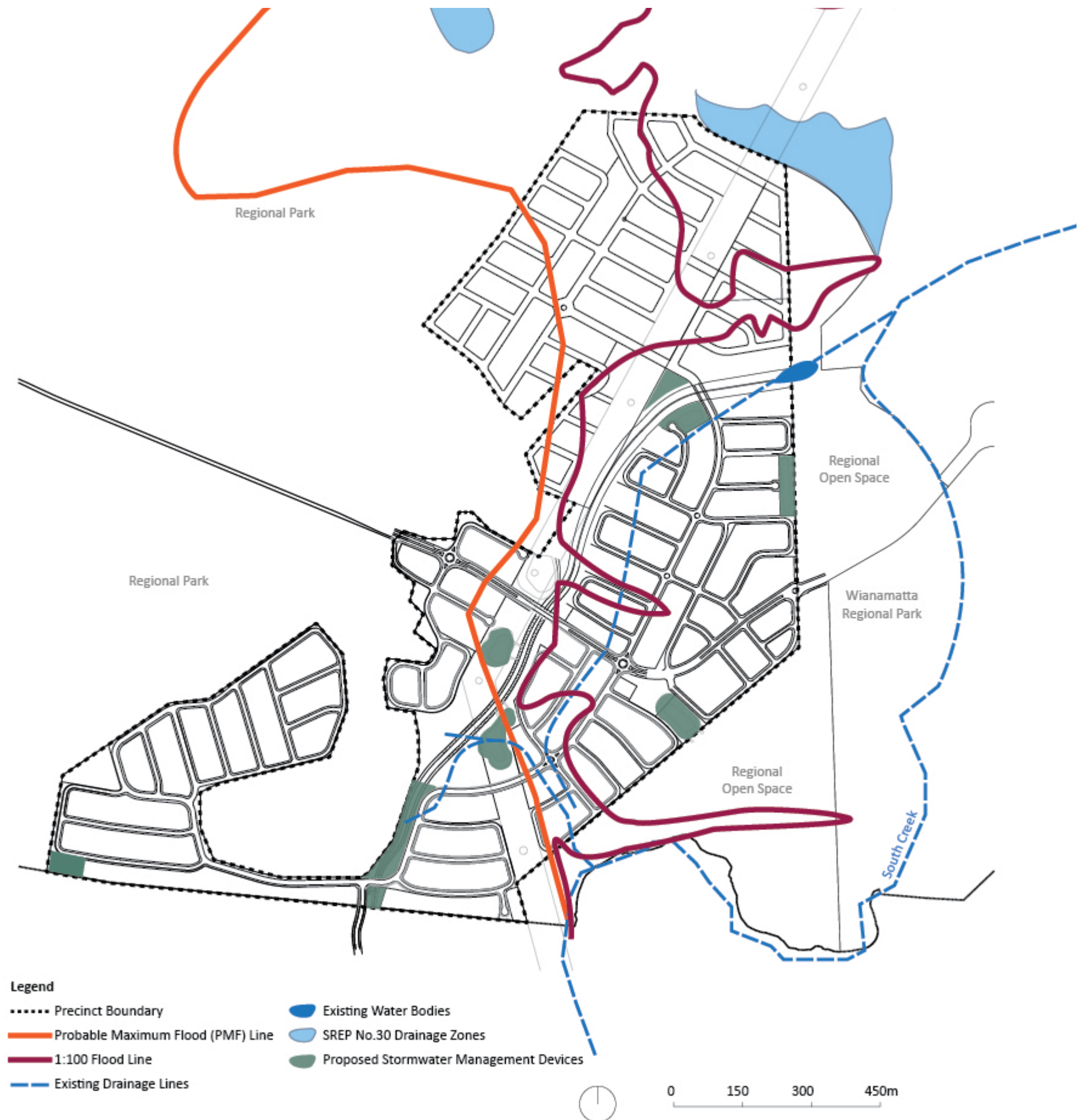
Maximising retention of the existing landform and drainage channels where possible minimises the change in stormwater management. The future Riparian Corridor and Stormwater Management Devices will incorporate stormwater management practices for sediment control and bioretention of water as an integrated system. Where possible, some areas of the proposed Riparian Corridor will retain existing site levels, while modification will be required in most other areas.



South Creek



Ephemeral drainage corridors



Drainage and Hydrology

1.7 Cultural Elements

Cultural Elements at Central Precinct have been divided into three themes and are detailed as follows:

Item	Cultural Element	Theme
	Aboriginal Heritage	Heritage
A	Elizabeth Farm Site / Brick Kilns	Heritage
B	Radar	Cultural land use
C	Regional Park	Environmental / Indigenous landscape
D	South Creek	Environmental / Indigenous landscape
E	Riparian Corridor	Environmental / Indigenous landscape
F	Ammunition Bund	Cultural land use
G	Dunheved Homestead	Heritage
H	Chimney	Heritage
I	Luxford's Orchard	Heritage
J	Bunya Pines	Heritage

A Heritage Interpretation Strategy has been prepared by Milne and Stonehouse for Central Precinct and aims to achieve the following outcomes for the site:

- A cross suburban consolidation of heritage interpretation
- A consideration of these stories integrated as design elements in streetscapes, parks and infrastructure like bridges hubs and shelters
- A reinforcement of identity for the precinct
- A cohesive design language and palette
- A strong connection with Wianamatta Regional Park and Regional Open Space
- A longer view of the suburb as a collective place inhabited by locals, enjoyed by all.

1.7.1 Pre-European Heritage

The Gomerigal clan of the Darug people occupied the area of Central Precinct for thousands of years before European settlement. The Darug people encompass several language groups who occupied the Sydney Basin.

The Aboriginal Cultural Heritage Assessment Report of Central Precinct state a series of landscape features providing resources to the Darug people including:

- The nearby confluence of Ropes Creek and South Creek with several lower order tributaries within Central Precinct possibly for fishing and a meeting place;
- The varied vegetation type and cover providing food resources for gathering and hunting food; and
- The local raw materials including silcrete for manufacturing stone artefacts.

The landscape would have been used seasonally and provide food reserves, water sources and raw materials for shelter, tools and other purposes (Godden Mackay Logan & Jo McDonald 2013).



Cultural Elements

1.7.2 European Heritage

The National Parks and Wildlife Service will endeavour to implement recommendations made in the Wianamatta Regional Park Conservation Management Plan in regards to the following European heritage items:

Elizabeth Farm Site / Brick Kilns

The remnants of the brick clamp kilns are identified as environmental heritage in the SREP No.30 as Site 3 and the objectives state:

- Regard for, and education and understanding of, the identified items of environmental heritage on the land to which this plan applies are to be promoted.
- Development is not to adversely affect the heritage significance of items of environmental heritage and their settings.
- The Aboriginal community is to be given the opportunity to comment regarding any potential impacts of development on, and proposals for mechanisms for the management of, items of Aboriginal heritage significance.

Remnants of Elizabeth Farm / Brick Clamp Kilns are evident in Central Precinct as partially buried visual remains of brickmaking. These remnants are one of only a few existing remains of early settlement on the site and provide opportunity for heritage interpretation. The remnant bricks are scattered around Site 3, as well as located in brick making areas and storage areas. The remnant wheel ruts signify wagon or barrow transport routes. The nearby creek indicates a potential clay source for the brick making. The kiln fires would have been fuelled by timber from nearby trees, however the localised landscape has changed through recent vegetation regrowth.

Dunheved Homestead

This site was the former location of the Dunheved Homestead evident from the avenue of trees along South Creek with sandstock brick foundations and rubble retaining wall (Casey & Lowe 1994). There are a variety of plantings in this area including a pine tree. There also have been artefacts of glass, ceramics and structural timbers (Casey & Lowe 1994).

Chimney

A remnant standing chimney and fireplace consist of dry pressed bricks with cement render to the western side (Casey & Lowe 1994). This is evidence of past site use at Central Precinct and is a point of interest to the proposed trail network.

Luxford's Orchard

Luxford's Orchard utilised between 1850 to 1940 are located 'close to the confluence of the two creeks approximates the location of Luxford's Orchard' (Wianamatta Regional Park – Conservation Management Plan March 2011). Presumably it is related to Luxford's house site (Casey & Lowe 1994).

Bunya Pines

Bunya Pines (*Araucaria bidwillii*) are located to the eastern approach into Central Precinct from Ropes Crossing and are located in the Wianamatta Regional Park. Bunya Pines were historically significant landscape markers from Victorian times during the nineteenth century. It isn't clear when these Bunya Pines were planted, however they may have had a connection with the homesteads in the area. The existing Bunya Pines are in poor condition; however there is opportunity to interpret this planting with similar species.



Brick fragments
Wianamatta Regional Park



Base of Brick Clamp Kilns
Wianamatta Regional Park



Brick making area
Wianamatta Regional Park



Base of Brick Clamp
Wianamatta Regional Park



Site of Dunheved Homestead
Wianamatta Regional Park
Image credit: Casey & Lowe 1994



Dunheved Homestead tree avenue
Wianamatta Regional Park
Image credit: Casey & Lowe 1994



Remnant Chimney
Wianamatta Regional Park
Image credit: Casey & Lowe 1994



Luxford's Orchard
Wianamatta Regional Park
Image credit: Casey & Lowe 1994

1.7.3 Cultural Land use

Radar Range

A radar range was previously located in Central Precinct at the eastern entry point from Ropes Crossing. This unique structure was visible from a distance throughout the Precinct and its unique form was a physical reminder of the prior use of the site. The radar calibrating frame was built between the 1960s and 1970s for the Royal Australian Navy where scaled model navy vessels were used with the radar range to train Navy operators for recognising vessels on radar screens (Wianamatta Regional Park Conservation Management Plan 2011).

Ammunition Bund

This unique landform is a physical reminder of the ADI munitions manufacturing and storage between the years of 1941 to 1994. The bund is a significant landform up to 12 meters in height located in the Wianamatta Regional Park to the west of Central Precinct. The bund is viewed from the Connector Road linking Central Precinct to Jordan Springs.



Radar Range



Radar range detail



Radar range detail



Ammunition Bund
Image credit: EP NSW

1.7.4 Environmental / Indigenous landscape

Wianamatta Regional Park

The Wianamatta Regional Park provides a strong sense of enclosure and defined character to Central Precinct with a strong interface to three edges of the Precinct being the northern, eastern and western edges. The Wianamatta Regional Park is 900ha in size and surrounds Central Precinct.

Riparian Corridor

There is an existing drainage corridor running through Central Precinct which develops into an ephemeral drainage zone due to the floodplain nature of the site. This corridor eventually drains to South Creek.

South Creek

South Creek is a major drainage catchment and corridor through western Sydney located to the east of Central Precinct in the Wianamatta Regional Park .



Regional Park



Cumberland Plain Woodland



Riparian Corridor



South Creek



1.8 Services and Infrastructure

Central Precinct is divided by a 500kv transmission line extending north to south requiring 70m wide easement. At a height of approximately 52 meters these lines are prominent in the landscape and will provide a green pedestrian and cycle link once the Precinct is developed. The Werrington Carrier sewer main traverses the site from the east to west. When this sewer line was installed earthworks were carried out along the future Collector Road connecting to Jordan Springs. As a result some existing trees were removed in this section of the Precinct opening up the tree canopy along this future road alignment.

The main constraint on landscape embellishment occurs in the Transgrid Transmission Easement where trees and shrubs above 4m are prohibited and structures/ materials need to comply with Transgrid requirements (Refer Section 2.4 and 4.3.3 for landscape treatment of Transmission Easement Corridor).

Landscape embellishment in these areas will be undertaken in accordance with Transgrid Easement Guidelines for Third Party Development (Refer Appendix 05)



Existing transmission easement

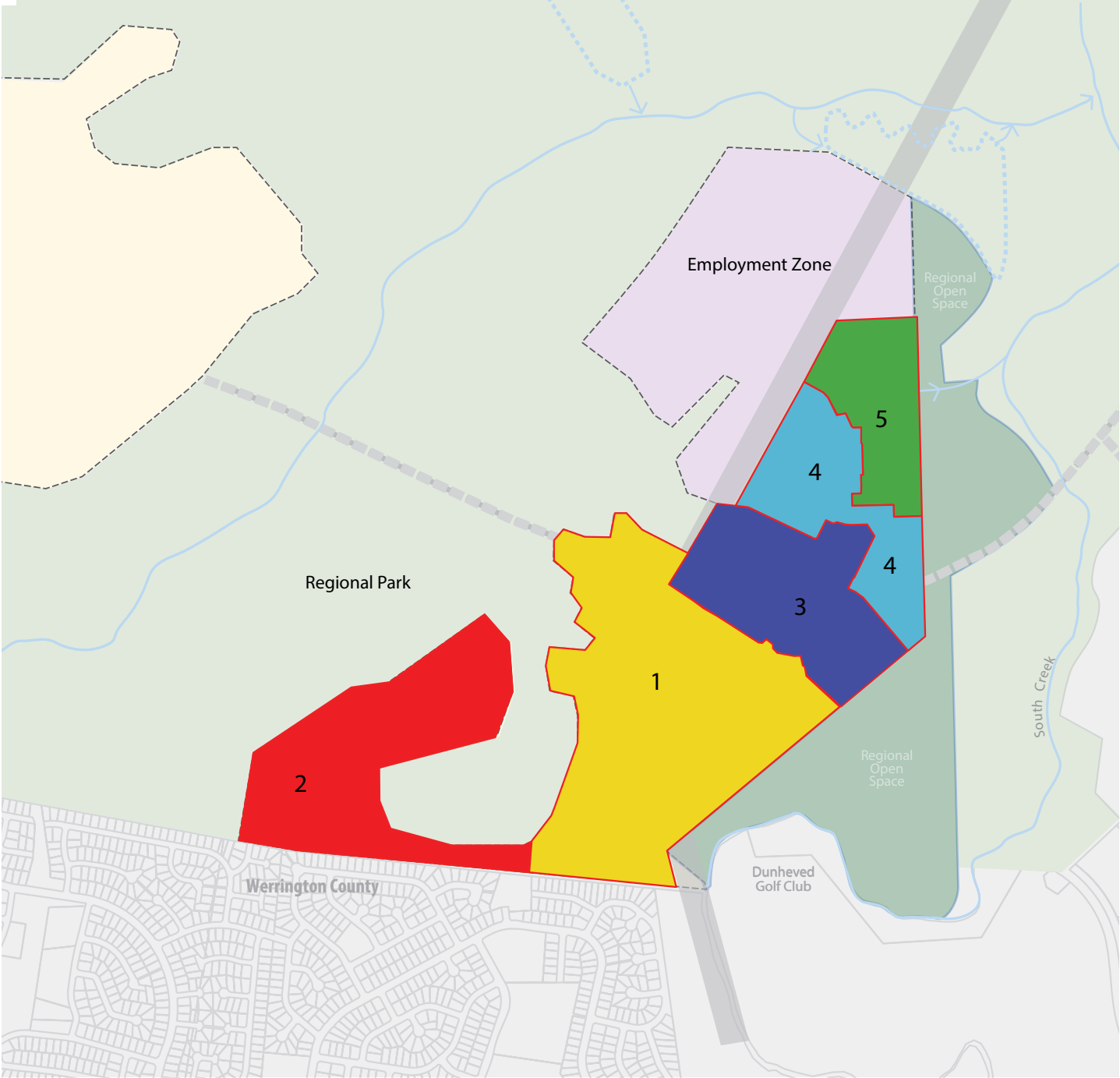


Services and Infrastructure



1.9 Staging

Central Precinct will be developed in 7 stages with drainage and road infrastructure being implemented first. Land will be generally developed from the south to the north as the land parcels are taken up in sequence. This progression enables development of the Village Centre and the Regional Open Space areas with recreational activity.



Revision 06/07/15

Staging Plan

Scale 1:15,000m @ A4 (approximate)

0 100m 200m 500m

Note: Plan taken from Lendlease Precinct Plan



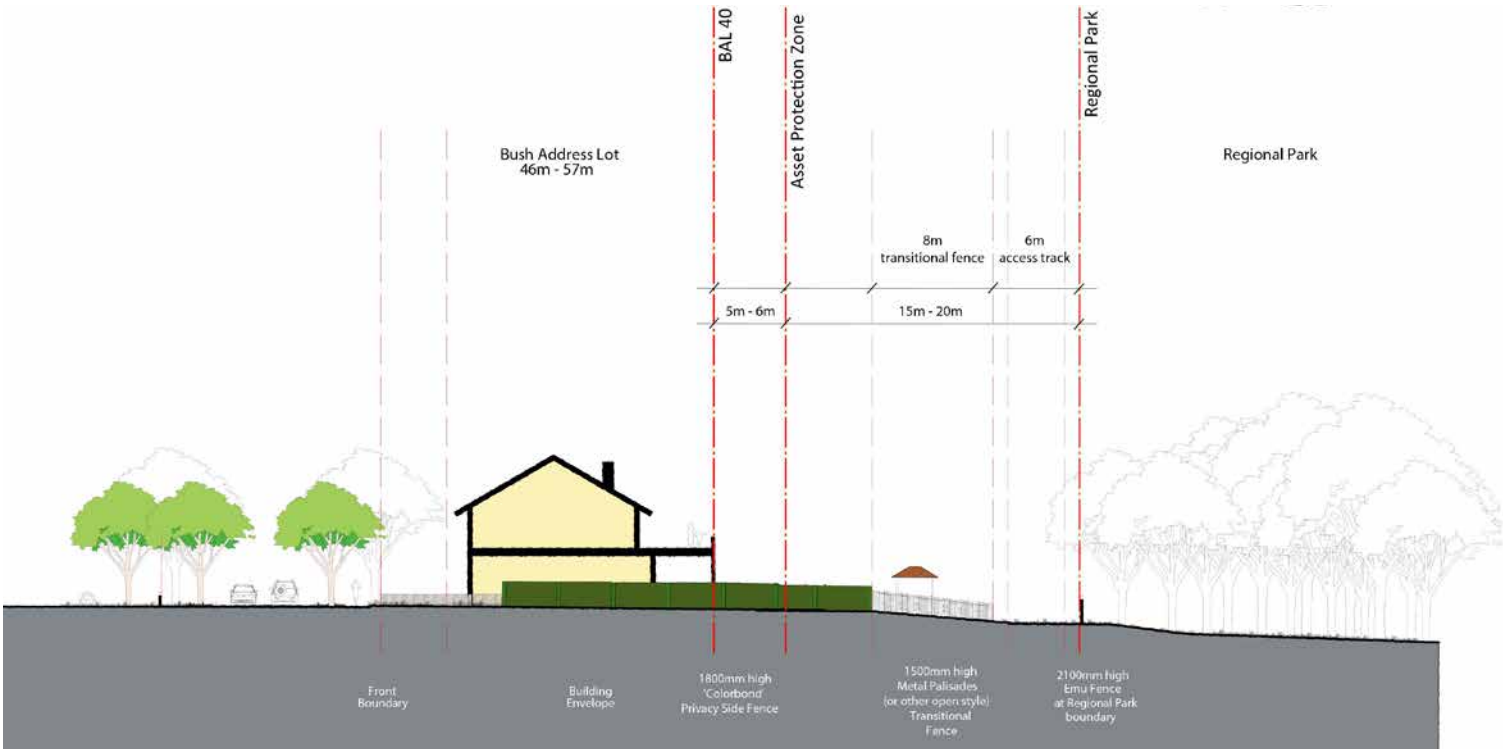
1.10 Bushfire

A variable bushfire Asset Protection Zone (APZ) applies to the development in the Central Precinct adjoining the Wianamatta Regional Park and Riparian Corridor. This varies from 11 – 32 meters in width. This APZ area includes both vegetated areas and hardscape areas such as roads and pathways.

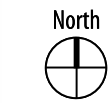
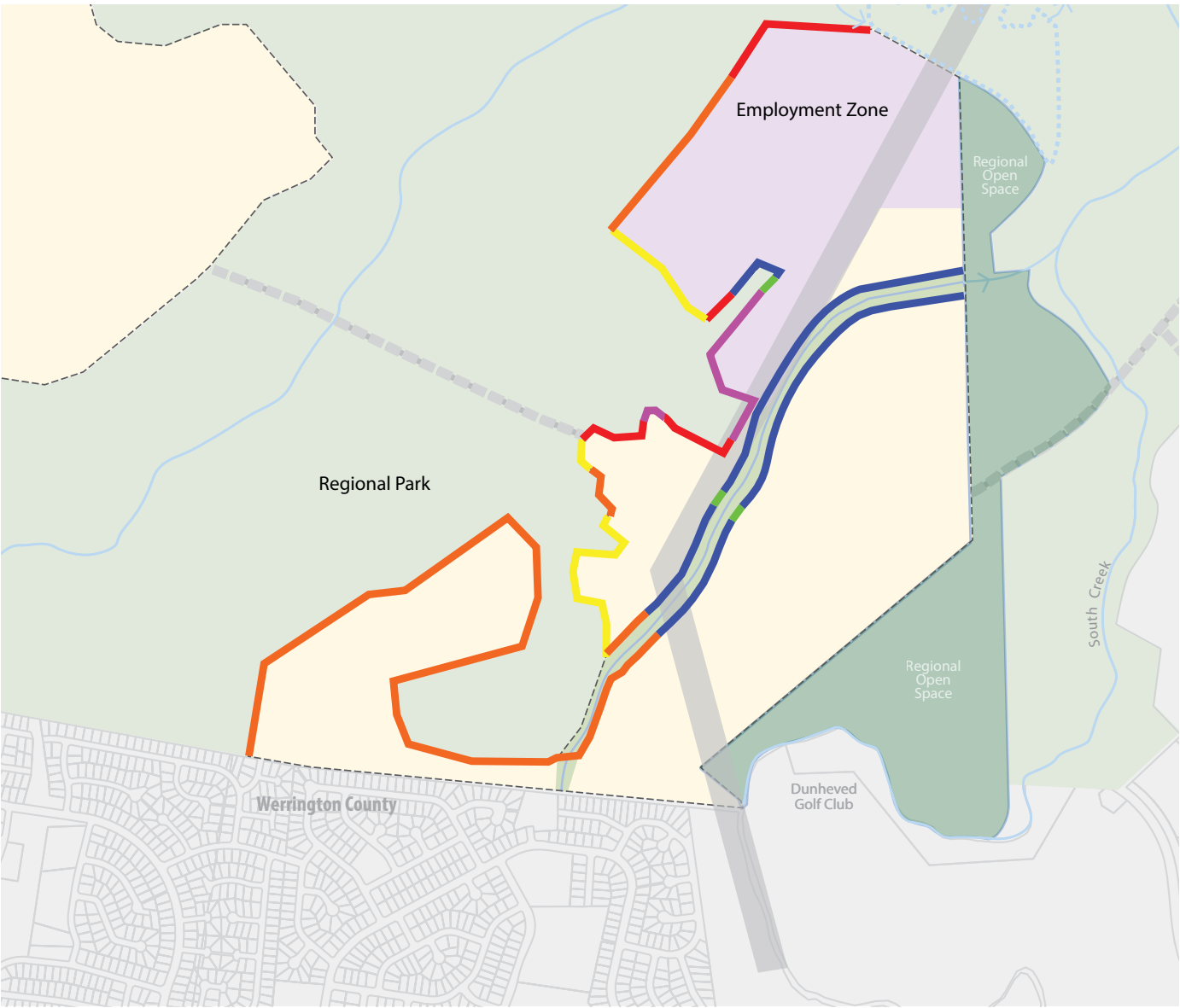
Standards for landscaping within the APZ area according to the NSW Rural Fire Service Standards include:

- Vegetation arranged in clumps with no continuous fire path to the residential development;
- Low branches pruned minimum 2m from the ground;
- Ensuring vegetation does not abut residential houses and buildings;
- Space mature tree canopies 2m to 5m apart;
- Maintain low fuel understorey planting; and
- Utilise vegetation which is less flammable.

Street tree planting, implemented with reference to the above spacing of mature tree canopies will not be impacted by BAL ratings or APZ requirements. In high BAL zones species with smooth bark and reduced fire risk will be underpruned to mitigate laddering effect. Trees will be located in order to prevent canopy interlocking with existing bushland (refer detailed street tree plans at DA stage prepared by Lendlease).



6m wide Bushfire Access Track to Regional Park Interface



Bushfire Attach Levels (BAL)

- Asset Protection Zone - 32m
- Asset Protection Zone - 25m
- Asset Protection Zone - 21m
- Asset Protection Zone - 16m
- Asset Protection Zone - 14m
- Asset Protection Zone - 11m

Note: Location of all elements indicative only, subject to confirmation via detailed design.

Note: Plan taken from Lendlease Precinct Plan

Revision 06/07/15

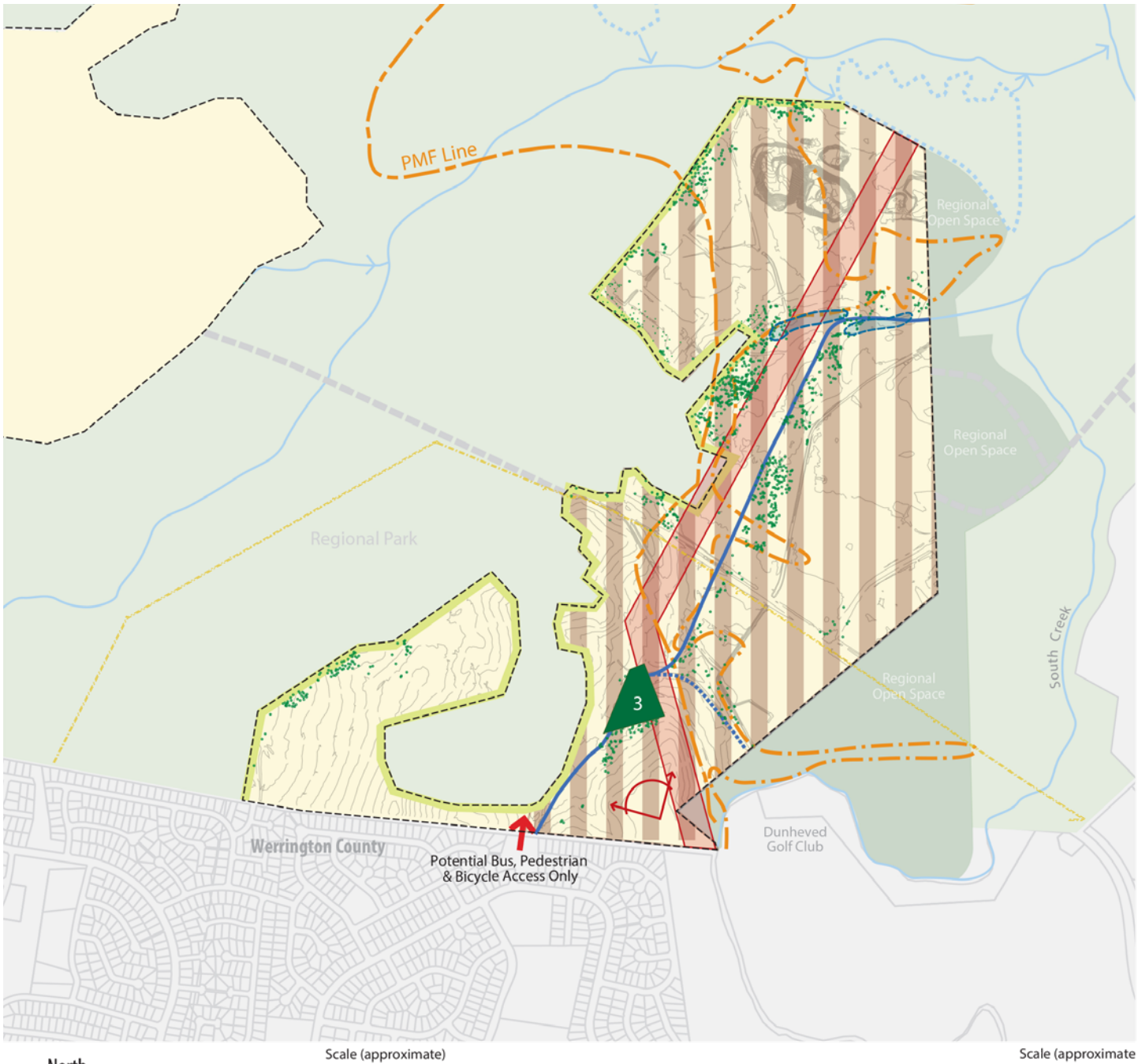
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2 Site Character

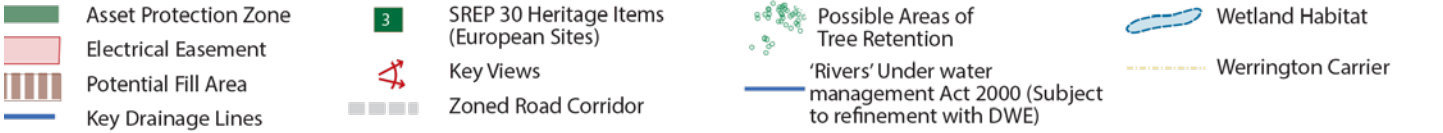
2.1 Response to site

Central Precinct is defined by its existing bushland character which has potential to be integrated into the proposed open spaces and urban development. After Aboriginal occupation the Precinct was used for agricultural purposes until the Defence Force occupied the site as a munitions manufacturing and storage facility. As a result of these land uses much of the Precinct was cleared and was almost completely devoid of vegetation. Refer 1940s Aerial Photo in Section 1.4. Defence land uses resulted in several landform changes and the replacement of natural water courses with concrete channels in some locations.



North
Scale (approximate)
Scale (approximate)
Revision 09/09/14

Constraint and Opportunities



Note: Plan taken from Lendlease Precinct Plan



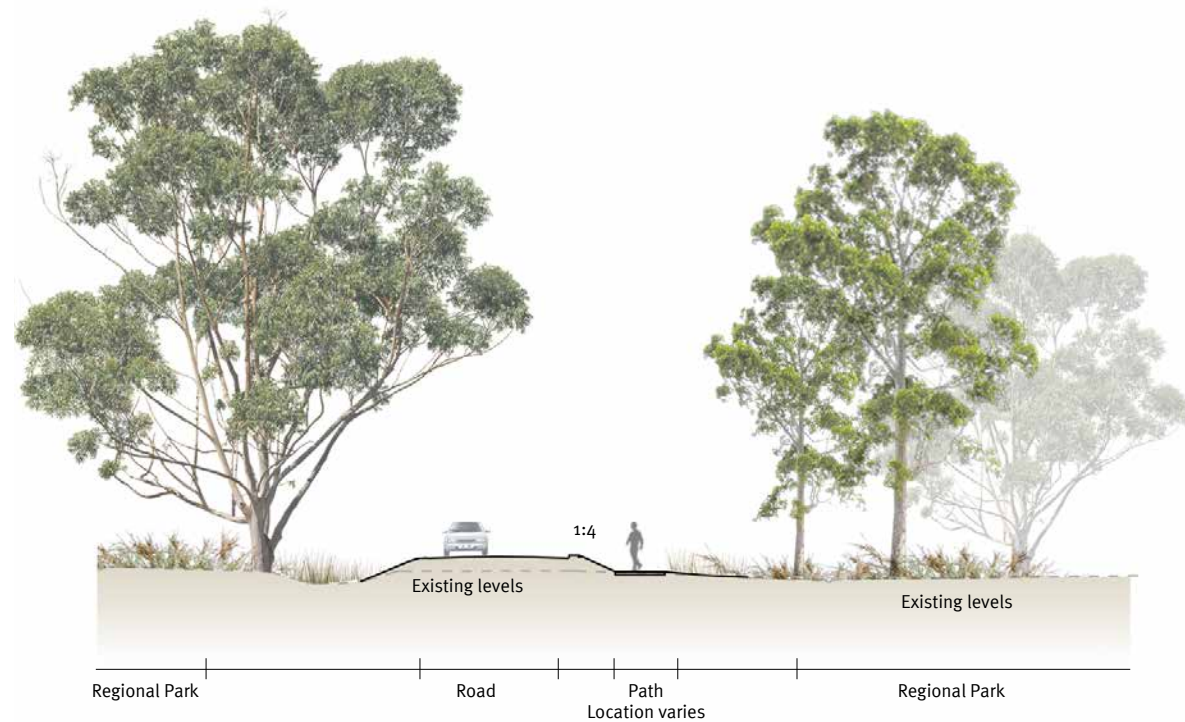
2.2 Arrival experience and view corridors

Central Precinct is primarily accessed from the west from Jordan Springs by a connector road with a possible secondary entry from the east from Ropes Crossing. There is also a transit way (bus only) access from Werrington County in the south.

Approaching Central Precinct from the west, there is a strong sequence of arrival formed by containment of the woodland, to the gateway of the bridge and then the elevated vistas. The woodland forms a dense natural edge providing a sense of enclosure and connection with the Wianamatta Regional Park. The elevated gateway of the bridge affords views of the Riparian Corridor, as well as significant vistas to the east to the Regional Open Space and beyond into the Wianamatta Regional Park.

Approaching Central Precinct from the east, the site character is more open with views of existing grasslands and South Creek. Once passing the South Creek Bridge there are Regional Open Space views to grassland dominated landscapes before reaching the Precinct.

Transit way (bus only) access is available from the suburb of Werrington County in the South through existing residential development for buses, cyclists and pedestrians. Pedestrians and cyclists arriving from Jordan Springs will traverse the Jordan Springs Connector Road via a share path along the southern verge, where the vehicle speed is 50km per hour. This will vary in location from adjacent to the carriageway to setback from the road adjacent to the Wianamatta Regional Park boundary providing a varied experience for users. A kerb and verge planting will be provided on the same side of the road as the share path as a safety barrier for pedestrians and cyclists.



Site Character

2.3 Character Zones

A series of character zones are defined in Central Precinct design layout responding to the attributes, constraints and opportunities of the site. These include the street hierarchy, proposed residential development, landform, Riparian Corridor, arrival / entry experiences, Park Corridor (Transmission Easement) and edge treatments to each zone. While these zones will have similar landscape treatments applied their character will be defined by their location on site.

2.4 Edge Treatments

A variety of open space edge conditions interface Central Precinct. The Wianamatta Regional Park and Regional Open Space edges provide a defined bushland aesthetic to the site edge. The predominate internal edges are defined by the Riparian Corridor, Transmission Corridor Park (Transmission Easement), employment zone and existing residential development.

Refer Wiannamatte Regional Park Plan of Management for relevant fence treatments along Wianamatta Regional Park boundaries.

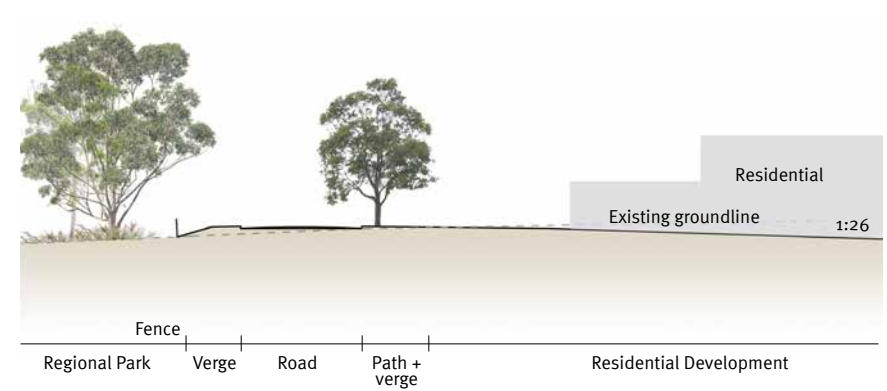


Edge Treatments



2.4.1 Wianamatta Regional Park edge (Section A)

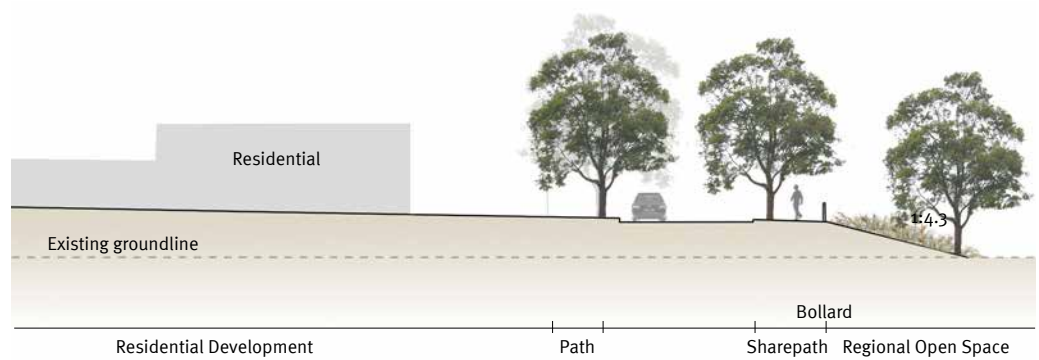
A variety of street typologies adjoin the Wianamatta Regional Park edge with wide landscape verges including Park Edge Road (Wianamatta Regional Park) and Local Road (Bus Route). Land use edges include employment, residential and local park uses. The landform with residential development is typically higher than the Wianamatta Regional Park as a result of the PMF levels for flooding. Vegetation should respond to the APZ with a native bushland character to integrate the Wianamatta Regional Park with the residential development. Selected vegetation should also consider potential urban runoff before entering the Wianamatta Regional Park with Water Sensitive Urban Design.



Section A - Regional Park edge
Scale 1:500

2.4.2 Regional Open Space edge (Section B)

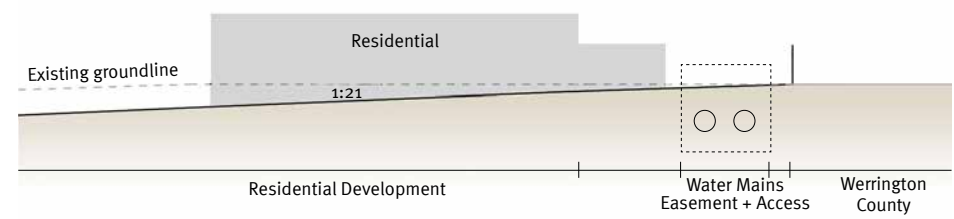
The Regional Open Space adjoins a variety of street typologies with 1.8m wide verges including Local Street (Share Path) and Local Street (Bus Route). A 2.5m wide share path or 1.8m wide pedestrian path is located along these street edges. Distinctive tree species is proposed to reinforce the interface between residential development and employment edges with the Regional Open Space. The change of level at the Regional Open Space edge, resulting from raising the Precinct above the 1 in 100 year flood level needs detailed resolution. There will be some locations where built form and pedestrian links adjoin the Regional Open Space to extend the landscape character into the residential development.



Section B - Regional Open Space edge
Scale 1:500

2.4.3 Existing Development edge (Section C)

Central Precinct is defined on the southern boundary by the existing residential suburb of Werrington County. This development edge is defined by a solid timber fence where residential development faces away from Werrington County in the south. There is minimal landform change between the existing and proposed development edge, for privacy between neighbouring residential lots.



Section C - Existing Development edge
Scale 1:500

2.4.4 Wianamatta Regional Park Fire Trail edge

The Bushfire Trail edge to the Wianamatta Regional Park is located where there is no direct road frontage. Vegetation should respond to the APZ requirements with a native bushland character to integrate the different areas. Refer to Bushfire in Section 1.10 on page 11.

2.4.5 Open Space edge

The Open Space edge adjoins several other open space typologies including Wianamatta Regional Park, Transmission Corridor Park, Riparian Corridor and Stormwater Management Devices. These open spaces are generally interfaced with street typologies. Even though there are various vegetation treatments between these typologies the overall character will be visually integrated with vegetation. Landform between these Open Space edges are various, the existing landform will be related where possible to bring the existing site character into the Precinct. At the Open Space edge retention of existing vegetation will be maximised for visual amenity of the site. Where Open Space adjoins residential allotments boundary elements (fences) are to be semi-transparent to increase natural surveillance. Refer Section 4.5 on CPTED Safety by Design.

2.4.6 Riparian Corridor edge

The Riparian Corridor adjoins several open space typologies and the future residential areas. The Corridor accommodates a vegetative buffer zone along the length of the channel. During detailed design, consideration will be given to varying the batter slopes and locations of the batters to create a more natural landscape character along the corridor. In order to maximise the natural landscape character, edge batter conditions will be varied. Refer Section 4.3.5 for details on treatment, edges and interface.

2.4.7 Stormwater Management Devices edge

Stormwater Management Device edges are typically integrated into Local Parks and the Transmission Corridor Park (Transmission Easement) to enable green links and connections. These edges should typically have battered slopes and vegetative buffer edges. Refer Riparian Corridor Sections in Section 4.3.5

2.4.8 Employment Zone edge

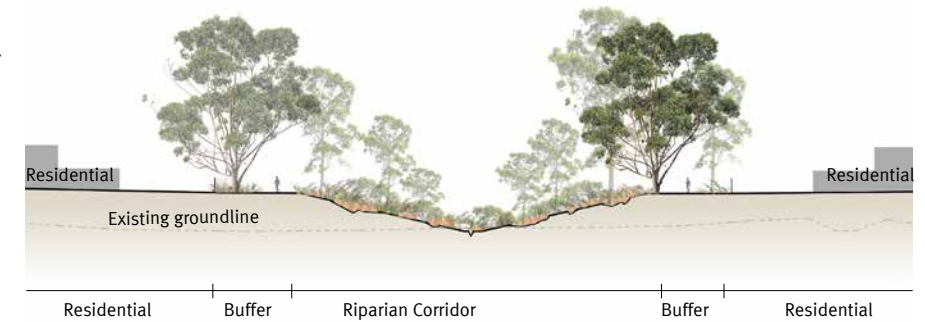
The Employment Zone edge adjoins several open space typologies including Local Parks, Transmission Corridor Park (Transmission Easement), Stormwater Management Devices and residential development. A variety of road typologies adjoin the Employment Zone with 1.8m wide landscape verges including Local Street and Local Street (Share Path). The vegetation character will integrate with the street and open space hierarchy.

2.4.9 Transmission Easement Edge

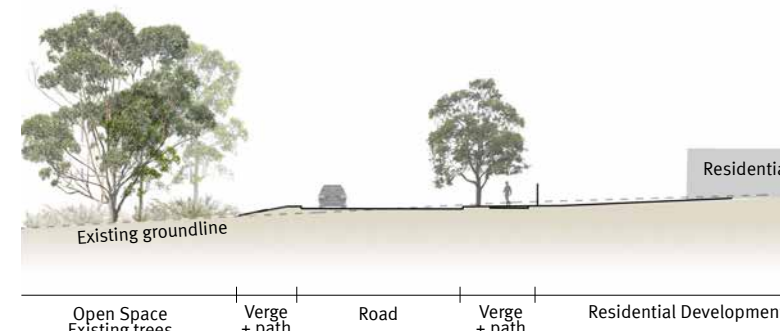
The Transmission Easement edge adjoins several other open space typologies including Wianamatta Regional Park, Local Parks, Riparian Corridor and Stormwater Management Devices. The easement occupies a 70m wide corridor running north west through the entire site and therefore interfaces with many different character zones. The edges are characterised by a change in treatment due to height (4m maximum) and material restrictions within the easement. A gradual transition from other character zones into the easement will be achieved with appropriate selection of planting.

2.4.10 Riparian Corridor/Transmission Easement Interface

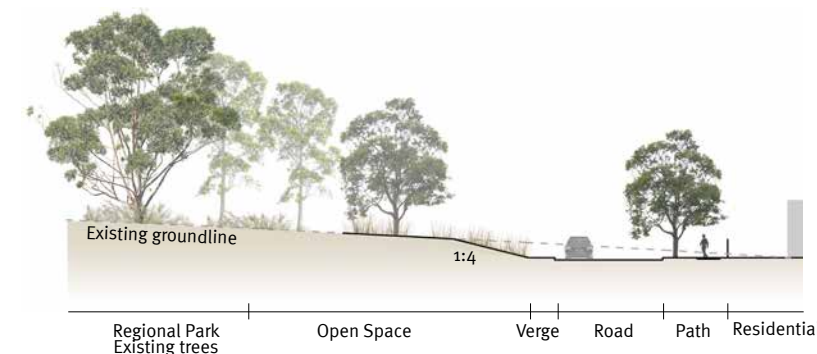
These two character zones are subject to contrasting condition requirements. Vegetation heights will be minimised as the Riparian corridor approaches the Transmission easement to create visual continuity between them. It is important that the character of the Riparian Corridor is not distinctively affected by the dissection of the Transmission Easement.



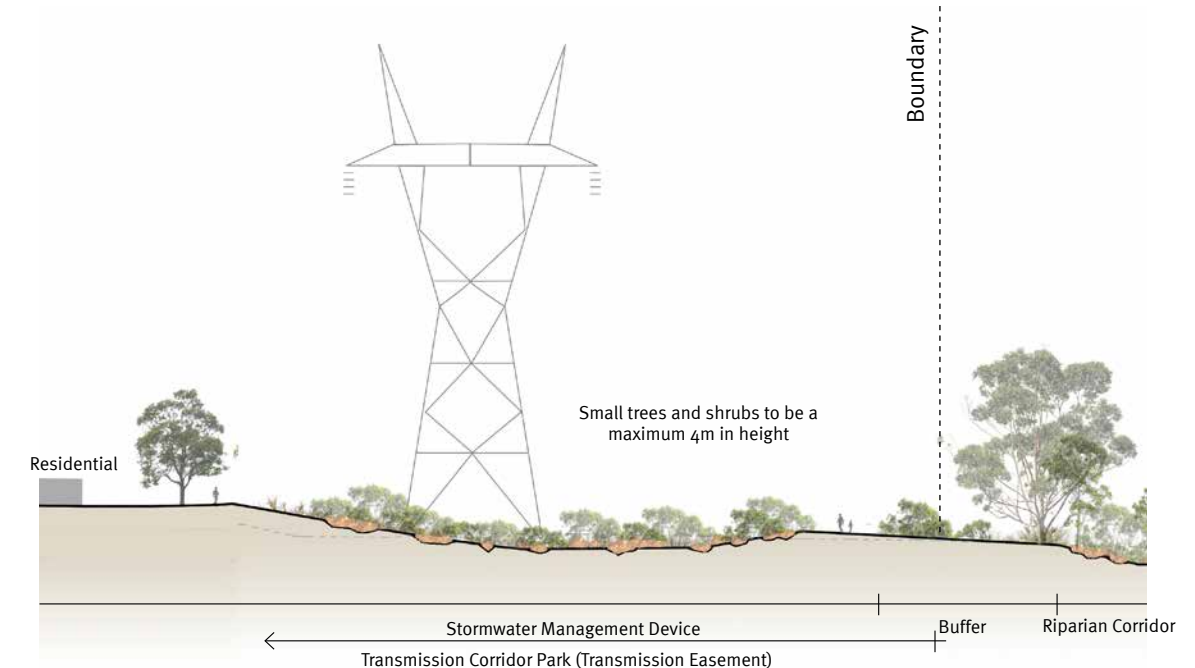
Section F - Riparian Corridor edge
Scale 1:500



Section D - Open Space (Local Park) edge
Scale 1:500



Section E - Open Space (Regional Park Interface) edge
Scale 1:500



Section G - Transmission Easement Edge and Riparian Corridor Interface
Scale 1:500

3 Access, Circulation and Green Links

3.1 General

Central Precinct will provide connections to the greater context of the St Marys Development Site with connector roads to the nearby communities of Jordan Springs and Ropes Crossing accommodating pedestrian and cyclist accessibility. The Precinct will provide an accessible and integrated pedestrian and cyclist network for safe and convenient access to facilities, open spaces and local destinations.

The street hierarchy provides a network of direct, safe and convenient pedestrian, cycle and public transport circulation and is supported by the Landscape Master Plan. The street hierarchy through the development will be reinforced by the street tree hierarchy to create a legible path of travel.

3.2 Access

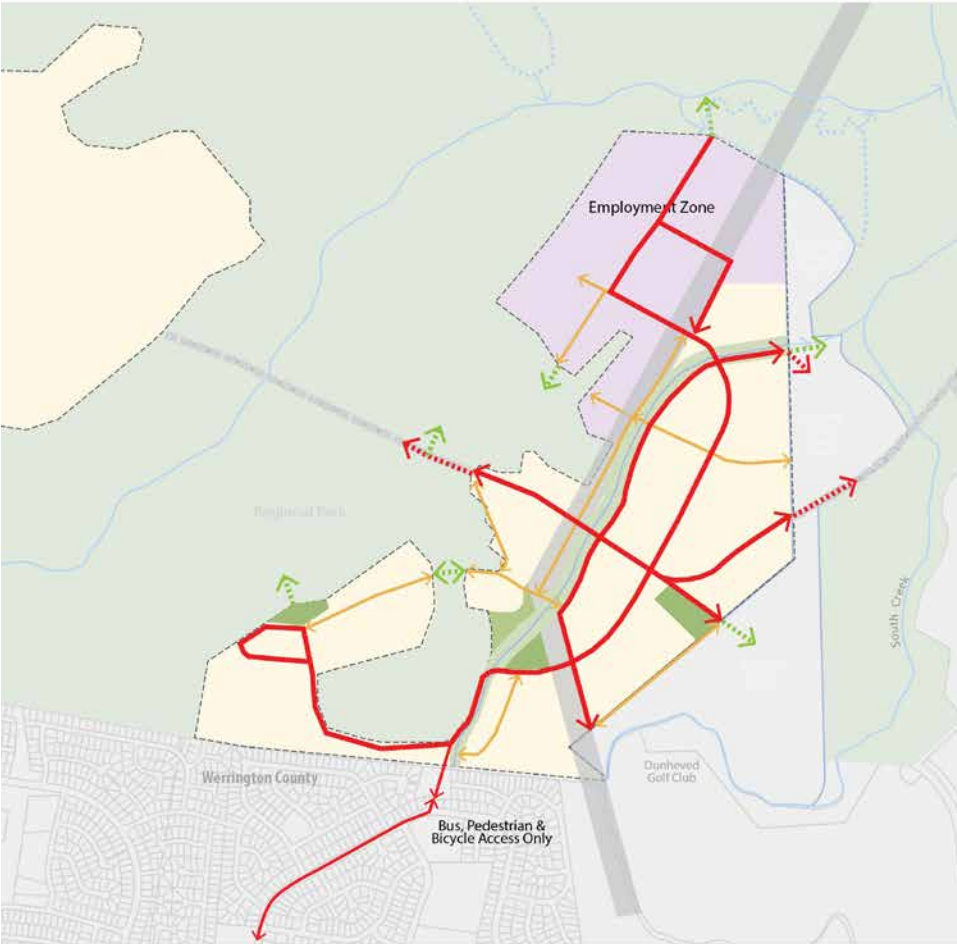
Central Precinct consists of an integrated circulation network providing connection throughout the site to the Village Centre, neighbourhoods, open spaces and the Wianamatta Regional Park . The network will maximise security and safety following standard widths, sight line and signage requirements. Access is provided through vehicular, cycleway and pedestrian networks.

3.2.1 Vehicular

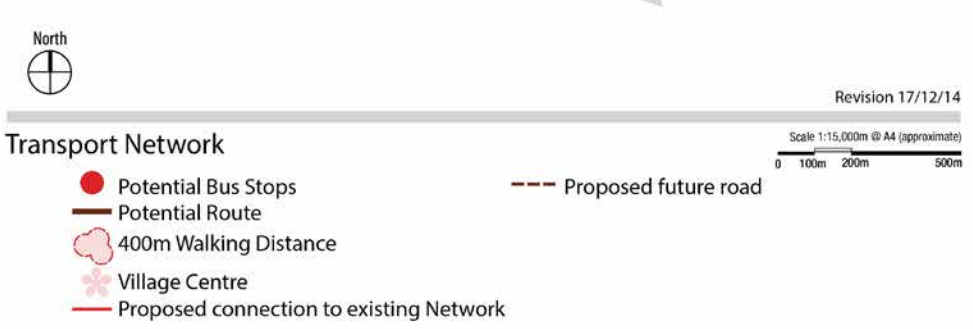
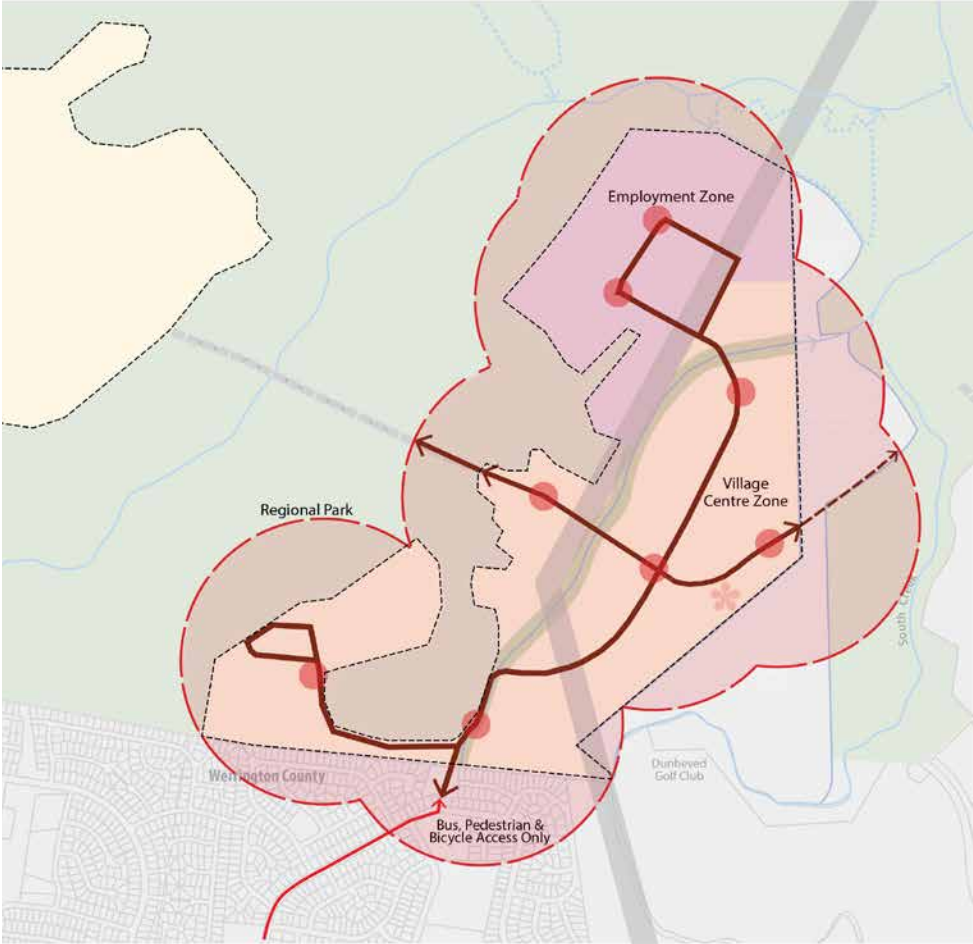
Central Precinct is primarily accessed from the adjacent suburbs of Jordan Springs in the west and Ropes Crossing from the east. The Precinct will be serviced by bus public transport with a minimum of 400m walking distance to any bus stop. A bus only transit way into the Precinct will be provided from Werrington County in the south.

3.2.2 Share Paths (Pedestrian / Cycle)

Central Precinct is to provide a network of 2.5m wide share paths for both cyclists and pedestrians throughout the site. These will be integrated with off-road share paths through open space areas and will maximise safety by reducing road crossings where possible. Share path access will connect with Werrington County to the south. There is potential to extend sharepaths into the Wianamatta Regional Park and Regional Open Space to further increase connectivity to the wider context and enhance greenlinks. No line marking will be provided on share paths.



Note: Plans taken from Lendlease Precinct Plan



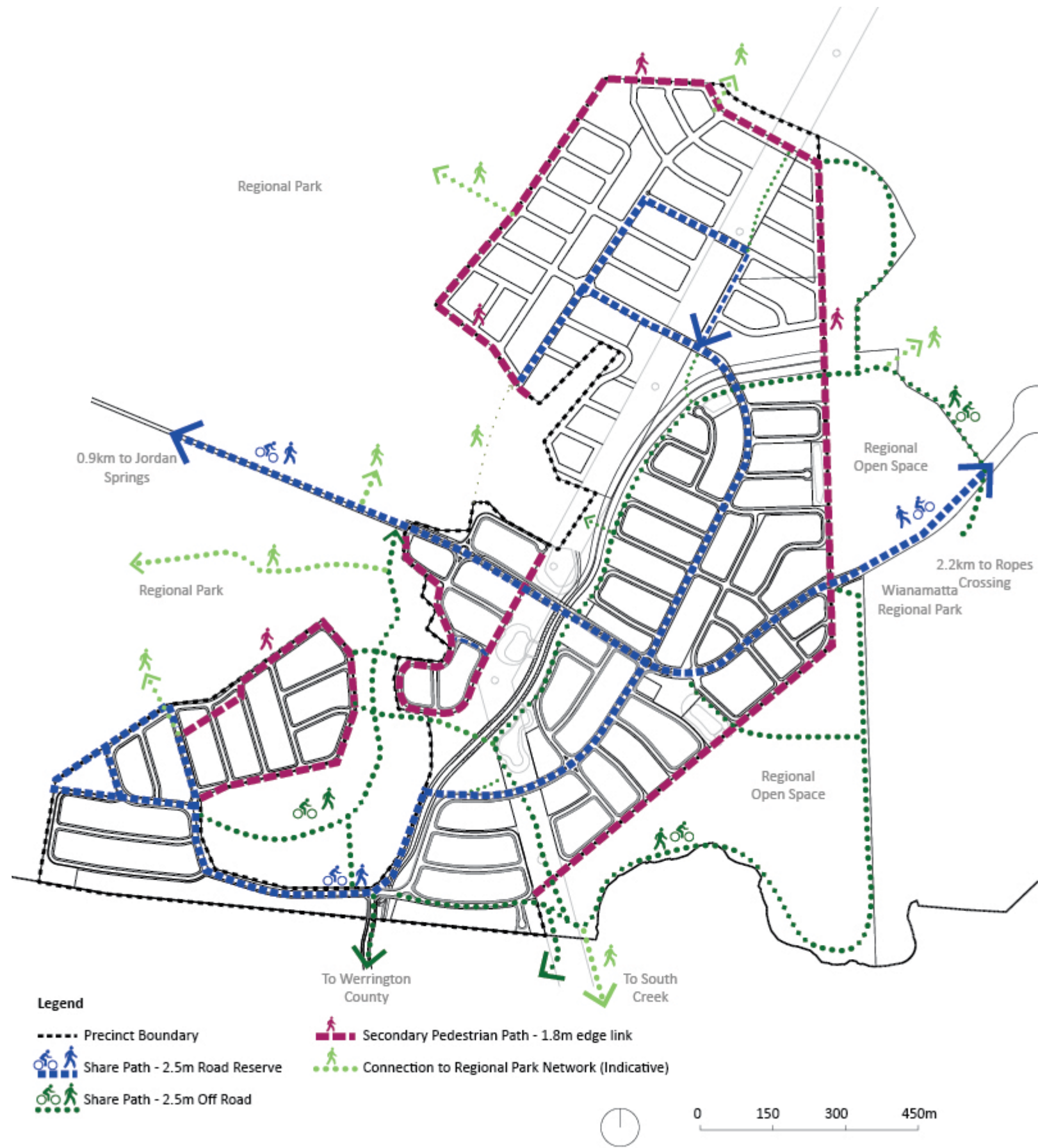
3.2.3 Pedestrian Links

A range of pedestrian facilities will be provided in Central Precinct via a series of 2.5m wide share paths, 1.8m wide secondary pedestrian paths and 1.5m wide footpaths. The pedestrian paths network will maximise universal access throughout the Precinct and are to be integrated with the open space areas for off road access through the Transmission Corridor Park (Transmission Easement) and the Riparian Corridor. Pedestrian links will also be provided from Werrington County.

Share paths for both cyclists and pedestrians will be provided in the road reserve and off road through open space areas.

Secondary pedestrian edge links provide a 1.8m wide path predominantly for pedestrian use. This connection is more generous than the standard 1.5m wide paths for greater volumes of pedestrian movement reinforcing its role in the recreation network. This secondary pedestrian edge link will direct pedestrian access to recreation and open space facilities.

Additional connections to the Wianamatta Regional Park and Regional Open Space will be provided. These connections will be via an informal path suitable to the Wianamatta Regional Park character and have potential to connect to existing paths in the Wianamatta Regional Park . (Refer to section 4.3.7)



Pedestrian and Cyclist Access



3.3 Green Links

The variety of open spaces within Central Precinct will form an overall network of interconnected green spaces. These green spaces are enhanced by:

- Minimising the visual impact of the Transmission Corridor Park (Transmission Easement) by integrating a range of adjacent open spaces including the Riparian Corridor;
- Integrating the Wianamatta Regional Park with a range of open space typologies to continue the bushland character into the Precinct;
- Connecting the Riparian Corridor with Stormwater Management Devices by linking the corridor with the broader landscape and the Wianamatta Regional Park and Regional Open Space;
- Regenerating indigenous vegetation from the site along the riparian corridor and adjacent landscape to improve environmental connectivity;
- Develop a specific park edge street along selected areas of the Wianamatta Regional Park and Regional Open Space boundary;
- Integrating residential development by incorporating Wianamatta Regional Park and Regional Open Space plant species and character into the new landscape vegetation types
- Connect Werrington County with Central Precinct by bringing community together and opening up access from the south; and
- Integrating Fire Trails with the Wianamatta Regional Park and Local Park vegetation character.
- Provide recreational opportunities within the Regional Open Space and connectivity into and throughout this space.



Green Links

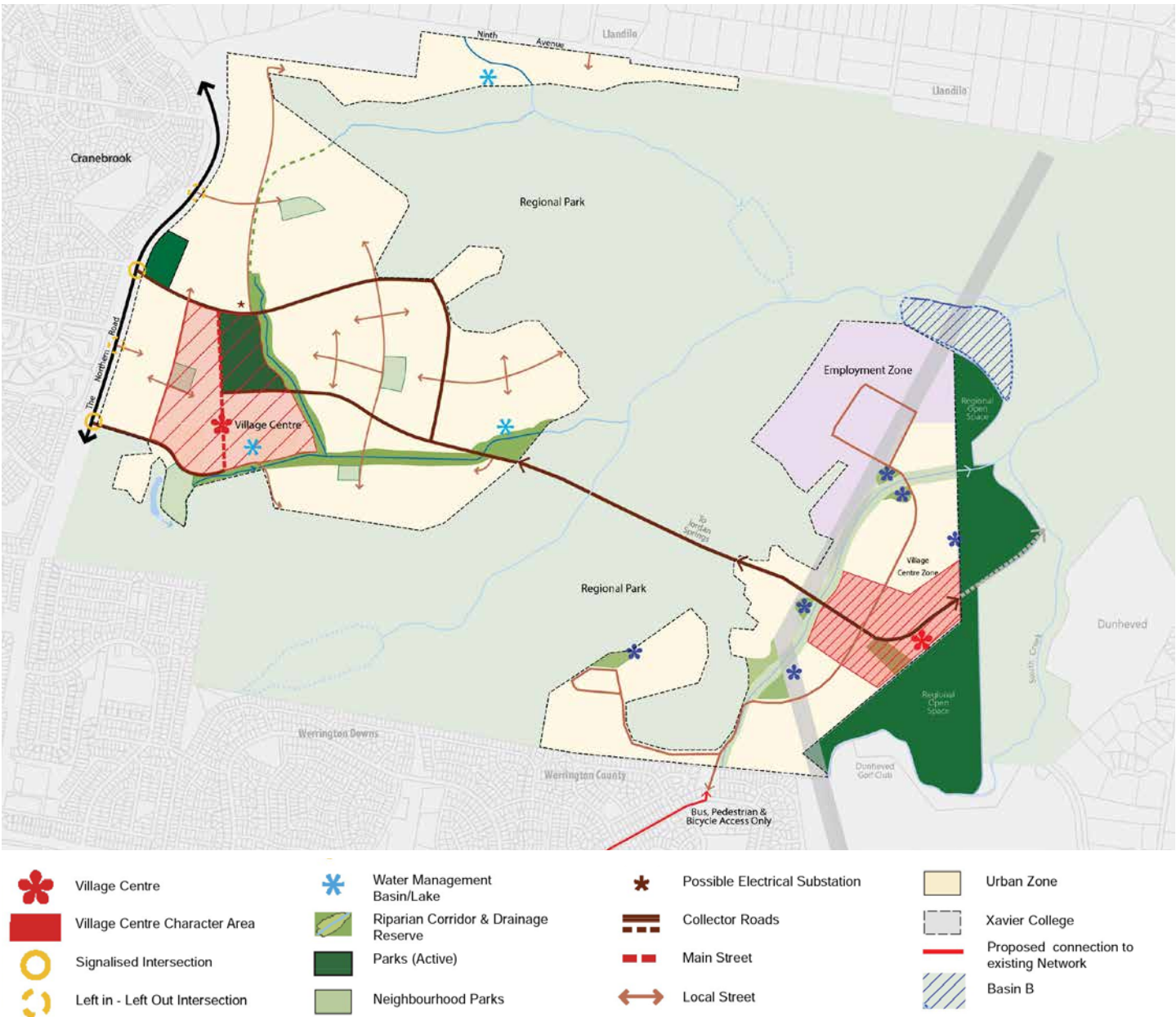
4 Open Space Master Plan and Recreation

4.1 Open Space Master Plan

The Open Space Master Plan is to provide a framework for the ongoing planning and design of the open space network. The network will cater for recreational use whilst also shaping and enhancing the character of the urban environment.

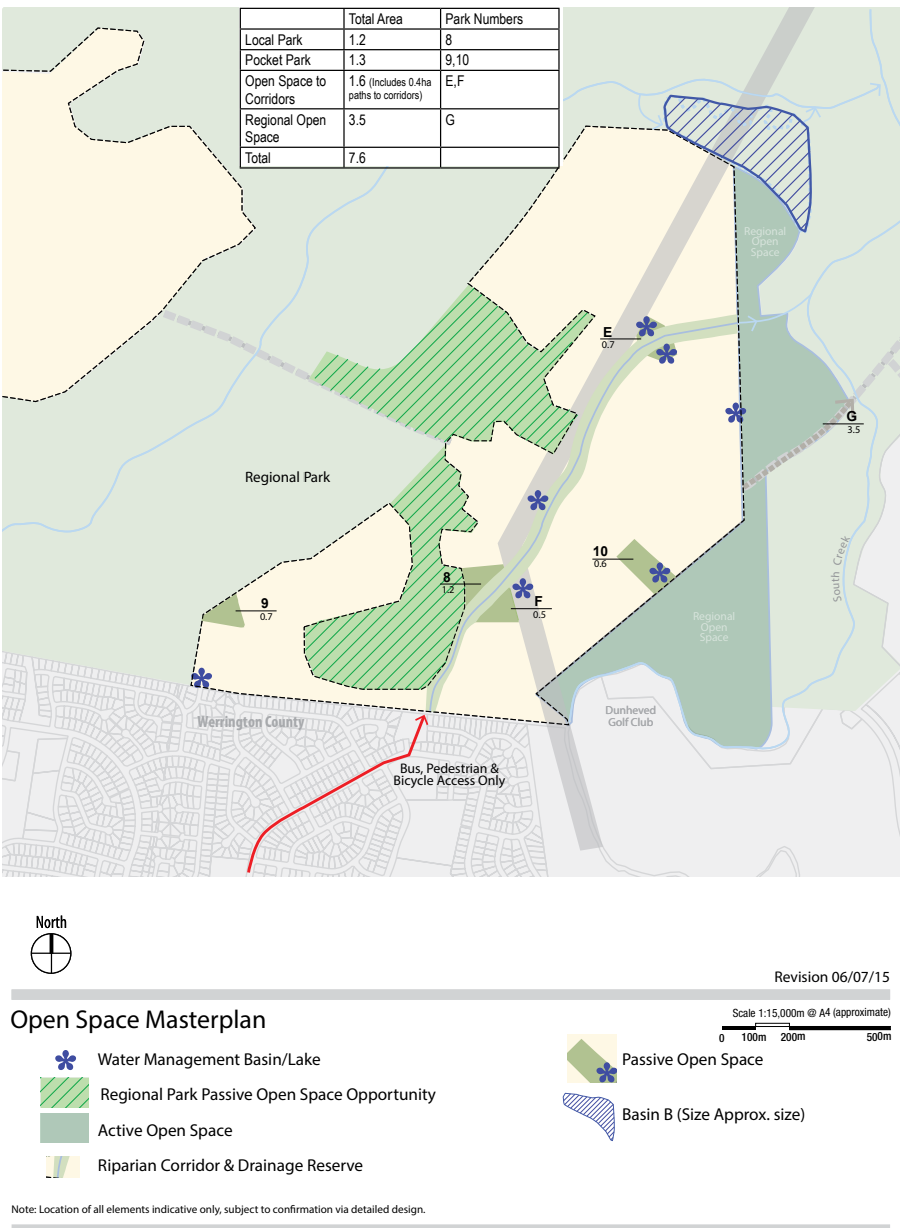
Objectives of the Open Space Master Plan according to the St Marys Central Precinct Open Space and Landscape Master Plan 2008 (Environmental Partnership) include:

- Recognition of natural values: including retention of canopy and understorey vegetation, impact on the adjacent Wianamatta Regional Park and optimising open space performance for other benefits relating to water, soils, salinity etc.
- Recognition of heritage and cultural values: including conserving heritage elements, interpretation and contribution to the identity of Central Precinct;
- Pedestrian and cycle connectivity: connecting to the broader regional network and accessible to all (within 400m);
- Multi use facilities: providing a range of facilities for a wide range of users;
- Responsiveness to community needs: including families, health and wellbeing. Considering new open space trends, community gathering and events, providing adaptable space and safe and secure open space areas.



Precinct Plan: Framework Plan for Western and Central Precincts

Note: Plans taken from Lendlease Precinct Plan



Open Space Masterplan



4.2 Open Space Hierarchy

Central Precinct will accommodate a range of public open spaces which are flexible and responsive to the diversity of the surrounding community. The range of open spaces will provide a seamless transition between open space areas throughout including Stormwater Management Devices, Wianamatta Regional Park , Regional Open Space and the Riparian Corridor.

The Planning Agreement for Central Precinct states that 7.6 hectares of open space including 3.5 hectares of Regional Active Open Space will be provided. This generally allows a minimum walking distance of 5 minutes to an open space area for the Central Precinct community.

Central Precinct is to provide a variety of open space typologies for passive recreation, active recreation and facilities for the community. The open space network is designed to be connected with pedestrian and cyclist networks. The Open Space hierarchy include:

- Wianamatta Regional Park
- Regional Open Space
- Transmission Corridor Park (Transmission Easement)
- Local Park (Edge and Central Pocket Parks)
- Riparian Corridor
- Stormwater Management Devices

The open space areas are to reinforce the cultural and environmental values where possible in Central Precinct. Each of these Open Spaces provides specific facilities to the community as outlined in the following sections and summarised in the table below.



Open Space Typologies

Facilities*	Open Space Hierarchy					
	Regional Park	Regional Open Space^	Local Parks (Edge and Central Pocket Parks)	Transmission Corridor Park (Transmission Easement)	Riparian Corridor	Stormwater Management Devices
Sports Oval		✓				
Sports Courts		✓				
Amenities Building		✓				
Car Parking		✓				
Shelters		✓	✓			
Picnic facilities		✓	✓	✓		
Electric BBQ + other		✓				
Play space for all ages		✓	✓+	✓		
Fitness equipment		✓	✓			
Kickabout area	✓	✓	✓			
Fenced off leash dog area		✓	✓			
Viewing area	✓		✓			
Seating	✓	✓	✓		✓	
Local path connections	✓	✓	✓	✓	✓	✓
Share path connections		✓	✓	✓	✓	✓
Connections to circuit walk	✓	✓	✓	✓	✓	✓
Heritage interpretation			✓			
Signage	✓		✓			
Public Art		✓	✓	✓		

* Indicative Open Space facilities for Central Precinct
+ Facilities will not to be provided in every Local Park
^ The Regional Active Open Space outlined in the Planning Agreement has been co-located into the Regional Open Space



4.3 Open Space Typologies

This section explains each of the open space typologies for passive and active recreational, and environmental uses at Central Precinct.

4.3.1 Wianamatta Regional Park

(Northern and Southern Central Visitor Precinct)

The 900 hectare Wianamatta Regional Park is to be a local and regional destination for nature based recreational activities. The Wianamatta Regional Park will reinforce the bushland character and recreational amenity of Central Precinct. The Wianamatta Regional Park will also provide a strong landscape setting and sense of identity for the Precinct. The Park will link with ecological communities within Central Precinct. Potential opportunities for the Wianamatta Regional Park include:

- Integrated through treatment of the vegetated edge treatment of the battered slopes between the existing Wianamatta Regional Park and the proposed Central Precinct;
- Interpretation of cultural and ecological elements within the Wianamatta Regional Park including the munitions bund and vegetation and environmental facilities;
- Way finding and interpretative signage for Wianamatta Regional Park connections; and
- Seating and respite areas with potential viewing areas.

Under the current planning agreement, Lendlease will work with the National Parks and Wildlife Services to implement these elements in accordance to the Plan of Management. It should be noted that Lendlease will not own the land and will only be required to contribute to a portion of the Wianamatta Regional Park embellishment.

Precedent sites may include:

- Nature Trail Connections (National Parks and Wildlife Services);
- Rouse Hill Regional Park;
- Western Sydney Parklands; and
- Mt Annan Botanic Gardens.



Key plan of publicly accessible Wianamatta Regional Park Visitor Precincts



Regional Park signage



Regional Park signage
Image credit: Anne Gordon Design



Mt Annan Botanic Garden



Castlecrag Amphitheatre
Image Credit: Willoughby Council



Rouse Hill Regional Park
Image credit: National Parks



Western Sydney Parklands
Image credit: Western Sydney Parklands



4.3.2 Regional Open Space

The Regional Open Space is a destination for the community to come together for active and passive uses for a variety of age groups, families and cultures. Playing fields and amenities are to be suitable for a range of sports and local team activities. The Regional Open Space should provide amenities for both day and night time use. Network connections throughout the Regional Open Space are to be integrated into the context of Central Precinct and the surrounding Wianamatta Regional Park .

The obligations for the delivery of potential facilities for the Regional Open Space are shared with multiple stakeholders and are subject to existing planning agreements. The process of engagement involves key authorities and stakeholders including the community in the delivery of the final outcomes for the Regional Open Space at Central Precinct.

Regional Open Space may feature the following facilities:

- playing field with irrigation and night lighting;
- multifunctional hard court;
- amenities block with associated services;
- play space;
- picnic facilities;
- landscaping; and
- car parking.

Precedent sites for Regional Open Space may include:

- Sydney Park St Peters;
- Redfern Park, Minto;
- Rushcutters Bay Park, Sydney;
- Blaxland Common, Sydney Olympic Park;
- Redfern Park, Sydney;
- Victoria Park, Darlington;
- Gregory Hills;
- The Ponds; and
- Wayne Gardener Reserve, Oran Park
- Western Sydney Parklands.



Key plan of Regional Open Space



Viewing Space, Blaxland Common Treehouse



Sports Courts Victoria Park, Darlington



Kickaround Space Sydney Park, St Peters



Sports Fields



Multifunctional hard courts and skate facilities, Lernvig



Skating Facilities Redfern Park, Sydney



Bike Trails Western Sydney Parklands
Photo credit: Fleetwood Urban



Playspace Sydney Park, St Peters



4.3.3 Transmission Corridor Park (Transmission Easement)

There is an existing Transmission Easement which bisects Central Precinct from the north to the south requiring a 70 meter wide easement. A variety of open space typologies intersect the Transmission Corridor Park including Local Parks, Riparian Corridor and the Stormwater Management Devices. This enables generous integration of continuous green links throughout the Precinct with vegetation, tree canopies and the visual identity of open space. The Transmission Corridor Park will avoid silhouetting the Transmission Easement structures to reduce their presence in the landscape. The Transmission Corridor Park also provides opportunity for public art in accordance with the TransGrid Easement Guidelines for Third Party Development (Refer Appendix 05) and will support the share path network.

A specific vegetation character is required for the Transmission Corridor Park to accommodate the Transmission Easement as well as the APZ requirements. This Transmission Corridor Park also provides the opportunity for retaining the existing grassland character on site.

The Transmission Corridor Park is divided into two zones (northern and southern) and may allow for facilities including:

- fitness stations;
- landscaping; and
- internal / street path linkages and connections to cycle / pedestrian links.

Precedent sites for the Transmission Corridor Park may include:

- Mt Annan;
- Sydney Park, St Peters;
- Redfern Park, Minto;
- Wentworth Common, Sydney Olympic Park;
- Bungarribee, Western Sydney Parklands; and
- Oran Park Town.



Key plan of Transmission Corridor Park (Transmission Easement)



Sydney Park, St Peters
Image credit: Furnass Landscaping



Shared Path
Mt Annan



Western Sydney Parklands
Image credit: Western Sydney Parklands



Mt Annan



Wentworth Common, Sydney Olympic Park
Image credit: Sydney Olympic Park

4.3.4 Local Park (Edge and Central Pocket Parks)

A number of Local Parks provide recreational amenities to support the local community of Central Precinct with a variety of local facilities. The landscape treatment will relate to adjoining open space areas to enhance the green links and connections for the community.

Local Parks will be developed to support the staged precinct development and will maximise the opportunity to retain existing site levels and trees to provide immediate visual amenity. Local Parks may include the following facilities:

- interpretive signage;
- play space;
- picnic facilities;
- landscaping;
- internal / street path linkages and connections to cycle / pedestrian links; and
- possible water play elements.

A series of Local Parks will be provided according to their location, requirements and user groups. These 3 typologies include Cultural Heritage Local Park , Edge Pocket Park and Central Pocket Park.



Key plan of Local Parks (Edge and Central Pocket Parks)



Picnic facilities
Jordan Springs, Sydney
Photo credit: JK Williams Projects



Walking connections
Redfern Park, Minto



Shelters
The Ponds, Sydney



Fitness Circuits
Gregory Hills



Illoura Village Park
Jordan Springs, Sydney
Photo credit: Penrith City Council



Walking circuits
Jordan Springs, Sydney
Photo credit: JK Williams Projects



Water Gum Community Park,
Jordan Springs, Sydney
Photo credit: Penrith City Council



Cultural Heritage Local Park

The Cultural Heritage Local Park incorporates the historic brick clamp kilns site as identified as Site 3 in the SREP No.30. This Local Park provides the opportunity for interpreting the brick clamp kiln remains and its curtilage. This is subject to further investigation and detailed design.

Precedent sites for Cultural Heritage Local Park may include:

- Rouse Hill Regional Park;
- Sydney Park, St Peters; and
- Railway Park, Auburn.



Key plan of Cultural Heritage Local Park



Rouse Hill Regional Park



Sydney Park, St Peters



Railway Park, Auburn
Image credit: MW Architects

Edge Pocket Park (Ecological)

The Edge Pocket Park is located adjacent to the Wianamatta Regional Park with opportunity to retain existing landform and vegetation for visual amenity and character for nature themed adventure play. This park provides opportunity for ecological interpretation with flora and fauna of the Cumberland Plain Woodland.

Precedent sites for Ecological Local Park may include:

- Wentworth Common, Sydney Olympic Park;
- Nurranginy Reserve, Doonside; and
- Lizard Log, Western Sydney Parklands.



Key plan of Edge Pocket Park
(Ecological Theme)



Nature Play
Wentworth Common, Sydney Olympic Park



Nature Play. Nurranginy Reserve, Western
Sydney Regional Park
Image credit: Western Sydney Parklands



Nature Play
Lizard Log, Western Sydney Regional Park
Image credit: Western Sydney Parklands

Central Pocket Park

The Urban Local Park is located near the Village Centre of Central Precinct and is to consist of a civic urban space for the community. An urban play space is proposed for this typology, which is to be integrated with a community gathering space for local activities and events.

Precedent sites for Urban Local Parks may include:

- Eddie Ward Reserve, Surry Hills;
- Doherty Reserve, Glebe; and
- Glenmore Ridge.



Key plan of Central Pocket Park
(Urban focus)



Eddie Ward Reserve
Surry Hills



Doherty Reserve
Sydney



Glenmore Ridge

4.3.5 Riparian Corridor

The Riparian Corridor bisects Central Precinct from north to south and interfaces with several open space typologies including Local Parks, Transmission Corridor Park (Transmission Easement) and Stormwater Management Devices. A series of connections will be established to maximise biodiversity benefits. This Riparian Corridor is to be mostly reconstructed and consolidate existing poorly defined channels. The Riparian Corridor is defined by the amount of fill required for Central Precinct, as well as the consideration of retaining existing landform and vegetation to existing drainage lines. Detailed configuration is subject to further design and investigation.

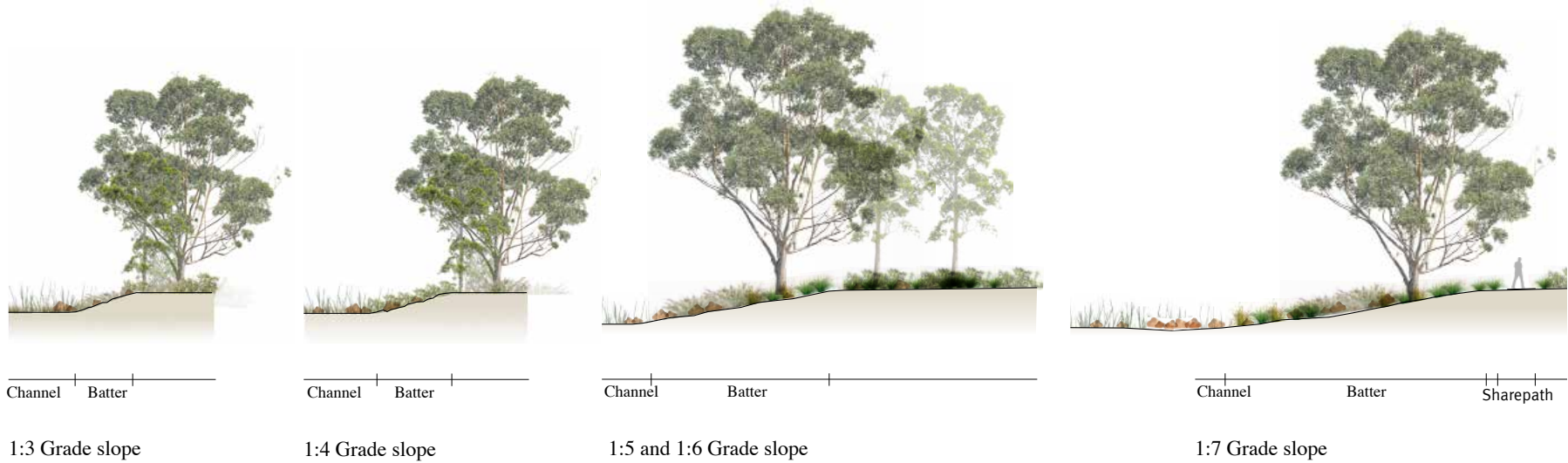
The objectives for the Riparian Corridor at Central Precinct are to:

- maximise retention of existing vegetation in the Riparian Corridor subject to levels, civil works and drainage requirements;
- establish a core riparian zone;
- establish aquatic habitat zones;
- improve and create environmental linkages through Central Precinct between South Creek and the Wianamatta Regional Park ;
- provide creek crossings in line with Office of Water (Department of Primary Industries) guidelines; and
- Provision of amenity through activated edges and nodal areas in key locations along length of corridor.

The Corridor consists of rills and bends in the core riparian zone as well as varying batter grades and profile to recreate a natural riparian character (Refer to Typical Riparian Corridor Slopes).



Key plan of Riparian Corridor



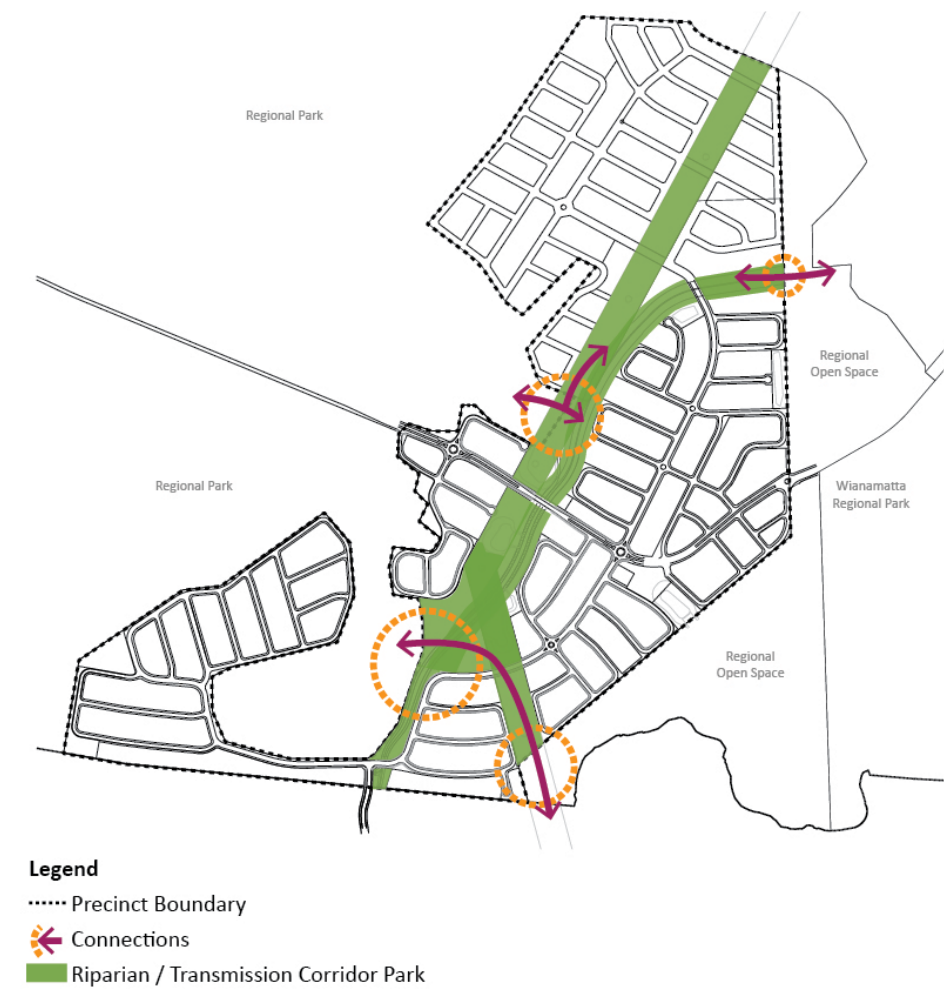
Typical Riparian Corridor Slopes
Scale 1:500



The Riparian Corridor will enhance the overall landscape character at Central Precinct as being a major landscape component of the site with direct links to the Wianamatta Regional Park . The Corridor will also include a vegetated buffer to either side of the channel for protecting both the core riparian zone, and the integrity of the corridor while enhancing the flora and fauna habitat. The corridor will provide amenity, environmental habitat, enhance the experience of the site and help define the visual character of the Precinct.

Precedent sites for the Riparian Corridor may include:

- Kolombo Reserve and Wayne Gardener Reserve, Oran Park;
- Mt Annan;
- Greenhills Landscape Rehabilitation, Kurnell; and
- Alamanda Point Cook, Victoria.



Biodiversity connections



Greenhills Landscape Rehabilitation, Kurnell



Mt Annan



Kolombo Reserve, Oran Park Town

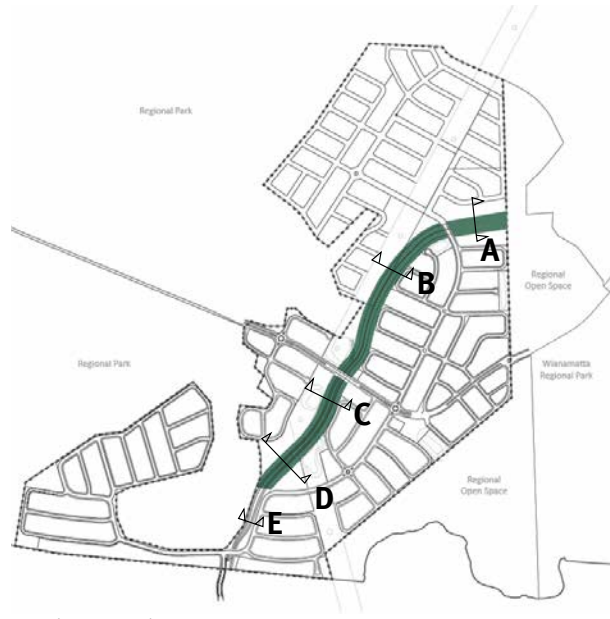


Alamanda Point Cook, Victoria

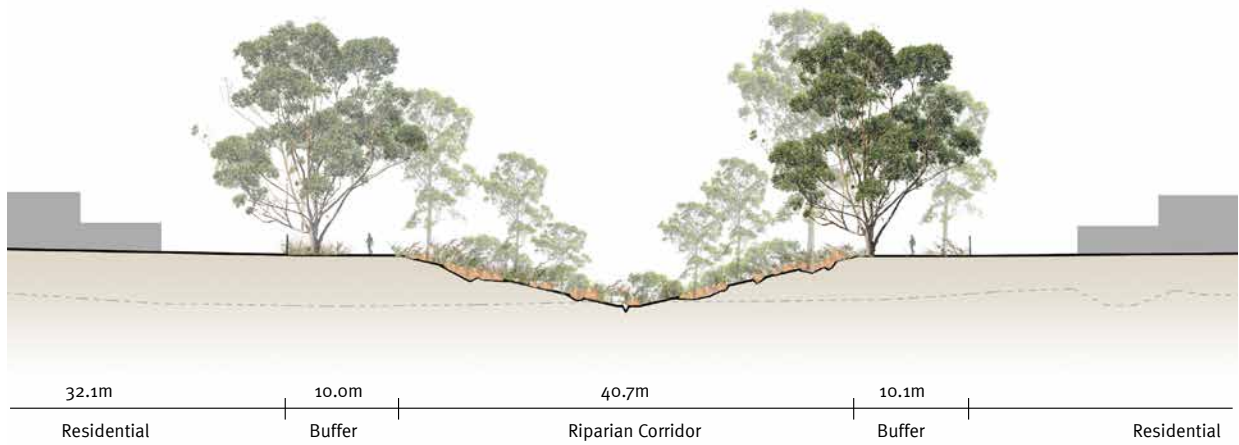


Alamanda Point Cook, Victoria

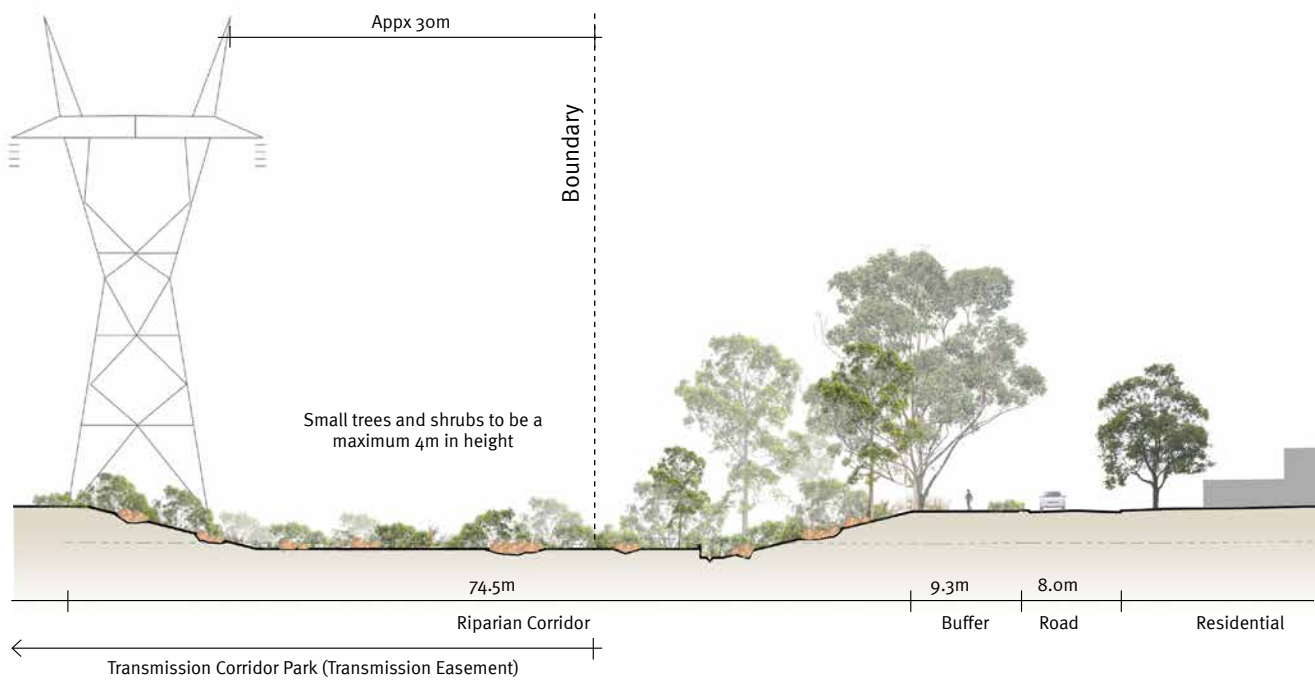




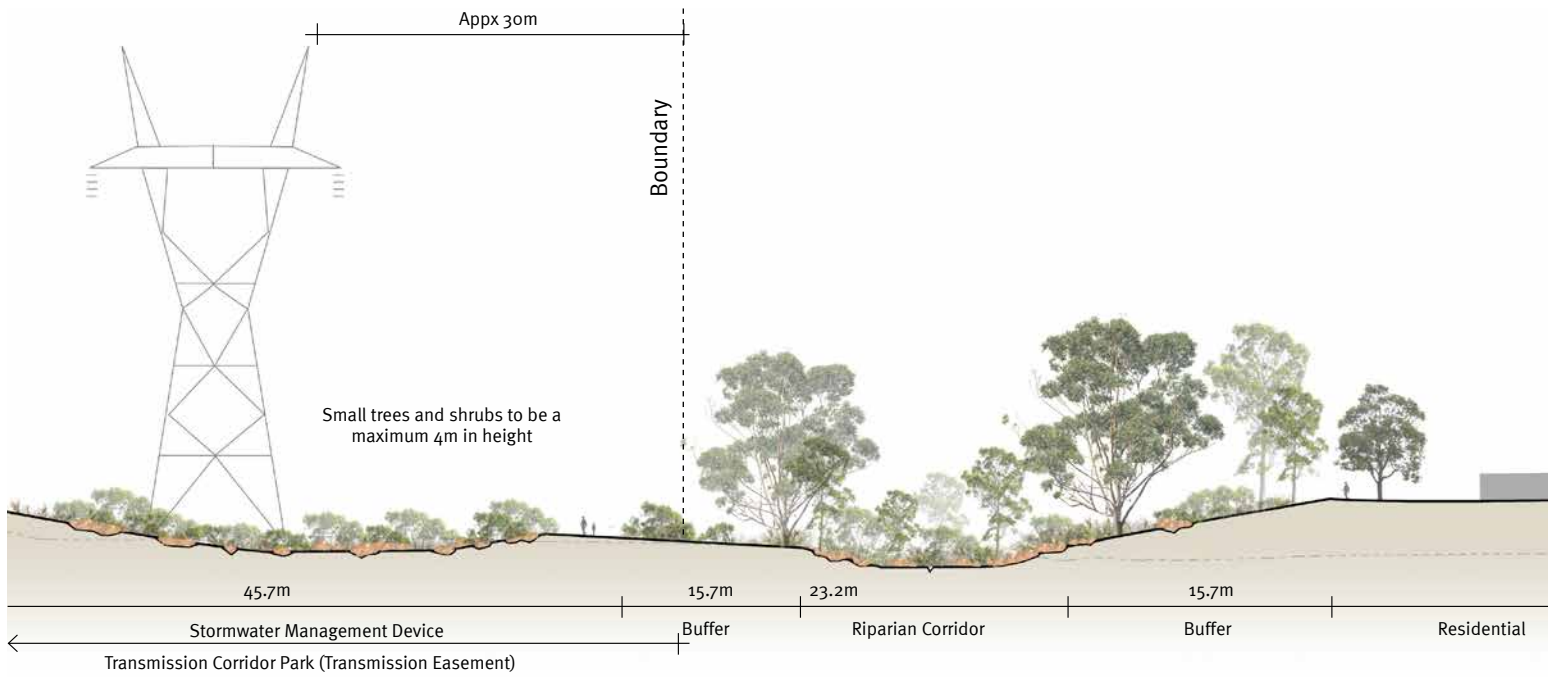
Section Locations
NTS



Section A
Scale 1:750



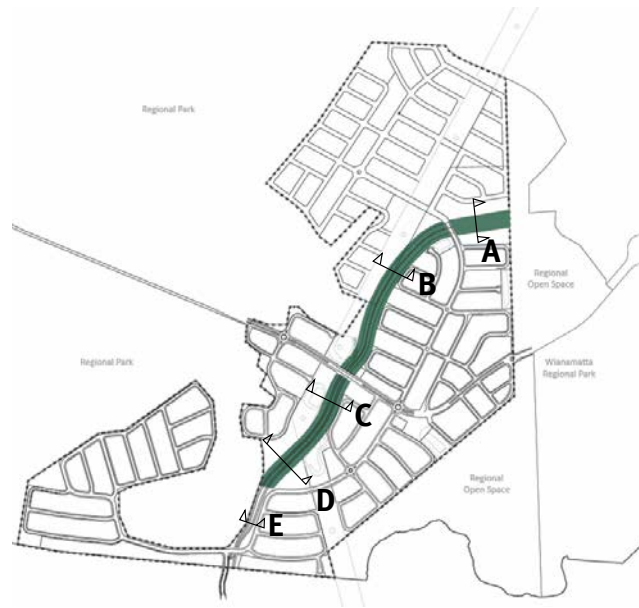
Section B
Scale 1:750



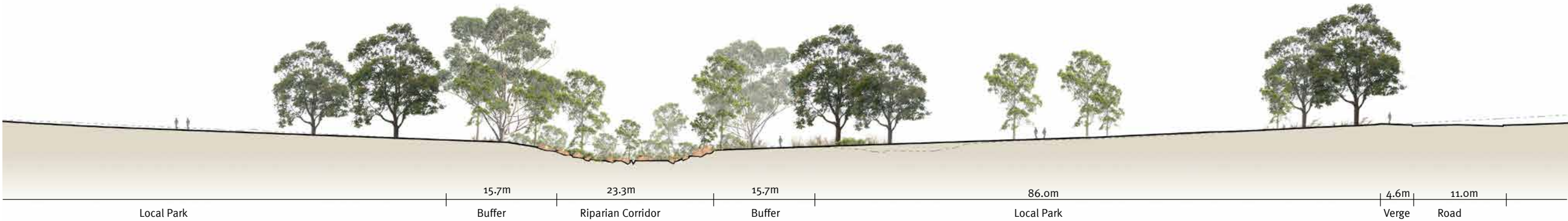
Section C
Scale 1:750

Note: Batter and channel profile is indicative only - final profile will be subject to detailed landscape design to achieve a more naturalised profile and to achieve environmental, visual and public amenity.

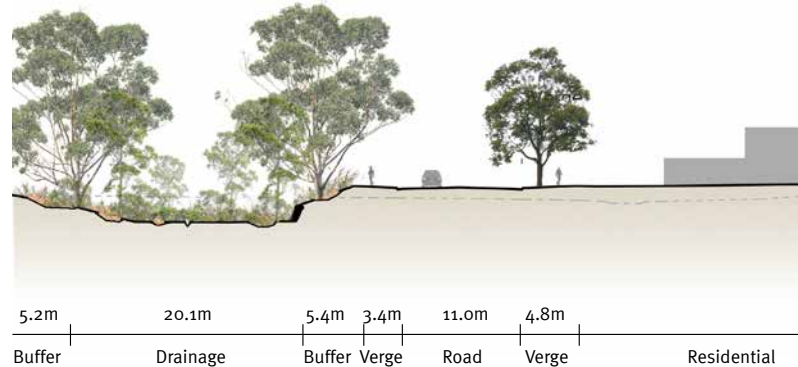




Section Locations
NTS



Section D
Scale 1:750



Section E
Scale 1:750



4.3.6 Stormwater Management Devices

Internal catchment boundaries have been established at Central Precinct as a result of the change in landform for PMF (Probable Maximum Flood) and resulting evacuation routes. This has informed the site drainage and the resulting catchment areas for drainage.

These catchment areas may feature bioretention and / or detention basins for stormwater management and control. Water harvesting for irrigation of open space will be investigated with Council. Planting will be selected for appropriate function and use for potential permanent / temporary inundation and erosion control. These areas have been integrated into other open space typologies to continue the green link connections into Local Parks, the Wianamatta Regional Park and the Regional Open Space to enable flora and fauna connections and movements. Community facilities provided for Stormwater Management areas will include share path and pedestrian path connections.

Precedent sites for Stormwater Management Devices may include:

- Mt Annan;
- Greenhills Rehabilitation, Kurnell;
- and
- Oran Park Town.



Key plan of Stormwater Management Devices



Mt Annan



Greenhills Rehabilitation, Kurnell



- Legend
- Boundary
 - Internal Catchment Boundary
 - 7 Catchment Area
 - Stormwater Management Devices

Stormwater Management Devices

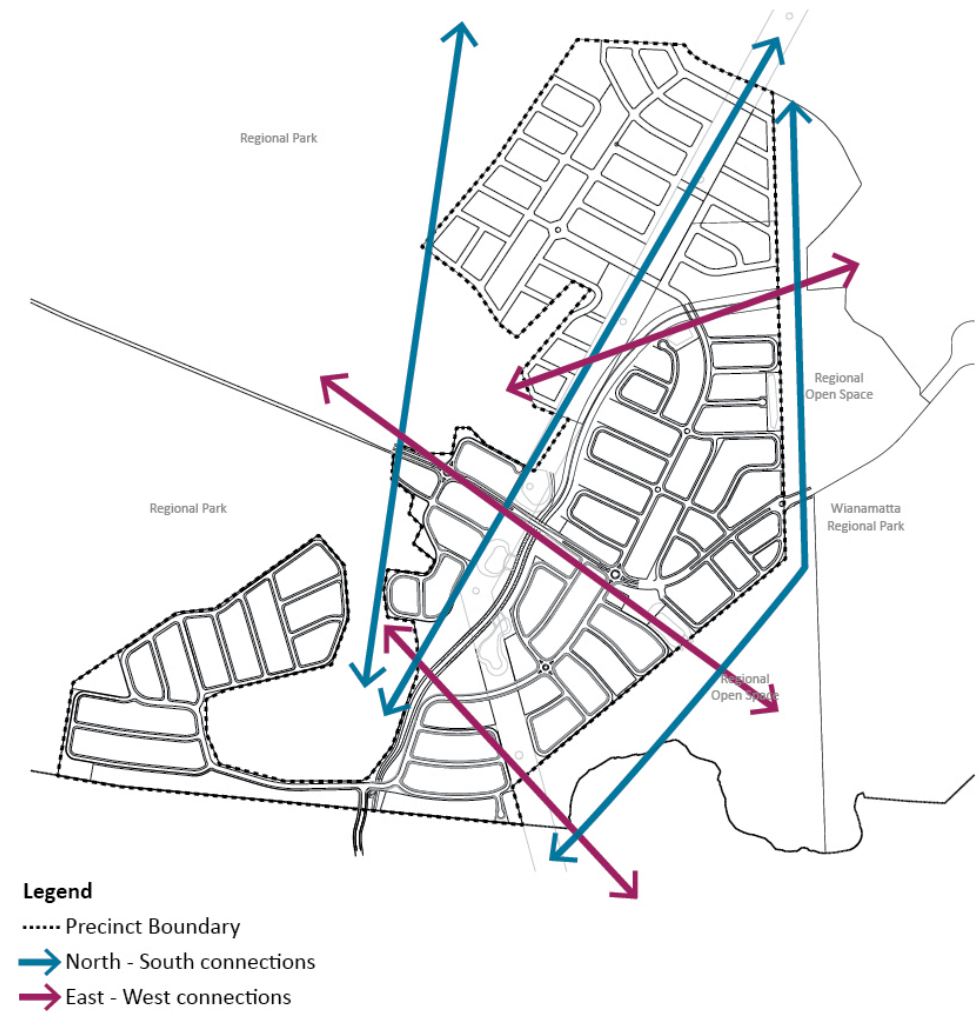


4.3.7 Connections

Central Precinct will provide a variety of connections with share path, pedestrian paths and bridges throughout the open space typologies and the site. The network will provide legible connections and loops throughout the Precinct in all landscape typologies to major and minor facilities for the community.

Precedent sites for Connections may include:

- Clifton Hill, Melbourne;
- Emeryville;
- Mt Annan;
- Flat Rock Gully, Willoughby; and
- Redfern Park, Minto.



- Legend**
- Precinct Boundary
 - North - South connections
 - East - West connections

Connections



Sharepath, Clifton Hill, Melbourne



Foot bridge, Mt Annan



Sharepath, Emeryville



Sharepath Flat Rock Gully, Willoughby
Photo credit: Willoughby Council



Pedestrian/ Cyclist Bridge
Redfern Park, Minto



4.4 Urban Landscape Elements

4.4.1 Gateway within the entry journey

- Central Precinct has a distinct landscape character derived from the surrounding Wianamatta Regional Park and natural setting. This existing character provides a strong visual identity and experience from the eastern and western approaches.
- The eastern approach is surrounded by grasslands and open woodlands as well as the remnant Bunya Pines. This provides opportunity to reinstate this planting with similar species.
 - The western approach is a progression through the Wianamatta Regional Park woodland, the bridge gateway and vistas to the Regional Open Space. The full strata woodland vegetation also provides views to the former munitions bund along the western approach. There is opportunity to reinforce the progression of the existing woodland character, the bridge gateway and views into an entry experience.

Gateway elements are required for Central Precinct to provide a visual and physical identity for site entry at the eastern and western approaches from Ropes Crossing and Jordan Springs. The elements are to be appropriate for Central Precinct and the context of the Wianamatta Regional Park, as well as its cultural and historic past. The elements are to be contemporary and timeless for the future community where natural or reused materials would provide an appropriate response to the existing character of the site. The historic past uses of Central Precinct may be represented with materials such as brick. Internal gateway elements beyond the main entry elements will not be considered

Precedent sites for Gateway Elements may include:

- Jordan Springs;
- Mulgoa Rise;
- Ropes Crossing;
- The Hermitage; and
- Glenmore Ridge.



Key plan of Entry Elements



Mulgoa Rise



Ropes Crossing



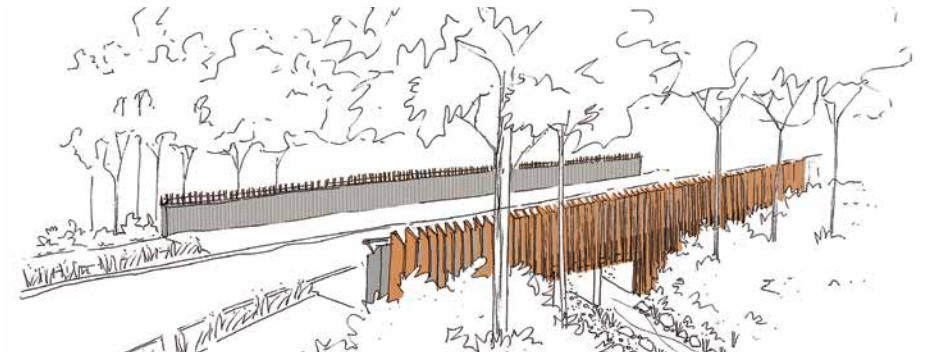
Ropes Crossing
Image Credit: Lendlease



The Hermitage



Bridge Gateway
Mount Annan



Bridge Gateway
Willowdale



4.4.2 Village Square

The Village Square at Central Precinct is to provide an active urban space for the community with a mix of commercial, retail and residential land uses. Shop fronts and associated uses are to front the Village Square to activate the space. The Square is to be a high profile space and will provide a more urban character for the community as a multifunctional space for gathering, events and socialising. The space will consist of a distinct public domain materials palette with a dominance of hard surfaces, lighting, public furniture and associated facilities to support community use. The vegetation character should be appropriate for an urban character with more colourful trees and mass planting for seasonal interest.

Precedent sites for the Village Centre may include:

- Railway Park, Auburn;
- Jordan Springs;
- Rouse Hill Town Centre;
- Ropes Crossing; and
- Coachman's Park, St Marys.

4.5 CPTED Safety by Design

Open and urban landscape elements in Central Precinct will apply CPTED (Crime Prevention Through Environmental Design Principles) in the design of public spaces. The application of the following four principles should be coordinated through the street network encouraging natural surveillance through open building frontages, pathways and street lighting. CPTED principles will be applied to the detailed design of all landscape areas as follows:

1. Surveillance

- Maximise natural surveillance.
- Eliminate barrier and concealment areas.
- Maximise transparency of public spaces.

2. Access Control

- Provide visual clues to highlight access points.
- Define a clear hierarchy of circulation.
- Provide clear sight lines for primary routes.

3. Territorial Reinforcement

- Clearly identify public/semi private/ private zones.
- Design a spatial hierarchy for activity areas.
- Designate territorial markers to indicate acceptable activities in spaces.
- Keep public areas clean / attractive and welcoming.

4. Activity and Space Management

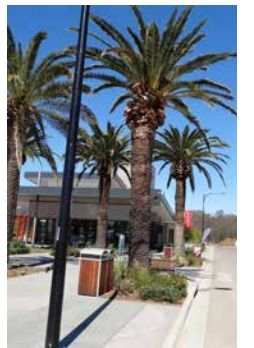
- Maximise activation through co-location and mixed use.
 - Design out conflict / concentrate like or complimentary activities.
 - Designate acceptable behaviour.
- (Refer Appendix 6, Penrith DCP 2014, Section 1.2.5 Safety and Security)



Key plan of Village Centre



Railway Park, Auburn
Image credit: MW Architects



Jordan Springs



Jordan Springs



Rouse Hill Town Centre



Ropes Crossing



Coachmans Park, St Marys

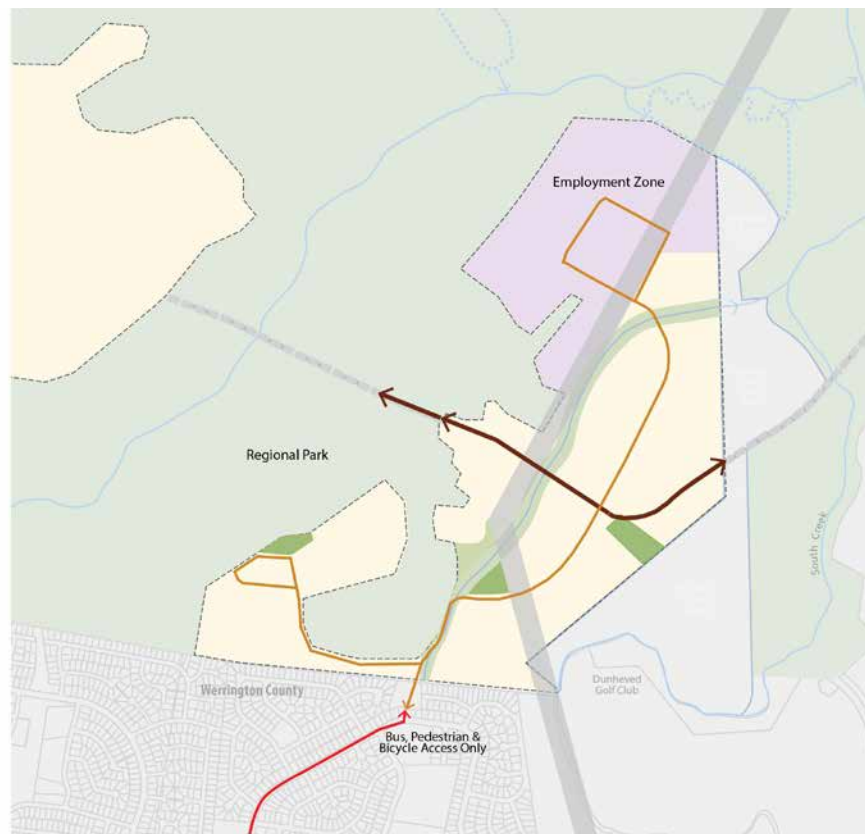
5 Streetscapes and Street Trees

5.1 Street Hierarchy

A clear street hierarchy has been developed for Central Precinct to enhance legibility and facilitate connectivity throughout the site for vehicles, cyclists and pedestrians. The street hierarchy consists of five street typologies suitable for the various land uses being:

- C2 – Collector Road with Median and Entry Boulevard
- L3 – Local Street (Bus Route)
- L2 – Local Street (Pedestrian Priority Shared Path)
- L1 – Local Street
- P1 – Park Edge Street

This street hierarchy is reinforced by a supporting palette of street trees listed under Section 5.2.

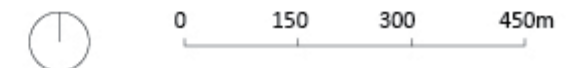


- Local Streets
- Collector Roads
- Proposed connection to existing network



Legend

- - - Precinct Boundary
- C2 - Collector Street with Median and Entry Boulevard
- L3 - Local Street (Bus Route)
- L2 - Local Street (Pedestrian Priority Share Path)
- L1 - Local Street
- P1 - Park Edge Street
- Accessway



Street Hierarchy



5.1.1 C2 - Collector Street with Median and Entry Boulevard

The Collector Street and the Entry Boulevard bisects Central Precinct from the east to west and provides the main connector road from Ropes Crossing and Jordan Springs. At the Entry Boulevards the existing vegetative character of the Wianamatta Regional Park provides a strong interface and entry statement to Central Precinct. A strong visual link is also provided with the 4m wide median and verges to either side of the Collector Street enhanced with formal avenue plantings of trees and mass planting. The Collector Street consists of 2.5m wide share paths and 1.5m wide pedestrian paths and widens in areas where there is more pedestrian movement around the Village Centre. This street typology is to consist of larger tree species to reflect the scale and dominance of the street.

Precedent sites for the Collector Street may include:

- Harrington Grove;
- Oran Park Town; and
- The Ponds.



C2 - Collector Street with Median
C2 Collector Street as per Precinct Plan. Off road share path adds 1m to Road reserve total width.
Scale 1:200



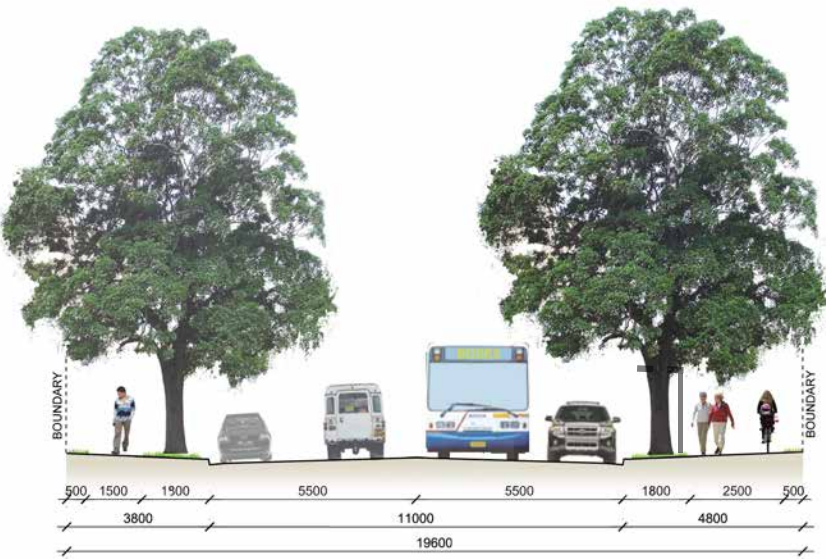
Oran Park



Harrington Grove

5.1.2 L3 - Local Street (Bus Route)

Local Street (Bus Route) transects Central Precinct from the north to the south and is the transit way connector road from Werrington County. Local Street (Bus Route) runs through the residential development of Central Precinct and edges the Wianamatta Regional Park . These streets feature the same verge widths as L2 but incorporate a wider carriageway to accommodate bus routes.

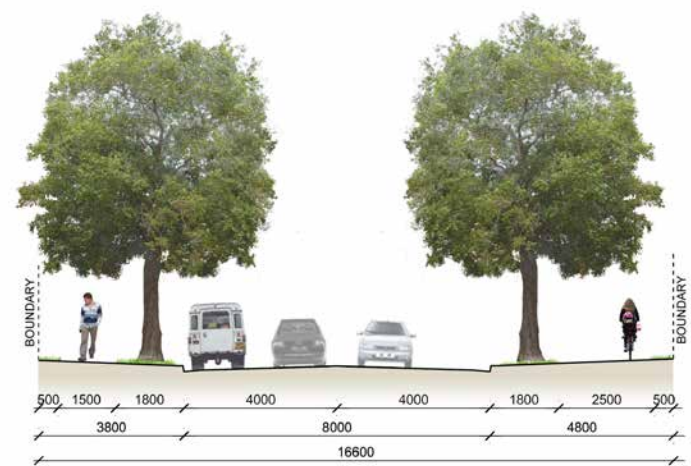


L3 - Local Street (Bus Route) with Bus Shelter
Scale 1:200



5.1.3 L2 - Local Street (Pedestrian Priority Shared Path)

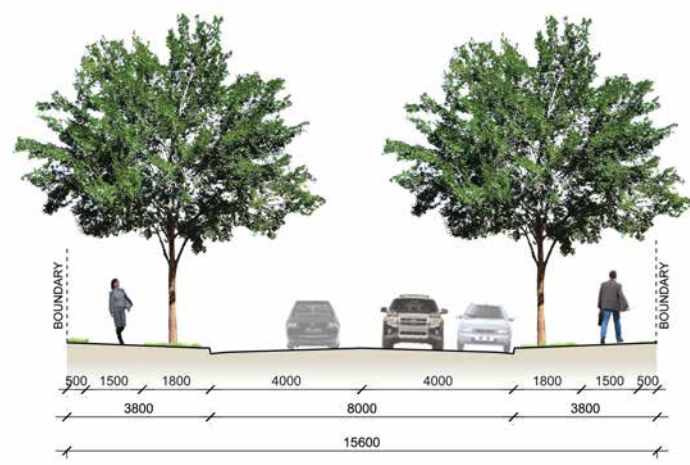
Local Street (Pedestrian Priority Shared Path) typologies are located within the residential development of Central Precinct. These streets feature a 4.8m wide verge incorporating 2.5m wide share paths and a 3.8m wide verge opposite incorporating a 1.5m wide pedestrian path.



L2 - Local Street (Pedestrian Priority Shared Path)
Scale 1:200

5.1.4 L1 - Local Street

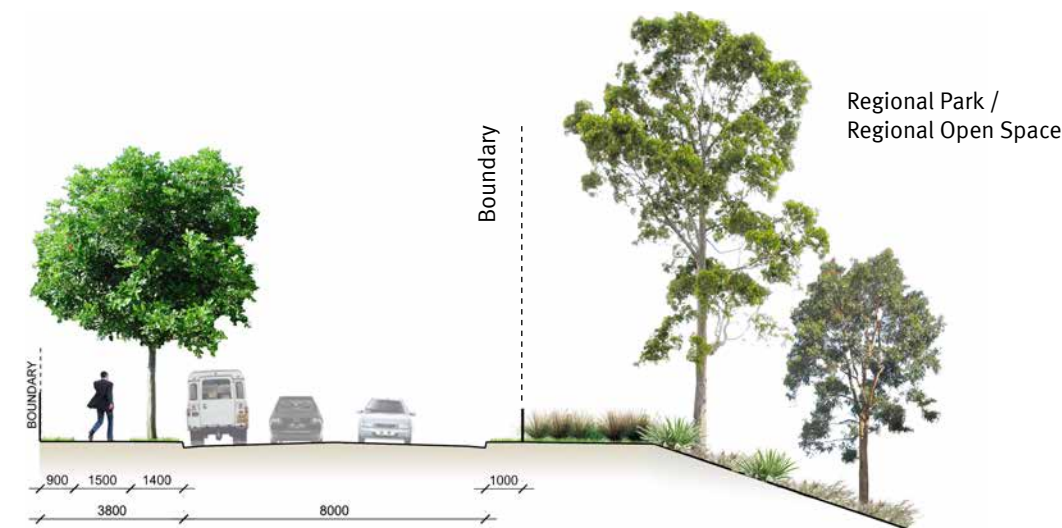
Local Streets are located within the residential development of Central Precinct featuring a 3.8m wide verge and a 1.5m wide pedestrian pathway to one or both sides of the street. Small and medium street trees are to be utilised in the Local Street typology planted in the 1.8m zone between the footpath and the kerb with larger feature tree species used in road blisters and street junctions.



L1 - Local Street
Scale 1:200

5.1.5 P1 - Park Edge Street

Park Edge Streets are located to the edges of the Wianamatta Regional Park and Regional Open Space and feature a 1m verge to the edge, bringing this character to the edge of the development. The Wianamatta Regional Park edge provides a parkland character opportunity for pathway connections. Park edge streets occur at a variety of open space types.



P1 - Park Edge Street
Scale 1:200

5.2 Street Tree Indicative Species

Street tree species selection has been based on the street hierarchy, land use and solar access at Central Precinct. Tree selection will consist of a mixture of native and exotic evergreen and deciduous species, which provide a diverse range of seasonal and all year colour. Tree species have been selected to:

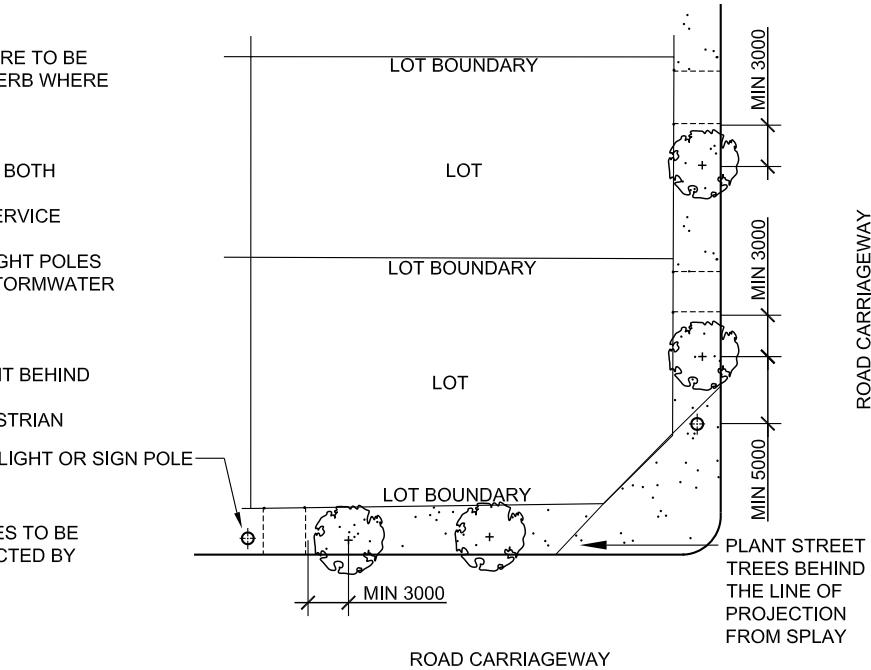
- Create clear legibility throughout the Precinct and the street hierarchy.
- Create a varied palette with feature trees used to highlight street blisters and junctions.
- The proposed land use within Central Precinct will determine the size and scale of the tree species complement the houses and buildings. Street tree selection will also be determined on the profile of the space, such as large feature trees used for the Town Centre and Collector Roads.
- Assist with solar access where evergreen tree species are planned for north to south orientated streets to screen western light, and deciduous trees are planned for east to west orientated streets for summer shade and solar access in winter.
- Create consistent tree avenues where each residential lot will generally feature a street tree in the verge.
- Street trees will be installed in line with PCC detailed requirements and the below rules to ensure the long term integrity of infrastructure.
- Strip and test site soil and subgrade for complete chemical analysis. Nominal 3 tests per ha or per seperate area type (ridge line/ sideslope/ valley bottom etc).
- Treat and apply additive as recommended in testing report.
- Do not mix topsoil and subsoil in earthworks operation.

Street Hierarchy	Street Orientation	Botanical name	Mature height (meters)	Mature width (meters)
C2 – Collector Street with Median and Entry Boulevard <i>^ Tree specie used for minimum 4m wide median/roundabout planting</i>				
C2		Agathis robusta	25	7
C2		Angophora floribunda	18	8
C2 Median^		Corymbia citriodora	25	15
C2		Corymbia eximia	15	10
C2		Corymbia maculata	20	8
C2		Lophostemon confertus	15	8
C2		Tristaniopsis laurina	12	4-8
C2		Waterhousia floribunda	15-20	6-8
L3 – Local Street (Bus Route) Strong corridor through Central Precinct from north to south				
L3	NS	Lophostemon confertus	15	8
L3	NS	Tristaniopsis laurina	12	4-8
L3	EW	Acer freemannii ‘Autumn Blaze’	13	10
L3	EW	Zelkova serrata ‘Green Vase’	14	10
L2 - Local Street (Share Path) <i>* Feature tree species used for planting blisters, street terminations/junctions</i>				
L2	NS	Backhousia citriodora	7	3
L2	NS	Brachychiton populneus	10	5
L2	NS	Calodendrum capense	12	9
L2	NS	Lophostemon confertus	15	8
L2	NS	Tristaniopsis laurina ‘Luscious’	7-10	6-7
L2 Feature*	NS	Waterhousia floribunda	15-20	6-8
L2	EW	Pistachia chinensis	8	6
L2	EW	Pyrus ussuriensis	9	7
L2	EW	Ulmus parvifolia ‘Todd’	10	8

CENTERLINE OF STREET TREES ARE TO BE SETOUT 800mm FROM BACK OF KERB WHERE FEASIBLE

- 1.0 MIN. 3m CLEARANCE FROM DRIVEWAYS(ALLOW DRIVEWAY IN BOTH FRONTAGES FOR CORNER LOTS)
- 2.0 MIN 3m. CLEARANCE FROM SERVICE LINES INTO LOTS
- 3.0 MIN. 5m CLEARANCE FROM LIGHT POLES
- 4.0 MIN. 3m CLEARANCE FROM STORMWATER OUTLETS
- 5.0 MIN. 1.5m CLEARANCE FROM STORMWATER PITS
- 6.0 CORNER/INTERSECTION PLANT BEHIND SPLAY PROJECTION LINE
- 7.0 MIN. 7m FROM MARKED PEDESTRIAN CROSSINGS
- 8.0 SPACING GENERALLY 10m

FINAL LOCATION OF STREET TREES TO BE DETERMINED ON SITE AS INSTRUCTED BY SUPERINTENDENT



Street Hierarchy	Street Orientation	Botanical name	Mature height (meters)	Mature width (meters)
L1 - Local Street <i>Emphasis on small scale tree species to reflect scale of residential development</i> <i>* Feature tree species used for planting blisters, street terminations/junctions</i> <i>+ Selected species used in Village Centre Roads for precinct hierarchy and scale of residential development</i>				
L1	NS	Backhousia citriodora	7	3
L1	NS	Cupaniopsis anacardioides	5-6	5-6
L1	NS	Fraxinus griffithii	7	4
L1	NS	Lophostemon confertus	15	8
L1	NS	Tristaniopsis laurina	12	4-8
L1 Feature*	NS	Brachychiton populneus	10	5
L1 Feature*	NS	Calodendrum capense	12	9
L1 Feature*	NS	Waterhousia floribunda	15-20	6-8
L1	EW	Acer buergeranum	6	6
L1	EW	Koelreuteria bipinnata	6	4
L1	EW	Lagerstroemia indica ‘Natchez’	8	6
L1	EW	Lagerstroemia indica ‘Tuscarora’	6	4
L1	EW	Pistachia chinensis	8	6
L1	EW	Pyrus ussuriensis	9	7
L1	EW	Ulmus parvifolia ‘Todd’	10	8
L1 Feature*	EW	Pyrus calleryana ‘Bradford’	12	9
L1 Village Centre+	NS	Tristaniopsis laurina ‘Luscious’	7-10	6-7
L1 Village Centre+	EW	Fraxinus ‘Urbanite’	11	8
L1 Village Centre+	EW	Pyrus ‘Chanticleer’	11	6
P1 – Park Edge Street Emphasis with natives for reinforcing regional park character Tree species selected for P1 Park Edge Street are for street verge planting areas only. Tree species selection for Regional Park not subject to this Landscape Master Plan. <i>* Feature tree species used for planting blisters, street terminations/junctions</i>				
P1	NS & EW	Acacia melanoxylon	10-15	6
P1	NS	Corymbia exima	15	10
P1	NS	Cupaniopsis anacardioides	6-8	5-6
P1	NS & EW	Eucalyptus crebra	8-10	6-7
P1	NS	Lophostemon confertus	15	8
P1	EW	Melaleuca decora	7	4-6
P1	NS & EW	Melaleuca linariifolia	9	5
P1 Feature*	NS	Flindersia australis	10	7
P1 Feature*	NS	Waterhousia floribunda	15-20	6-8



North South Street Orientation

C2 - Collector Street



Agathis robusta Corymbia citriodora Angophora floribunda



Lophostemon confertus Tristaniopsis laurina



Waterhousia floribunda Corymbia eximia Corymbia maculata

East West Street Orientation

C2 - Collector Street

L3 - Local Street (Bus Route)



Lophostemon confertus Tristaniopsis laurina

L2 - Local Street (Share Path)



Backhousia citriodora Calodendrum capense

L1 - Local Street



Backhousia citriodora Fraxinus griffithii



Cupaniopsis anacardioides Calodendrum capense

P1 - Park Edge Street



Cupaniopsis anacardioides Lophostemon confertus



Waterhousia floribunda Flindersia australis



Melaleuca linariifolia Acacia melanoxylon

L3 - Local Street (Bus Route)



Acer freemanii 'Autumn Blaze' Zelkova serrata 'Green Vase' Image credit: Flemings

L2 - Local Street (Share Path)



Nyssa sylvatica Pistacia chinensis

L1 - Local Street



Acer buergerianum Koelreuteria paniculata



Fraxinus 'Urbanite' Pyrus ussuriensis

P1 - Park Edge Street



Eucalyptus crebra Melaleuca decora



Pyrus ussuriensis Ulmus parvifolia 'Todd' Image credit: Flemings



Lagerstroemia indica 'Natchez' Pyrus 'Chanticleer'



Nyssa sylvatica



Lagerstroemia 'Tuscarora' Pyrus calleryana 'Bradford'



Ulmus parvifolia 'Todd' Angophora floribunda Image credit: Flemings



6 Interpretation and Public Art

6.1 General

Interpretation is defined by the NSW Heritage Office as "*all the ways of presenting the significance of an item*". Details of which are found within its Heritage Information Series publication of *Interpreting Heritage Places and Items: Guidelines and a Heritage Interpretation Policy Statement*.

Underpinning the Heritage Council’s Policy and the Australia ICOMOS Burra Charter is the acceptance that:

“Heritage interpretation is an integral part of the conservation and management of heritage items and is relevant to other aspects of environmental and cultural management and policy”.

Interpretation should connect to a target audience and the wider community and explain why a site is conserved and significant in methods which are stimulating, informative and culturally appropriate. This is usually achieved through landscape elements and their relation to built elements which enables people to understand the evolution of the site.

The implementation of an Interpretation Strategy will increase public awareness and understanding of Central Precinct. A detailed Interpretation Strategy is being prepared and will guide all decision making on the interpretation of heritage in the Central Precinct and Regional open Space.

A series of Interpretation Policies include:

1. Interpretation measures of cultural heritage should be included into all conservation and development proposals.
2. An Interpretation Plan is to be prepared prior to any sale of land as according to the Heritage Council policy and guidelines and submitted for approval to all stakeholders.
3. The Interpretation Plan should be prepared by a suitably qualified interpretation specialist.
4. The interpretation should not detract from the heritage value of the Precinct and should be culturally appropriate. This may include design interpretation, street names and buildings, signage, walking routes, public art and applications of electronic media.
5. Signage design should be to style guidelines to indicate the type, setting, location and fixing method appropriate for conservation.
6. Preserving, restoring and reconstruction of significant features are the preferred methods for interpreting. Where adaption is part of the conservation, it is important to incorporate this change so that all stages of the Precinct history is understood.
7. Opportunities to interpret the holistic significance and history of the Precinct should be included into future proposals of the site and its context.
8. Original place location should be interpreted appropriately. Additions and alterations should preserve and enhance the interpretation, even if it reflects changes or developments over time.
9. The environmental, pre-European and European heritage should be interpreted so the Precinct’s evolution can be read and understood.
10. Heritage and interpretation information should be collected and stored in a public archive where it’s accessible to the community.



6.2 Interpretation Strategy

The Interpretation Strategy focuses on European heritage and in particular the brick kilns and radar station. In addition to the indigenous heritage environmental opportunities exist in a number of locations across the site.

Many of the cultural elements identified in this Master Plan are not within the site boundary of Central Precinct and are located in areas including the Wianamatta Regional Park and the Regional Open Space. There is the opportunity to provide interpretative signage and walk connections to these cultural elements from Central Precinct.

A Heritage Interpretation Strategy has been prepared by Milne and Stonehouse for Central Precinct and should be referred to for additional information in relation to interpretation themes and opportunities.



Cultural Elements



6.2.1 European Heritage

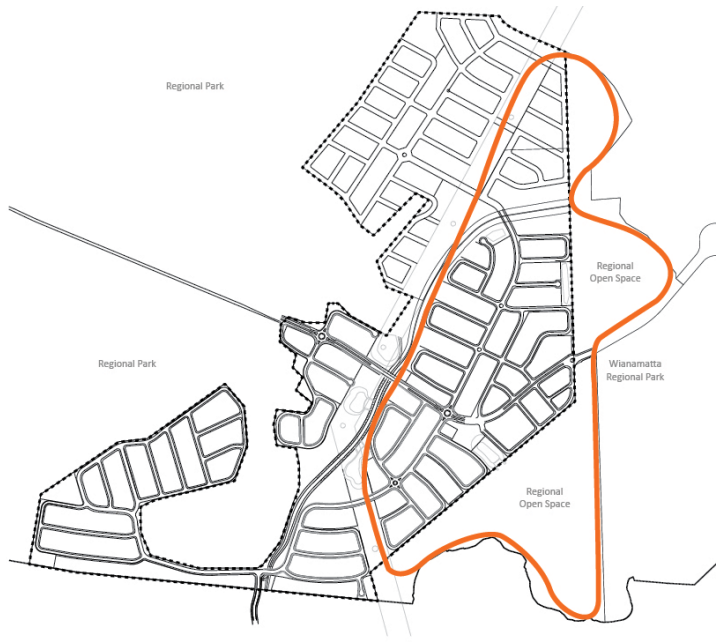
The heritage conservation zone of Elizabeth Farm / brick clamp kilns is limited to the physical extent of the site relics being the brick clamp kiln outlines, the remnant bricks and the various soil colours from the kiln fires.

There is opportunity for site interpretation and public art of the brick clamp kilns at Central Precinct through in-situ and / or design. In situ interpretation would be challenging due to the fragile nature of the archaeological remains. Burying parts of this site that can be retained for conservation would enable preservation for the future and interpretation through design is the preferred approach adopted in this Landscape Master Plan.

Interpretation and public art of the brick clamp kilns element through design would provide opportunities to reinstate the site heritage. This could be achieved through:

- Clamp kiln outlines interpreted with paving.
- Remnant brick fragments contained in gabions (subject to conservation advice on long term survival) for seating or park elements.
- Locations for interpretive signage which detail, photos and written accounts.

A heritage walking loop throughout the site would provide connections to the other heritage elements including the Aboriginal Heritage, Dunheved Homestead, the Chimney relic, Luxford’s Orchard and the Bunya Pines. There is opportunity to provide further interpretative signage to these heritage elements.



Key plan of heritage walking loop.

* Diagram and Images are indicative only. A Heritage Interpretation Strategy will provide detailed and specific recommendations on heritage of the site and how it will be communicated with the community.



Paving materials for heritage interpretation
Image credit: MUSEscape 2014



Surface materials for heritage interpretation
Image credit: MUSEscape 2014



Gabion cages for brick interpretation
Image credit: MUSEscape 2014



Brick use in public art
Image credit: MUSEscape 2014



Railway Park, Auburn
Image credit: MW Architects



Brick interpretation in seating walls
Sydney Park, St Peters



Brick pit interpretation
Sydney Olympic Park



Brick Interpretation
Paddington Reservoir, Sydney



Salvaged brick chimneys
Sydney Park, St Peters



The Radar Range located within the site is proposed to be removed as part of the proposed development at Central Precinct. There is opportunity for reuse and adaptation of salvageable elements of the Radar as well as the interpretation of the Radar forms with design at Central Precinct. The reuse and adaptation may be possible with the spherical radome. There is opportunity for forms of the Radar hoop antennae to be interpreted as a marker or entry treatment to the secondary eastern entry into Central Precinct. There is also the opportunity for the forms to be used as part of a playground element in the Regional Open Space.

The Ammunition Bund is located outside Central Precinct site within the Wianamatta Regional Park and is visually dominant within the landscape from the Jordan Springs Connector Road. There is an opportunity for interpretation within the site reflecting the munitions manufacturing and storage facility with signage and trail connections.

There is a strong cultural link between the Ammunition Bund and the Radar Range which are located at the primary and secondary entries to the site along the Collector Road and this connection should be incorporated into the entry sequence.



Key plan of cultural nodes and linkage

6.2.2 Indigenous Heritage of Environmental Interpretation Opportunities

The Regional Open Space and Wianamatta Regional Park provide a number of opportunities for educational and interpretation about indigenous occupation of the site, environmental restoration, ecology, biodiversity, ecosystems and the flora and fauna of the local area.

A walking loop throughout the site would provide opportunities to create an interpretive loop with signage or other installations and may connect with key landscape elements such as South Creek.



Key plan of indigenous heritage of environmental interpretation opportunities



Cultural element interpretation (industrial)
The Knoll Remnants, Pyrmont



Hoop antennae form
Image credit: Wikipedia, 2015

Playground featuring random forms
Image credit: MUSEscape 2015



Aboriginal Interpretative signage
Parramatta River Walk

Environmental interpretation
Wentworth Common, Sydney Olympic Park

7 Materials and Finishes

7.1 General

Materials and finishes provide a palette of hardscape elements for the urban spaces and open spaces for Central Precinct. This palette reflects the Wianamatta Regional Park character and heritage value of Central Precinct. The materials and finishes should support the aesthetic character of the Precinct and should be consistent throughout the public domain to strengthen legibility and identity. The palette with be contemporary and timeless in its appeal with the opportunity to utilise custom items along with standard elements in line with Penrith City Council guidelines. Material selection will be guided by a separate Public Domain Manual which will be based on the Jordan Springs Public Domain Manual.



Brick Paving



Exposed aggregate concrete



Corten Steel



Gabion walls

7.2 Urban Space

7.2.1 Paving

Paving throughout Central Precinct should be applied to pedestrian, cycleway and share pathways, as well as urban spaces in the Village Centre. The paving is influenced from the open space hierarchy and street hierarchy at Central Precinct. The paving also determines legibility and connection points of urban spaces and open spaces throughout the Precinct with main path types as follows:

- 2.5m wide share path;
- 1.5m wide pedestrian path; and
- 1.8m wide secondary pedestrian path.

Paving surface treatments should be durable, low maintenance and appropriate for pedestrians and cyclists as well as being universally accessibility.

- Formal surface treatments may include insitu-concrete paths, decorative concrete paths, brick paving and concrete edging.
- Informal surface treatments may be applicable to open spaces for aesthetic appearance and visual connection with the Wianamatta Regional Park . Informal surface treatments may include decomposed granite, crushed sandstone and gravel paths.
- Brick paving may be utilised in urban and open spaces to enhance the heritage value of the historic brick clamp kilns theme throughout the Precinct.



Concrete path



Feature path



Feature paving



Picnic setting



Bench seat



Low walls

7.2.2 Furniture

A consistent palette of furnishings should be provided throughout Central Precinct which is functional, aesthetically pleasing and consistent with the overall character of the site. Furniture will be placed in strategic locations appropriate for the use and function for the community for open and urban spaces, play spaces and rest areas. Bollards will also be utilised for vehicle control and to limit access. There is opportunity to utilise different furniture between urban spaces and open spaces within the Precinct to reinforce identity of high profile spaces. Furnishings for Central Precinct include: seats, benches, picnic settings, low walls, bins, bike racks, shelters, drinking fountains, bollards and informal bridge crossings.



Bin enclosure



Bike rack



Picnic shelter



Drinking fountain



Bollard



Informal bridge crossing

7.3 Open Space

7.3.1 Riparian Corridor

The riparian corridor will be fully reconstructed to recreate a riparian environment. The landscape treatment is subject to the Vegetation Management Plan (JMDdesign 2015). Specific landscape elements should assist with this reconstruction to recreate a riparian ecosystem with flora and fauna habitat, as well as managing water flow and erosion and providing public and visual amenity. These elements may include the following:

- Dry creek beds;
- Rip rap walls;
- Gabion walls;
- Rocks and boulders;
- Habitat logs; and
- Ponds and riffles.

Pedestrian / cycle connections will be facilitated along the riparian corridor in the vegetated buffer.

7.3.2 Stormwater Management Devices

Stormwater Management Devices will comprise a base of native sedges / grasses that perform well in wet conditions. These species will be compatible with those provided in the riparian corridor and Vegetation Management Plan. The banks of basins and drainage element may allow for limited tree and shrub planting. Maintenance access will be considered.

7.3.3 Playspaces

Central Precinct should consist of a variety of playspaces in each of the local park and Regional Open Space. Playspace materials may include the following:

- Playground mulch;
- Rubber wetpour softfall;
- Boulders and rocks;
- Step stones; and
- Timber sleepers.

Themes explored in play experiences include:

- Nature play;
- Interpretive play; and
- Adventure play.



Dry creek bed



Rip rap walls



Gabion walls



Rocks and boulders / ponds and riffles



Bioswales



Detention Basins



Bioretention Basin



Adventure Play
Plough and Harrow, Western Sydney Parklands



Interpretative play
Sydney Park, St Peters



Nature Play
Plough and Harrow.
Image credit: Western Sydney Parklands



Timber sleepers

8 Planting

8.1 General

The planting palette for Central Precinct will provide legibility and hierarchy to the site through its application in public domain areas. This will be achieved via both evergreen native trees and ornamental exotic trees as appropriate providing a balance of colour, form and texture along with seasonal variation. Larger trees species will be selectively utilised in open spaces and urban spaces to enhance green links and connectivity throughout the site. Mass planting will provide form and colour with a mix of natives and exotics. All plant species are selected to be successful in the Penrith climatic and soil conditions and to be installed according to the APZ requirements.

The Penrith Development Control Plan 2015 identities the following objectives for Landscape Design:

1. ensure that landscape design reinforces the principles of Ecologically Sustainable Development;
2. promote landscape design and planning as part of a fully integrated approach to site development;
3. ensure landscape design takes into account the site’s context, landscape and visual character, existing landscape features and visual amenity, both at the local and regional scale;
4. encourage the development of quality landscape setting associated with new development that is consistent with industry best-practice;
5. encourage the retention of existing trees and vegetation to enhance landscape character;
6. ensure the landscape setting adequately complements the proposed built form and minimises the impacts of scale, mass and bulk of the development in its context;
7. encourage a constructed landscape that can be effectively maintained to a high standard for the life of that development; and
8. establish a framework for allowing “Controlled Private Certification” of the landscape design components of new developments.

8.2 Open Space Hierarchy

8.2.1 Wianamatta Regional Park

Central Precinct adjoins the Wianamatta Regional Park in several locations. In these locations plant species selection will consider the recreational uses of the space and the indigenous native species of the existing plant communities on site. There is opportunity to collect native seed stock for Wianamatta Regional Park planting to ensure genetic integrity and local provenance is maintained.

8.2.2 Regional Open Space

The Regional Open Space will provide active recreational facilities in the form of sports fields, courts and playground facilities. Plant species will consist of a mixture of native and exotic plant species with a focus on locally indigenous natives. A focus on establishing mature shade trees will ensure amenity is provided for users of the site.

8.2.3 Local Parks (Edge and Central Pocket Parks)

Local Park planting consists of a more diverse range of native and exotic plant species and will include statement planting in response to heritage and local significance.

Where Local Parks interface Wianamatta Regional Park native indigenous species are to be utilised to maximise ecological green connections for flora and fauna. The interface between Local Parks and the Regional Open Space require detailed consideration to achieve varied landform along this edge. Both native and exotic plant species will be used in these locations, where battered slopes are to be planted out with stabilising species.

8.2.4 Transmission Corridor Park (Transmission Easement)

Planting to the Transmission Corridor Park will be in accordance with the requirements of the TransGrid Easement Guidelines for Third Party Development (Refer Appendix xx) and the APZ planting requirements. Generally this will take the form of a native grassland meadow character with copses of shrubs under 4m in height. Swathes of native grasses will be developed to create a low maintenance grassland character which integrates and complements the existing grasslands within Central Precinct.

8.2.5 Riparian Corridor and Stormwater Management Devices

Planting suitable for the Riparian Corridor and Stormwater Management Devices is divided into a series of zones for drainage and stabilisation purposes being:

- Channel base zone: consisting of stabilised channel with erosion control. Groundcovers with fibrous root systems to be planted at a closer density for erosion control and stabilisation. Species in the channel base zone must tolerate inundation. Tighter plant species spacing will be required for soil stabilizing.
- Embankment zone: consisting of mass planting as per the channel base zone with the addition of scattered tree planting.
- Revegetation/buffer zone: consisting of scattered tree plantings, shrubs and groundcovers which don’t necessarily tolerate inundation. These buffer species are more common plant species which will integrate into other adjoining open spaces.

Planting should integrate with the native remnant plant species where possible and with mostly reconstructed riparian zone. Planting in these areas must consider the APZ and the TransGrid Easement Guide. Plant species should be considered for habitat zones i.e. with tighter foliage and branches for protection of wildlife species. Refer to the Vegetation Management Plan for further information (JMDdesign, 2015).



Typical Plant Species	Open Space Heirachy					
	Regional Park	Regional Open Space	Local Parks (Edge and Central Pocket Parks)	Transmission Corridor Parks (Transmission Easement)	Riparian Corridor and Stormwater Management Devices	
Trees						
<i>Araucaria araucana</i>		✓	✓			
<i>Backhousia citriodora</i>						
<i>Brachychiton acerifolius</i>	✓	✓	✓			
<i>Casuarina cunninghamiana</i>			✓		✓	✓
<i>Cupaniopsis anacardioides</i>		✓	✓			
<i>Eucalyptus crebra</i>	✓	✓	✓			
<i>Eucalyptus fibrosa</i>	✓	✓	✓			
<i>Eucalyptus moluccana</i>	✓	✓	✓			
<i>Eucalyptus tereticornis</i>	✓	✓	✓			
<i>Ficus macrophylla</i> , <i>F. macrocarpa</i> , <i>F. rubiginosa</i>		✓	✓			
<i>Flindersia australis</i>		✓	✓			
<i>Lophostemon confertus</i>		✓	✓			
<i>Melaleuca decora</i>	✓		✓		✓	✓
<i>Melaleuca nodosa</i>			✓		✓	✓
<i>Melaleuca styphelioides</i>	✓		✓		✓	✓
<i>Pistacia chinensis</i>		✓	✓			
<i>Platanus</i> 'Digitata'		✓	✓			
<i>Pyrus calleryana</i> 'Chanticleer'		✓	✓			
<i>Nyssa sylvatica</i>		✓	✓			
<i>Ulmus parvifolia</i> 'Todd'		✓	✓			
<i>Waterhousia floribunda</i>		✓	✓			
Shrubs						
<i>Anigozanthos</i> cvs.		✓	✓			
<i>Bursaria spinosa</i>	✓	✓	✓			
<i>Callistemon</i> 'Anzac', <i>C.</i> 'Endeavour' <i>C.</i> 'Little John'		✓	✓			
<i>Daviesia ulicifolia</i>	✓			✓		✓
<i>Dillwynia sieberi</i>	✓					
<i>Dodonaea viscosa</i>				✓		✓
<i>Doryanthes excelsa</i>		✓	✓			
<i>Goodenia ovata</i>				✓		✓
<i>Grevillea juniperina</i>	✓					
<i>Grevillea rosmarinifolia</i>		✓	✓			
<i>Grevillea</i> 'New Blood'		✓	✓			
<i>Hardenbergia</i> 'Mini Ha Ha'		✓	✓			
<i>Leptospermum</i> 'Pink Cascade'		✓	✓			
<i>Melaleuca</i> 'Claret Tops'		✓	✓			
<i>Melaleuca linariifolia</i> 'Snow Storm'		✓	✓			
<i>Pultenaea villifera</i>				✓		✓
<i>Westringia</i> 'Jervis Gem'		✓	✓			
Grasses						
<i>Austrostipa bigeniculata</i> , <i>A.pubescens</i>				✓		
<i>Bothriochloa macra</i>				✓		
<i>Carex appressa</i>	✓			✓	✓	✓
<i>Cyperus gracilis</i>					✓	✓
<i>Dianella longifolia</i> , <i>D. caerulea</i>	✓	✓	✓			
<i>Dichelachne micrantha</i>					✓	✓
<i>Echinopogon caespitosus</i>				✓		
<i>Entolasia marginata</i>					✓	✓
<i>Ficinia nodosa</i>					✓	✓
<i>Imperata cylindrica</i>		✓	✓	✓		
<i>Juncus usitatus</i>					✓	✓
<i>Lepidosperma laterale</i>					✓	✓
<i>Lomandra longifolia</i>	✓	✓	✓		✓	✓
<i>Lomandra</i> 'Tanika'		✓	✓			
<i>Orthrosanthus multiflorus</i>		✓	✓			
<i>Poa labillardieri</i>		✓	✓			
<i>Themeda australis</i>	✓	✓	✓	✓		
<i>Zoysia macrantha</i> 'Nara'			✓	✓		
Groundcovers						
<i>Dichondra repens</i>		✓	✓			
<i>Goodenia hederacea</i>	✓					
<i>Grevillea juniperina</i> 'Molonglo'		✓	✓			
<i>Hardenbergia violacea</i>	✓					
<i>Hibbertia obtusifolia</i>	✓					
<i>Viola hederacea</i>		✓	✓			
<i>Wahlenbergia communis</i>	✓					



Brachychiton acerifolius



Eucalyptus moluccana



Eucalyptus crebra



Bursaria spinosa



Callistemon 'Little John'



Leptospermum 'Pink Cascade'



Ficinia nodosa



Imperata cylindrica



Lomandra longifolia



Dichondra repens



Hardenbergia violacea



Grevillea juniperina 'Molonglo'

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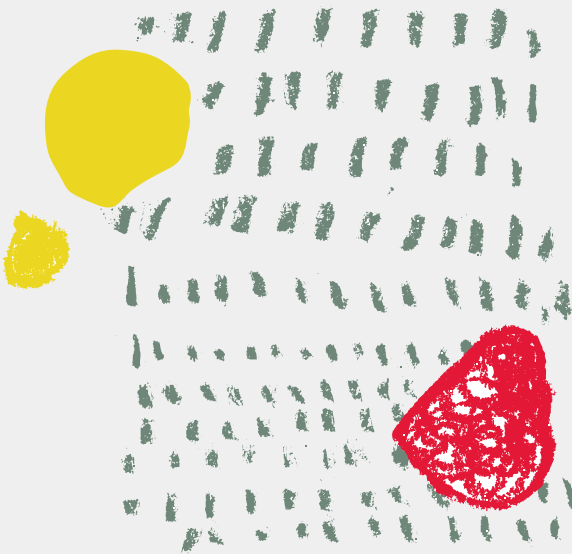
NSW Rural Fire Service: Standards for Asset Protection Zones
http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf

TransGrid Easement Guide
<http://www.transgrid.com.au/pe/lwp/Documents/TransGrid%20Easement%20Brochure%20FINAL.pdf>

Penrith Development Control Plan 2010
http://www.penrithcity.nsw.gov.au/uploadedFiles/Content/Website/Our_Services/Planning_and_Development/Planning__Zoning_Information/Local_Planning_Documents/DCPS_and_Exhibited_Drafts/DCP2010Amended22July2013%281%29.pdf

Appendix

- 1. Central Precinct Indicative Landscape Master Plan.
- 2. Central Precinct (St Marys Development) Vegetation Management Plan, JMDdesign, Issue E.
- 3. Final Interpretation Strategy for historic brick making site (Site 3, Central Precinct) and former Naval Radar Calibration Range (proposed Wianamatta Regional Park / Regional Open Space) St Marys Development, St Marys, NSW, 29th January 2015.
- 4. National Parks & Wildlife Service, 2013, Wianamatta Regional Park Volume 3: Park Masterplan, NSW Government Environment, Climate Change & Water.
- 5. Transgrid Easement Guidelines for Third Party Development



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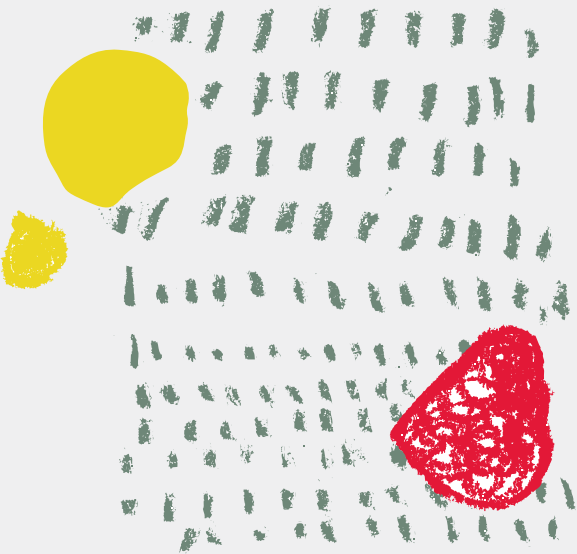
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Appendix 1

Central Precinct Indicative Landscape Master Plan



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Appendix 2

Central Precinct (St Marys Development) Vegetation Management Plan, JMDdesign, Issue F.



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Appendix 3

Final Interpretation Strategy for historic brick making site (Site 3, Central Precinct) and former Naval Radar Calibration Range (proposed Wianamatta Regional Park / Regional Open Space) St Marys Development, St Marys, NSW, 29th January 2015.



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Appendix 4

National Parks & Wildlife Service, 2013, Wianamatta Regional Park Volume 3: Park Masterplan, NSW Government Environment, Climate Change & Water.

Available at: <http://www.environment.nsw.gov.au/parkmanagement/wianamattaRPmasterplan.htm>



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Appendix 5

Transgrid Easement Guidelines for Third Party Development.



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Appendix 6

Heritage Interpretation Strategy - Jordan Springs, Central Precinct & Regional Open Space (Milne & Stonehouse 2015)



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Open Space and Landscape Masterplan

Environmental Partnership



ST MARYS

CENTRAL PRECINCT

OPEN SPACE AND LANDSCAPE MASTERPLAN (LOSM)



Final

July 2008



St Marys Development

CENTRAL PRECINCT OPEN SPACE AND LANDSCAPE MASTERPLAN

July 2008

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Executive Summary

Implementation Objectives

The open space masterplan must provide a framework for the ongoing planning and design of an interconnected network of functional and attractive open space. The network will cater for recreational use whilst also shaping and enhancing the character of the urban environment.

Objectives of the open space plan include:

recognition of natural values

- retention of appropriate natural canopy and understorey
- effectively manage relationship of urban development to the adjoining Regional Park
- optimisation of role and benefit of open space (eg. water, soils, salinity management)

recognition of cultural values

- conservation of significant heritage elements
- interpretation of cultural heritage values to enhance community experiences
- facilitation of sustainable and vibrant community
- development of identity

network connectivity

- serving a practical user catchment (ie within walking distance)
- linked to broader regional network of open space and access (ie Ropes and South Creeks and the Regional Park)

multi use facilities

- open space / recreation linked to other community facilities
- combination of open space types to provide opportunity for a variety of facilities
- be of practical dimensions to achieve the recreational / landscape role intended

responsiveness to needs

- cater for family use (playgrounds, kickabout, shaded seating, some parking)
- cater for personal fitness (walking, cycling, jogging, exercise)
- potential to cater for new active trends (skate uses, adventure playgrounds)
- community gathering space
- flexibility and adaptability in planning to cater for changing community needs
- provide safe and secure recreation environment

recognise specific opportunities provided by the St Marys site

- cater for family use (playgrounds, kickabout with support facilities – shaded seating, some parking)

Baseline open space requirements

The 1999 St Marys Open Space and Recreation Plan identified a “needs based approach” to open space provision rather than simply a focus on numeric requirements. Penrith Councils subsequent PLANS (People’s Lifestyle Aspirations and Needs Study) research also identified the need to improve the quality of the City’s open space and facilities through a focus on quality (rather than just on quantity), and incorporating the principles of social inclusion and universal (accessible and inclusive) design.

Penrith Councils 2007 Open Space Action Plan builds upon the PLANS principles but also defines baseline open space provision ratios based on the average open space provision across the LGA for active and passive open space. This establishes a guideline provision only and a baseline reference for developing an open space plan for the site. The application of the baseline ratios to the projected population (2500) for the Central Precinct are listed below:

Active Open Space	1.4 ha /1000	3.5 ha
Passive Open Space	1.64 ha /1000	4.1 ha
Total	3.04 ha / 1000	7.6 ha



Natural values



Network connectivity



Responsiveness to needs

Above: Objectives of the Open Space Plan

Open Space and Landscape Opportunities

The Central Precinct site presents a range of specific characteristics and opportunities that must be considered in establishing the most effective open space provision and distribution framework that can not only address community needs and aspirations but be sustainable in the long term for Council.

Regional Park

The Central Precinct is bounded by the 900 ha Regional Park for much of its perimeter. The park edge may be fenced but general access and recreation opportunities, consistent with the St Marys Development Agreement and the draft Regional Park plan of management (POM) will be available. The St Marys Development Agreement (cl. 11.13) requires the POM to provide for certain matters, including:

- make reasonable provision for public access to the Regional Park
- the provision of opportunities, in an outdoor setting, for recreation and enjoyment in natural and modified landscapes
- provision for sustainable visitor use and enjoyment that is compatible with the conservation of the Regional Park's natural and cultural values

In addition, cl. 11.14 of the Agreement requires the consideration of certain principles in the objectives of the POM:

- the principles of environmental and economic sustainability
- the principle of social/community sustainability, involving eg: maximising educational and community interaction and passive recreation opportunities

These suggest that it is fundamental that the park interact with the local and broader community. Use of the Regional Park such as access to bush trails and internal park facilities will greatly enhance the recreational amenity available to Central Precinct residents. In addition the relationship to the "bushland edge" of the park for over half of the precincts boundary will be a significant influence on the landscape amenity and character of the urban development.

Discussions with Department of Environment and Climate Change (DECC) have also identified that it is highly likely that the "boot shaped" area of Regional Park projecting into the Central Precinct could play a role in the local open space network as Bushland type parkland similar to the "Woodlands Park" in the Eastern Precinct.

Regional Open Space

In close proximity to the Central Precinct is 40 ha of land dedicated as Regional Open Space to be managed by Council for regional use and benefit. Penrith Councils 2007 Open Space Action Plan and District Open Space Contributions Plan identifies the provision of a range of district level sporting and recreation facilities on the Regional Open Space land.

The Developer of the Western and Central Precincts has a contractual obligation with the Commonwealth Government to deliver district level sporting and recreation facilities on the land which likewise will greatly enhance the accessibility of quality recreational facilities to the Central Precinct population

Drainage and vegetation corridors

The development of riparian and vegetation corridors through the precinct provide potential for recreational and open space provision. It is proposed to construct several open space corridors (serving dual riparian and recreation function) and stormwater basins (also dual detention and recreation function) within the Central Precinct. This will provide open space adjacent to creeklines and water bodies which will enhance landscape amenity and diversity of experiences and visual settings available to the community.

Proposed Open Space Masterplan

The open space masterplan developed for the Central Precinct (refer Figure 1 below) provides an open space distribution and quantum that meets the needs of the new community for quality, accessible, and sustainable open space and takes into account site specific open space opportunities.

The total local open space contribution area of 7.6 hectares equates to 3.04 ha / 1000 population based on the population estimate for the Central Precinct of 2500. This comprises 3.5ha of active open space (located as an offset within the central Regional Open Space) and a total of 4.1ha passive open space.

The quantum recognises the following factors:

- distribution of open space adequately addresses the minimum target for accessibility to residences of 5 minutes walk generally
- the Regional Park and Regional Open Space accessible to the Central Precinct in addition to Regional Park areas suitable for use as passive open space supplement local open space in providing a “quantum” of space for recreational use
- the Regional Park context and the accessibility of corridor open space and linkages provides a high level of landscape amenity
- The Regional Open Space will also provide passive recreational amenity that will supplement the passive use local and pocket parks
- open space embellishment will provide a high level of landscape amenity that promotes “quality” of open space and recreational experiences
- the capacity of Council to effectively and sustainably maintain open space area must be considered - oversupply of poor quality open space is not a good or sustainable community outcome.
- in the context of the above factors the proposed open space masterplan reflects the needs based and qualitative approach as recommended in Council's PLANS strategy.

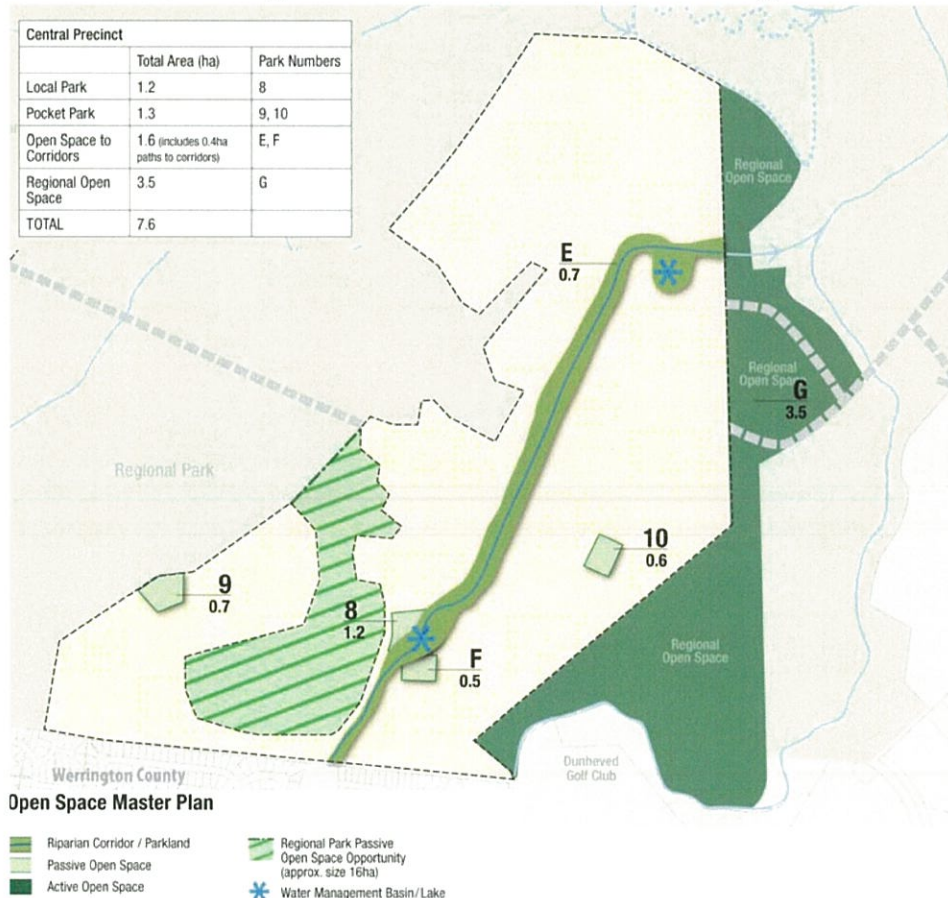


Figure 1: Open Space Masterplan

The process from here

Planning Agreement

The alternative open space masterplan as outlined is proposed to form the basis of ongoing negotiation of open space and embellishment contributions for the Central Precinct through the Planning Agreement process.

Open Space embellishment

The performance criteria identified in section 3.0 provide an indicative framework of items for consideration in embellishment of the open space system, and of the landscape settings to be developed and maintained.

Introduction

1.0

Background

The former Australian Defence Industries (ADI) site at St Marys was endorsed by the NSW Government for inclusion on the Urban Development Program (UDP) in 1993. The site was seen to present an opportunity to provide housing for Sydney's growing population within an environmentally sustainable framework.

The St Marys site is located approximately 45km west of the Sydney CBD, 5km north-east of the Penrith City Centre and 12km west of the Blacktown City Centre. The main western railway is located approximately 2.5km south of the site. The Great Western Highway is located another 1 km south and the M4 Motorway a further 1.5km south.

The overall site has an area of 1,545ha, and stretches roughly 7 kilometres from east to west and 2 kilometres from north to south, from Forrester Road, St Marys in the east to The Northern Road, Cranebrook in the west, Cranebrook in the west, and is bounded by Llandilo and Willmot in the north and Cambridge Gardens/ Werrington County and the Dunheved Industrial Area in the south. Figure 1.1 illustrates the site.



Figure 1.1 Location Plan of St Marys Development

Given that the site straddles the boundary between two local government areas (Blacktown and Penrith), the Government decided that a regional environmental plan should be prepared for the site. Technical investigations into the environmental values and development capability of the land were commenced in 1994, and the Regional Environmental Plan for St Marys (Sydney Regional Environmental Plan No. 30 (SREP 30)) was gazetted in January, 2001. It zoned the land for a combination of "urban", "employment", "regional open space", and "Regional Park" uses.

In view of the original scale of the residential and employment uses, a package of documents was prepared to guide and control development. It comprised SREP 30 (maps and written instrument), and an Environmental Planning Strategy (EPS) which sets out performance objectives and strategies to address key aspects associated with the site, including: conservation, cultural heritage, water and soils, transport, urban form, energy and waste, human services, employment, and land contamination.

A Deed of Agreement was entered into in December 2002, between the landowner and developers of the land (a Joint Venture comprising ComLand and Lend Lease Development) and the NSW Government setting out the developer's and State Government's responsibilities in providing services and infrastructure.

SREP 30 identified 6 development "precincts" (known as the Western Precinct, Central Precinct, North and South Dunheved Precincts, Ropes Creek Precinct and Eastern Precinct).

SREP 30 requires that a Precinct Plan be adopted by Council prior to any development taking place.

Planning for any precinct is to address all of the issues in SREP 30 and the EPS, including preparation of management plans for a range of key issues.

In March 2002 the Commonwealth Government advised that those areas of the site listed on the Register of the National Estate should be excluded from urban development. This had the effect of changing the boundaries of the areas to be set aside for conservation. The precincts available for development are shown in Figure 1.2.



Figure 1.2 – St Marys development precincts

On 29th December 2006 the Minister for Planning declared the Western and Central Precincts Release Areas, paving the way for the preparation of a Precinct Plan for these areas. The Landscape and Open Space Masterplan has been prepared in accordance with the requirements of SREP 30 and the St Marys EPS, the Penrith Open Space Action Plan (2007), and the Penrith Sustainability Blueprint for Urban Release Areas (2005) and addresses all relevant legislation.

The report supports the draft Precinct Plan for the Central Precinct.

1.2 Open Space Planning Process

The development of the strategy has been based upon the following process.

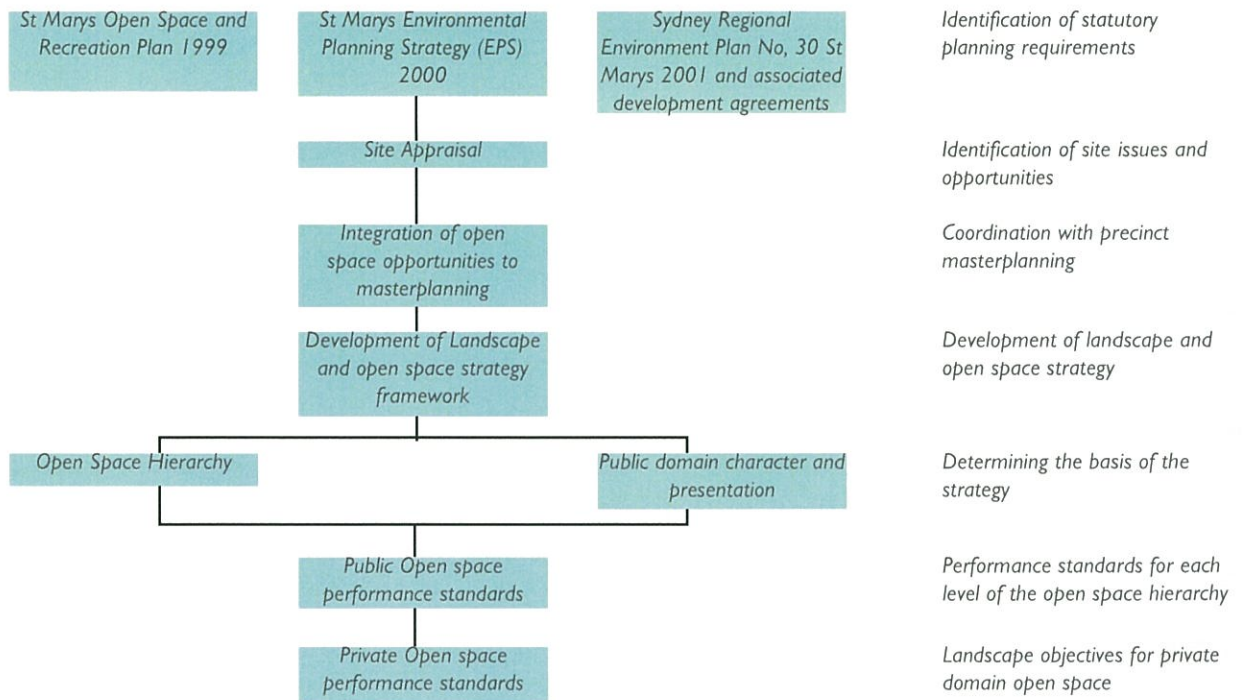


Figure 1.3: Landscape & Open Space Planning Strategy

1.3 Structure of the Report

Section One – Introduction

Background to the precinct planning process and review of the key site characteristics of significance to open space planning for the site. An open space / landscape strategies framework describes a strategic development process for the Central Precinct.

Section Two – Open Space Strategy

The development of an open space hierarchy is described that establishes an integrated network of open space, defining a setting and character for the development and which will encourage the new community to seek and enjoy recreation within their locality.

Section Three – Open Space Performance Standards

A series of performance standards are identified for open space and related landscape outcomes, which aim to ensure that a coordinated structure of natural and recreational open space is conserved, designed, and implemented achieving sustainable landscape setting and quality benchmarks. Maintenance requirements for the hierarchy are outlined in the separate Landscape Maintenance and Handover Report.

Section Four - Public Domain Character and Presentation

Standards for public domain character and presentation are outlined which identify character types appropriate to the elements of the open space hierarchy based on function, usage and general site opportunities. Design and materials treatments principles for landscape implementation are also identified.

Section Five – Private Domain Landscape Outcomes

To assist in complimenting the overall open space and landscape strategy with its strong linkages to the Regional Park context, broad objectives for private open space landscape are provided as a reference target.

Section Six – Appendix

Section Six provides an appraisal of responses to these key planning requirements of the St Marys EPS, SREP, and PCC's Sustainability Blueprint (2005) and Open Space Action Plan (2007) relevant to open space and landscape planning.

1.2 The Shared Vision

Project Vision

The St Marys Development will be a cohesive community that meets the needs and aspirations of all stakeholders. It will be an integrated, thriving and vibrant place centred on the core elements of learning, community interaction and engagement, housing diversity, enterprise and sustainability. It will capitalise on connections with nature and open space, respecting the natural and rural qualities of the region.

Key Elements Driving the Vision

Learning – access to whole of life learning

Diversity – mixture of uses and housing

People Focused – safe, accessible, community centric, lifestyle driven

Employment – employment for local residents providing 21st Century jobs, enterprise capability

Innovation – creative, distinctive, functional and responsive

Collaboration – partnership and integration

Sustainability – a holistic approach to social, economic and environmental outcomes, consistent with Council's 'Sustainability Blueprint for Urban Release Areas'

Delivery – timely delivery of facilities to meet the needs of the community

Design – provision of safe, well-designed and high quality urban environments that foster a cohesive community

Value & Place Attributes

A real place where you feel you belong and can contribute to the life of the community

A planned community that features places and spaces for today and tomorrow's needs

A walkable place where you can walk or cycle safely to school, work and other destinations – a place that caters for personal mobility choice, regardless of age or level of ability

1.3 Site Appraisal

The following summary provides a review of the key landscape issues identified in the appraisal of the existing site as part of this report. The outcomes are summarised on the diagrams on the following pages:

- Figure 1.4 Topography: summarises the key topographic features of the site, and resulting major view corridors
- Figure 1.5 Landscape Character: Identifies key character zones in terms of enclosure exposure, and topography along with major stands of existing vegetation
- Figure 1.6 Development Constraints & Opportunities: Identifies key open space and landscape factors for consideration in urban planning for the precincts

Key observations from each of these maps are listed following.

Figure 1.4 Topography:

- Central Precinct typified by generally level topography related to the creek floodplain in its central to northern zones with undulating slopes on the south
- Strong visual enclosure of site on western edge by vegetation within the Regional Park and to Regional Open Space to east

Figure 1.5 Landscape Character:

- Predominantly cleared undulating landscape
- Stands of tree canopy through central zone of precinct
- Scattered tree canopy through Regional Open Space
- Strong relationship to Regional Open Space
- Time lag for establishment of new tree plantings — potential for early works

Figure 1.6 Development Constraints and Opportunities

- Moderate to low falls for drainage through Central precinct
- Central Precinct is generally level without strongly defined aspect
- Open space opportunities around significant stands of trees
- Open space opportunities around indicative drainage basins and drainage lines within the precinct.
- DECC has advised the “boot” area of Regional Park that extends into the Central Precinct has potential for use as local passive open space and may not be fenced. The potential role of this area as open space should be explored further through planning agreement discussions.
- The proximity to the Regional Open Space provides the opportunity for active and passive recreational use by the community of the Central Precinct.



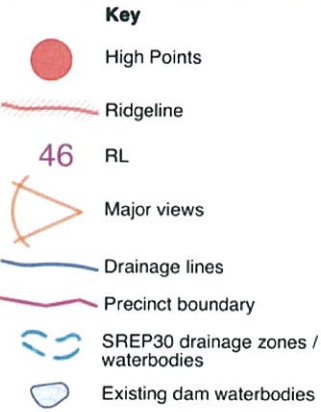
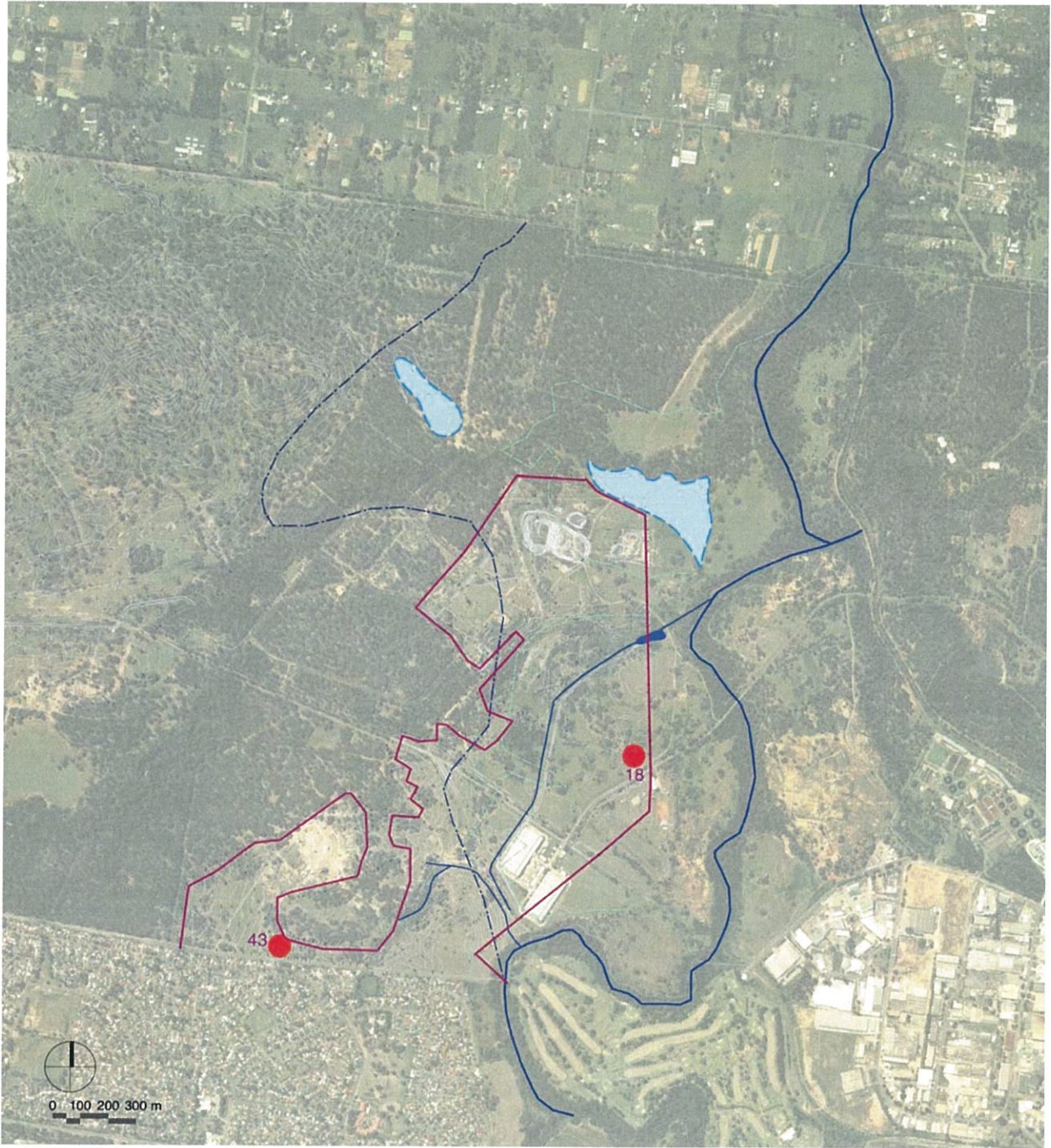
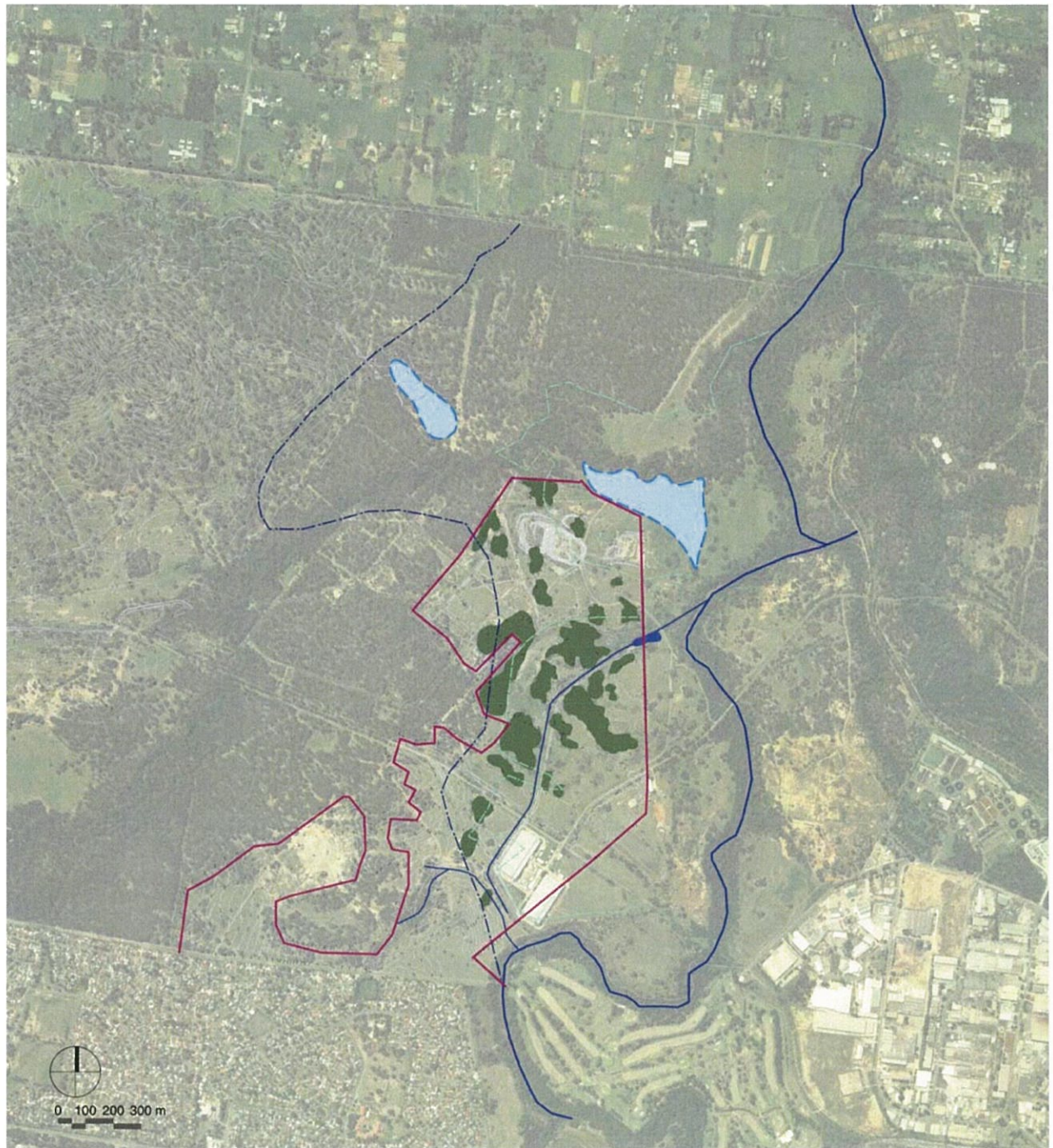


Figure 1.4 Topography and visual features



Key





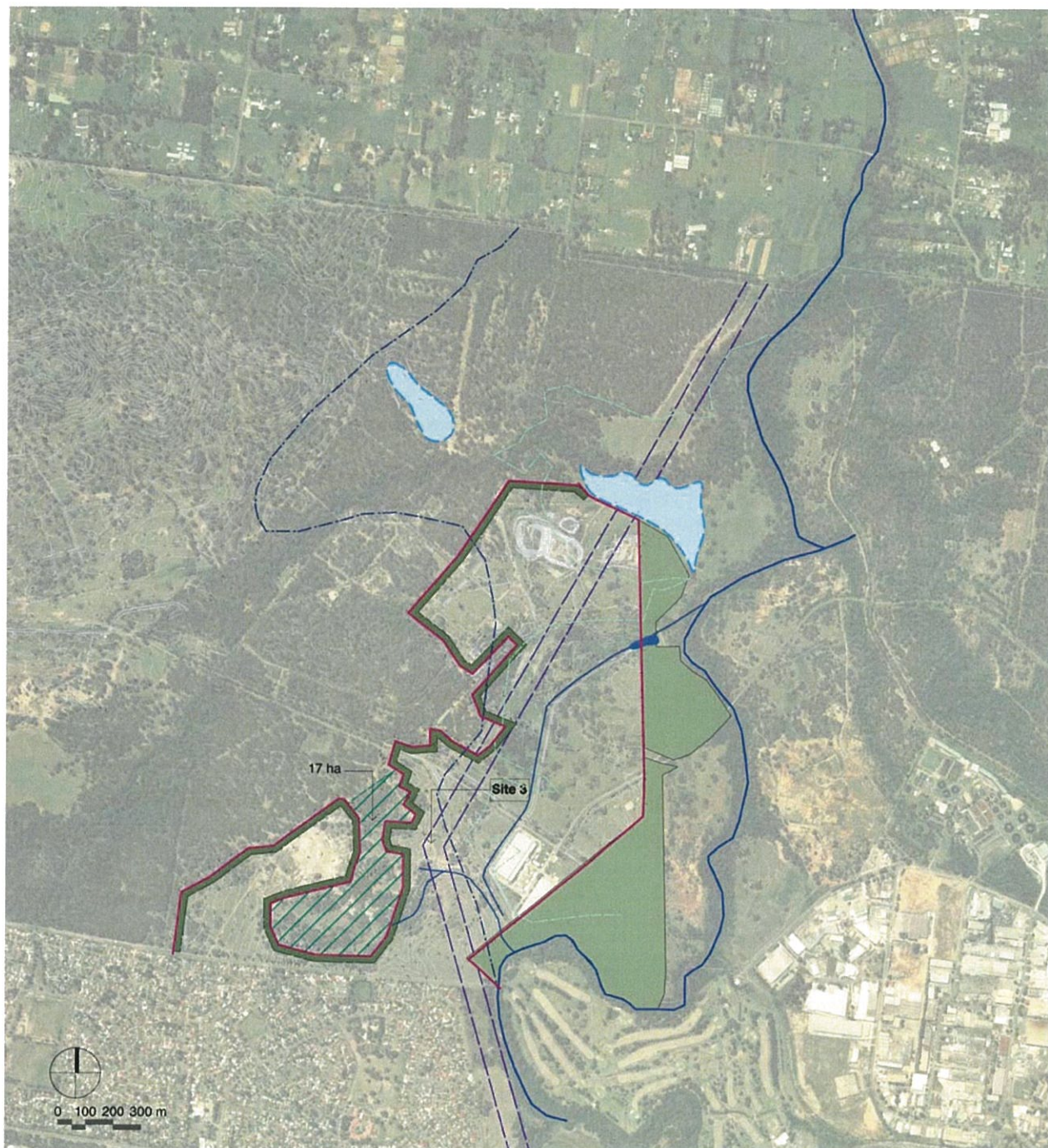
-  Major stands of existing vegetation
-  Existing artificial water bodies
-  SREP30 drainage zones
-  Proposed drainage basins

Figure 1.5 Landscape Character



Key

- Areas limited by spatial constraints from urban development
- Isolated zones from main development area
- Proximity to Northern Road - visual and noise exposure
- Steepest topography (over 1:10 slope)
- Asset Protection Zone (indicative)
- PMF
- High voltage power easement
- Regional Park areas not anticipated to be fenced by DECC - Potential open space role subject to discussion
- Regional Open Space

Site 3 Site 3 Cultural Heritage Site

Figure 1.6 Development Constraints / Opportunities

1.4 Open space / landscape strategies framework

A series of open space, landscape, and recreational values have been identified for the Central Precinct. The following framework relates these values to desired outcomes / objectives and opportunities and constraints that will influence realisation of the outcomes. Potential strategies for landscape and open space planning and management are listed to resolve open space hierarchy and performance standards.

Landscape and Open Space Values of the St Marys site

The Central Precinct site described in this report is one of strong individual identity and character. Foremost is the urban development area's relationship to the 900 ha Regional Park which conserves the highest quality biodiversity values and potential habitat zones.

The Central Precinct is bounded by the Regional Park for its western perimeter and draw on its values and qualities. To the east the precinct is bounded by the Regional Open Space which will likewise contribute to visual and recreational amenity of residents.

This requires that planning, design, and management strategies respond to both the physical and cultural values of the Regional Park and of the urban development area proper to facilitate a quality and sustainable community.

The summary values below for the Central Precinct should be addressed in open space planning. The strategies framework on the following explains how the constraints and opportunities presented by the site may address the site values.

Natural Values

- biodiversity conservation and enhancement
- appropriate conservation of natural vegetation
- water cycle management

Cultural values

- Aboriginal cultural heritage
- European cultural heritage
- views

Connectivity

- open space corridors
- off road cycle and pedestrian linkages
- access to Regional Park
- regional connections

Multi- use facilities

- linkages between facilities
- diversity of open space types
- practical / functional open space
- adaptability

Responsiveness to needs

- family recreation
- access and fitness trails
- adaptability
- sustainability

Landscape Strategies Framework				
Value	Objective	Opportunities	Constraints	Strategies
Natural environment	Appropriate and integrated conservation of natural canopy and understorey for flora and fauna protection and biodiversity enhancement	Regional vegetation corridors	Reduction in open space utility and flexibility	Locate open space around significant (good quality) stands of existing trees outside regional corridors
		Quality stands of trees along existing drainage corridors	Requirements for modifications to drainage corridors to cater for increased stormwater volumes. Cut and fill required.	Maximise conservation of existing drainage lines for drainage and vegetation retention purposes Effectively design any upgrading of drainage lines to conserve existing trees
		Individual trees and stands of existing trees through the site	Safety of residents	Appropriate and healthy trees retained where possible in road reserves
	Landscape planting to respond to Biodiversity Values of Regional Park	Potential to collect native seed stock for propagation of plant material for landscape plantings to ensure local provenance and genetic integrity is maintained	Implementation of some native tree species in urban environment: – limb and branch drop – general instability	Design of open space area embellishment to maximise use of existing site indigenous plant material
				Design of streetscape and urban public domain spaces to incorporate existing site indigenous plant material where practical, or native plant material generally (to continue visual character)
				Appropriate exotic / deciduous trees to be selectively used in urban public domain spaces to complement built character and provide micro climate benefits
	Effectively manage relationship or urban development to adjoining Regional Park	Much of the site is enclosed by Regional Park – bushland setting	Potential impacts of residential gardens, etc. at edges to Regional Park	Where possible edge to regional park to be formed by functional zone such as road, pathway or open space integrated as bushfire protection reflecting bushfire management requirements for urban development
	Habitat values of open space corridors watercourses / bodies to be maximised	Aquatic habitat at waters edge and within swales of wetlands	Design suitability of hard water edges to some water bodies for habitat enhancement / salinity management	Conserve and enhance natural edges and riparian vegetation zones to existing creek line water bodies
				Incorporate habitat voids and niches in hard water edges to artificial water bodies and integrate with natural / vegetated edge
				Maximise overhanging native vegetation at edges of water bodies
	Optimise role and benefit of open space in water cycle management for the urban development	Existing drainage lines generally support existing tree and understorey vegetation	Generally flat upper half of site – minimal fall for drainage	Conserve and enhance drainage lines as natural corridors – also providing for off road access
		Potential use of corridors for off road pedestrian / cycle access		Provide shared access paths to corridors and APZ zones where possible as part of an integrated access network
		Potential recycling of water for irrigation	Impact of irrigation on water table and high salt content of soils needs to be managed	Design to consider minimal irrigation requirement to reduce impacts on water table and recurrent water use
		Water Sensitive Urban Design Strategy will provide additional natural corridor values	Ensuring water quality objectives are met prior to stormwater discharge off site	Where irrigation is to be provided (eg. playing fields) use strategies to limit impact on water table (eg. drainage, programming)
				Investigate storage and recycling of water to supplement irrigation needs
				Maximise use of recycled (treated) water where suitable for irrigation purposes in partnership with Sydney Water
Cultural role	Conservation and optimisation of interpretation of Aboriginal cultural heritage values in relation to site	Potential to research and develop interpretive / educational focus through oral history and Aboriginal site / area habitation and use	Limited physical sites in urban development area	Plan of Management for Regional Park shall consider development of Aboriginal cultural heritage themes and interpretation in appropriate bushland context

Landscape Strategies Framework				
Value	Objective	Opportunities	Constraints	Strategies
Cultural role (continued)	Optimise educational role of open space network	High quality natural and cultural heritage qualities of the site	For residents – static interpretation (eg. signage) can lose interest over time	Quality / evolving interpretive programme (natural and cultural heritage) linked to open space for educational, public art, and recreational benefit
	Open space system to assist in development of sustainable and vibrant community	Community pride and identity	Limited sphere of interest of typical residential communities in broader community values	Promote community and civic pride in the open space and landscape identity of the development through the provision of quality but practical environment
		Potential community meeting / gathering places in a variety of contexts	Central meeting place should be located near to complementary community and retail facilities	Incorporate public art in design and embellishment of open space
			Lack of knowledge / interest in sustainable practices	Public gathering spaces related to Village Centre will offer potential for outdoor activities Smaller meeting spaces incorporated through the open space network Design and treatments to promote visibility and legibility of sustainable strategies
Open space	Well sited and integrated open space network to balance Regional Park	Open space to integrate and provide access to Regional Park	Management of Regional Park yet to be defined	Ensure Regional Park values are protected, enhanced and complimented by Central Precinct open space
	Community role of open space network to be maximised	Use existing site features and character where possible to optimise park setting	Park facilities need to be usable	Quality of parks to be maximised: - setting (use of remnant trees, pleasant views, and visual character) - provide good quality facilities
			Size of open space can limit long-term utility and ability to adapt to future needs	Ensure parks are of an adequate size to enable a quality landscape setting and adapt to changing use over time Intimate spaces be integrated within basic structure of open space along CPTED design principles
		Panoramic views from south east of site to Blue Mountains and southwards	Areas having views are also exposed to westerly / south westerly winds	Locate open space and pedestrian / cycle access where possible to take advantage of views whilst providing protection from winds
	High level of community accessibility to open space	Use of green corridors to link open space system	Distance of open space for residents	Open space located within walking distance (5 minute) of residential areas
			Quality and safety of open space and access system eg. paths and street interface	Variety of facilities integrated throughout Central Precinct that will ensure all age groups (in particular teens) will be catered for Design of open space to have regard for safety and security issues Links to open space to residential areas by quality footpath and through park pathway system
			Potential to use streets, parks, and drainage / vegetation corridors to provide network	Lighting to be provided to major links
				Provide an access network for pedestrians, cyclists, and joggers that links open space, residential areas and the village centre
				Pedestrian, cycle and jogging access through parks maximised – and where provided on streets – located in a wider landscaped setback
		Access to Regional Park for residents and broader community	Potential input of Regional Park access on local open space and residential amenity	Pedestrian and cycle links to Regional Park maximised reinforcing appropriate local and regional access points
	Sustainable quantum of open space	Regional Park, Regional Open Space, and green corridors supplement local open space in providing open space and recreational opportunities	Potential over supply of open space area compromising quality of open space and capacity for Council to maintain open space in the long term	Open space planning to provide a holistic approach that considers the range of site specific open space opportunities along with Council's baseline ratios in providing a sustainable and effective open space network for the community



Open Space Strategy

2.0

2.1 Objectives for open space provision and distribution

Objectives to be addressed in the open space plan include:

recognition of natural values

- retention of appropriate natural canopy and understorey in green corridors or within open space
- effectively manage relationship of urban development to the adjoining Regional Park
- optimisation of role and benefit of open space (eg. water, soils, salinity)

recognition of cultural values

- conservation of significant heritage elements
- interpretation of cultural heritage values to enhance community experiences
- facilitation of sustainable and vibrant community
- development of identity

network connectivity

- serving a practical user catchment (ie within walking distance)
- linked to broader regional network of open space and access (ie Ropes and South Creeks and the Regional Park)

multi use facilities

- open space / recreation linked to other community facilities
- combination of open space types to provide opportunity for a variety of facilities
- be of practical dimensions to achieve the recreational / landscape role intended
- optimise role of Regional Open Space

responsiveness to needs

- cater for family use (playgrounds, kickabout with support facilities – shaded seating, some parking)
- cater for personal fitness (walking, cycling, jogging, exercise)
- potential to cater for new active trends (skate uses, mountain bikes, adventure playgrounds)
- community gathering spaces
- flexibility and adaptability in planning to cater for changing community needs
- provide safe and secure recreation environment

recognise specific opportunities provided by the St Marys site

- recognise in consideration of open space quantum, distribution and design the specific opportunities provided by the St Marys site.

2.2 Penrith City Council baseline requirements

The guiding open space and recreation document for the Environmental Planning Strategy of 2000 was the 1999 St Marys Open Space and Recreation Plan which identified a "needs based approach" to open space provision rather than simply a focus on numeric requirements. Penrith Councils subsequent PLANS (People's Lifestyle Aspirations and Needs Study) research identified:

"the need to improve the quality of the City's open space and facilities through a focus on –

- quality (rather than just on the quantity) through larger open space areas that provide a range of experiences for different age groups and interests, and
- incorporating the principles of social inclusion and universal (accessible and inclusive) design into the planning and design of open space areas."

Penrith Councils 2007 Open Space Action Plan builds upon the PLANS principles but also defines baseline open space provision ratios based on the average open space provision across the LGA for active and passive open space. These targets must be equated against current population projections for the site.

This establishes a guideline provision only and a baseline reference for developing an open space plan for the site. It is also important to consider the specific characteristics of the site in terms of open space and landscape opportunities and in particular the PLANS principle of a focus on quality of experiences and facilities rather than quantum only.

Figure 2.1 below lists the application of the baseline ratio to the projected population for the Central Precinct.

Baseline Open Space Provision

Penrith City Council 2007 Open Space Action Plan

Component	Projected Development Population	Base requirement - 2007 Penrith Open Space Action Plan	Baseline Open Space Provision
Central Precinct	2500		
Active Open Space		1.4 ha /1000 pop	3.5 ha
Passive Open Space		1.64 ha /1000 pop	4.1 ha
Total Open Space		3.04ha /1000 pop	7.6 ha

Figure 2.1 Baseline open Space Provision table

2.3 Site Opportunities

The key site opportunities to be considered are outlined further below:

Regional Park

The Central Precinct is bounded by the 900 ha Regional Park for over 60% of its perimeter. The park edge may be fenced for protection of flora and fauna values but general access and recreation opportunities, consistent with the St Marys Development Agreement and the draft Regional Park Plan of Management (POM) will be available. The St Marys Development Agreement (cl. 11.13) requires the POM to provide for certain matters, including:

- make reasonable provision for public access to the Regional Park
- the provision of opportunities, in an outdoor setting, for recreation and enjoyment in natural and modified landscapes
- provision for sustainable visitor use and enjoyment that is compatible with the conservation of the Regional Park's natural and cultural values

In addition, cl. 11.14 of the Agreement requires the consideration of certain principles in the objectives of the POM:

- the principle of environmental sustainability
- the principle of economic sustainability
- the principle of social/community sustainability, involving eg: maximising educational opportunities for school and community groups; maximising opportunities for community interaction and passive recreation within the Regional Park.

These suggest that it is fundamental that the park interact with the local and broader community. Access to bush trails and internal park facilities will greatly enhance the recreational amenity available to Central Precinct residents.

In addition the relationship to the "bushland edge" of the park for over half of the precincts boundary will be a significant influence on the landscape amenity and character of the urban development.

Discussions with Department of Environment and Climate Change (DECC) have also identified that it is highly likely that the "boot" shaped area of Regional Park projecting into the western edge of the south section of the Central Precinct could play a role in the passive open space network as bushland type parkland similar to the "Woodlands Park" in the Eastern Precinct.



The current Regional Park "boot" offers potential for passive open space use

Regional Open Space

In close proximity to the Central Precinct directly adjoining the Central Precinct is 40 ha of land dedicated as Regional Open Space for regional use and benefit. Penrith Council's 2007 Open Space Action Plan and District Open Space Contributions Plan identifies the provision of a range of district level sporting and recreation facilities on the Regional Open Space land. The developer of the Western and Central Precincts has a contractual obligation with the Commonwealth Government to deliver a range of district level sporting and recreation facilities on the land which likewise will greatly enhance the accessibility of quality recreational facilities to the Central Precinct population.

Drainage and vegetation corridors

The development of riparian and vegetation corridors through the precinct provide potential for recreational and open space provision. It is proposed to construct several open space corridors (serving dual riparian and recreation function) and stormwater basins (also dual detention and recreation function) within the Central Precinct. This will provide open space adjacent to creeklines and water bodies which will enhance landscape amenity and diversity of experiences and visual settings available to the community.

2.4 Principles for open space provision and distribution

The proposed open space plan puts forward an alternative scenario in terms of open space quantum to the base requirements outlined in 2.2. Broadly the plan arising develops the following principles whilst addressing Council's open space classifications (Open Space Action Plan -2007):

1. Local park at centre of neighbourhood as recreational, civic, and landscape focus
2. Residents within walking distance (5 minutes) of quality open space
3. Central active recreational parkland that builds upon and complements active and passive recreational facilities through the development and relates to the Village Centre community and educational facilities.
4. Locate parklands to take advantage of quality existing tree canopy where possible
5. Provide access to recreational and environmental amenity of Regional Park and Regional Open Space to complement local open space provision
6. Balance quantum of open space for residential population against quality of open space settings and experiences and diversity and range of recreational and lifestyle opportunities available.
7. Provide a sustainable quantum of open space that does not place demand on Council's maintenance resources without tangible benefit for the community.

2.5 Proposed Open Space Plan

Open Space Hierarchy

The proposed open space hierarchy responds to the categories of open space as defined in Penrith Council's 2007 Open Space Action Plan (OSRP). These are listed in the table below in relation to the categories outlined in the 1999 Open Space and Recreation Plan prepared by Clouston, and to which the Environmental Planning Strategy (EPS) and REP refer.

EPS / OSRP 1999 OPEN SPACE ELEMENT	SIZE RANGE	ACCESSIBILITY	PROPOSED HIERARCHY	SIZE RANGE	ACCESSIBILITY	CHARACTERISTICS
District facilities & Open Space			District facilities & Open Space			Range of sporting facilities in the Central Regional Open Space Specific facilities will be determined through consultation with key stakeholders
Level One Park	5.8 ha	District	District Park	>5 ha	District	
			Neighbourhood Park	up to 5 ha	Serves cluster of suburbs	
						<ul style="list-style-type: none"> • Focus of village • Major open space network access point • Active recreation focus • Passive park component • Dual use with educational facilities • Limited to pedestrian and cycle access systems
Level Two Park	1.5-2 ha		Local Park	0.5-3ha	2km	
						<ul style="list-style-type: none"> • The focus of neighbourhood • Individual theme based on physical and cultural characteristics • Linked to pedestrian and cycle access system • Variety of facilities including play/picnic needs
Level Three Park	0.5-1.2 ha		Pocket Park	0.25-1 ha	5 minute walk 500-600m	
						<ul style="list-style-type: none"> • Less Structured / formal • Serving local catchment • Incorporating playgrounds where required for equitable distribution

Figure 2.2 Relationship of PCC Open Space Action Plan hierarchy to EPS Classifications

Brief descriptions and roles of the components of the proposed hierarchy follow. These are based on the 2007 Penrith Open Space Action Plan (OSAP). include the addition of several further categories of open space to best realise the opportunities presented by the site:

District Facilities > 5ha

Recreational facilities used by and benefiting a district (eg. St Marys) catchment. The OSAP identified the potential contributions to existing Regional Facilities in the surrounding area that may be used by residents of the new community (eg. Potential Penrith Lakes district sporting complex). For the Western and Central Precincts these contributions may include facilities with the Regional Open Space adjoining the eastern edge of the Central Precinct

District Park

A District Park is greater than 5 hectares. It provides a wide range of recreational experiences for individuals, groups, families and communities. It will also provide experiences and facilities for the City's visitors. A District Park is accessible by public transport, and typically includes car parking, and toilet and change room facilities that may be associated with formal active sports facilities. District Parks will provide visitor facilities, such as BBQs and picnic furniture, lighting, attractive landscaped areas, shade structures where natural shade is not available, and universally designed playground systems (in areas of priority within the city). Recreation areas and facilities that cater for a range of age groups will also be available, such as pedestrian and cycle way systems, and informal areas for sports and recreation.

Neighbourhood Park Parks up to 5 ha

A Neighbourhood Park will be up to 5 hectares in area, and typically serves a 'cluster' of suburbs. Neighbourhood Parks will generally be accessible to bus routes, include (limited) parking, and have lighting, attractive landscaped areas, pedestrian and cycle ways, playground structures, standard toilet facilities, natural shade, and picnic and visitor facilities. A Neighbourhood Park could include a sports field suitable for children's training and competition activities, and other formal or informal (non-competitive) recreation areas. It is proposed that neighbourhoods parks may develop a design and facilities theme distinguishing it from that of the other neighbourhoods, and as such may draw on a larger user catchment than purely the local neighbourhood.

Local Parks 0.3 - 5 ha

A Local Park will be from 0.5 to 3 hectares in area, and primarily serves a suburb, or an area up to 2km in radius. The Local Park will typically have on street parking, landscaping, natural shade, park benches and seating, and a playground area (no toilet facilities).

Pocket Parks 0.25 to 1ha

A Pocket Park will be between 0.25 and 1 hectare in area, and caters for the local area. It will be within a 5 minute walk from most households (400m – 600m radius). The Pocket Park will typically include natural surface and shade areas, sometimes seating, informal play and passive recreation areas, and may have some play equipment. Pocket Parks will provide passive recreational use over a smaller sub-neighbourhood catchment, and as such will be distributed and sized to provide equitable access to open space for all residents. Parks will be developed under two general themes:

Sub-neighbourhood Parks: located within Neighbourhood Parks to supplement Local Parks for open space distribution

Bushland Interface Parks: adjoining Bush Fire Protection Zone and Regional Park

Additional open space categories

Other elements of the proposed open space hierarchy are listed following:

Drainage and vegetation corridors

Vegetation and drainage corridors in which existing and proposed drainage lines will be enhanced, existing vegetation will be retained, and through which shared cycle / pedestrian access (for off road access linkages between the neighbourhood areas of the development) will generally be provided. Some corridors may also include basic exercise equipment.

Within corridor zones any drainage channel area (including base and embankments) and required buffer zone (20m overall - nominal 10m each side minimum buffer) is not included in complying open space calculations in this masterplan. However it is proposed at several locations open space nodes are provided in addition to drainage and buffer requirements to supplement the local open space network. Access paths within the corridors may also be included as complying open space (based on Council's 2007 OSAP). These spaces will benefit from proximity to vegetation and access corridors and water edge situations to specific locations (adjoining drainage basins).

Corridors may require traversal by roads and services to ensure that infrastructure is developed in a manageable and interconnected arrangement. Such crossings will be minimised and the intrinsic qualities of the corridors (including habitat / biodiversity) maintained through appropriate design and detailing. Design will minimise tree removal, and maintain fauna movement function in the corridor.

Bush fire asset protection zones

A variable bushfire asset protection zone (APZ) has been defined for the Western Precinct by the 2008 Bushfire Management Plan for the Western and Central Precincts adjoining the Regional Park boundary to the development. These zones will incorporate roadways in some cases, effecting a management and environmental buffer between residential lots and the Regional Park. The zones also provide further opportunities for cycle / pedestrian access, and for consolidation with adjoining "interface parks" as identified earlier.

Quantum of Open Space

The proposed open space hierarchy as identified on the following page on Figure 2.2 and on the Open space Masterplan - Figure 2.3 has considered the provision of open space on the site addressing the objectives and principles for open space provision and distribution and the specific opportunities the site presents. The open space masterplan provides an open space distribution and quantum that meets the needs of the new community for quality, accessible, and sustainable open space.

The total local open space contribution area of 7.6 hectares equates to 3.04 ha / 1000 population based on the population estimate for the Central Precinct of 2500. This comprises 3.5ha of active open space (located as an offset within the central Regional Open Space) and a total of 4.1ha passive open space.

The quantum recognises the following factors:

- distribution of open space adequately addresses the minimum target for accessibility to residences of 5 minutes walk generally
- the Regional Park and Regional Open Space accessible to the Central Precinct in addition to Regional Park areas suitable for use as passive open space supplement local open space in providing a "quantum" of space for recreational use
- the Regional Park context and the accessibility of corridor open space and linkages provides a high level of landscape amenity
- The Regional Open Space will also provide passive recreational amenity that will supplement the passive use local and pocket parks
- open space embellishment will provide a high level of landscape amenity that promotes "quality" of open space and recreational experiences
- the capacity of Council to effectively and sustainably maintain open space area must be considered - oversupply of poor quality open space is not a good or sustainable community outcome.
- in the context of the above factors the proposed open space masterplan reflects the needs based and qualitative approach as recommended in Council's PLANS strategy.

Open Space Masterplan

The table below identifies the hierarchy of open spaces comprising the proposed open space masterplan for the Central Precinct. The masterplan includes the following open space additional to neighbourhood, local and pocket parks:

- open space adjoining drainage and vegetation corridors which is additional to area required for drainage line and vegetation buffers (minimum 10m buffer each side of drainage line as identified in DWE creekline management requirements for St Marys site);
- pathways to drainage and vegetation corridors (nominal 2.5m width); and
- active facilities provided in Regional Open Space to Central Precinct as offset to active open space requirements;

which supplement local open space provision. Figure 2.3 opposite describes the proposed distribution of open space which is described further in section 2.6 Distribution of the Open Space Hierarchy.

Item	No.	Average Area	Total Area Cent prec
District Open Space			
District Park		in Western Precinct	
Neighbourhood Park (> 5 ha)		in Regional Open Space	
Facilities to ROS	G	3.5 ha	3.5 ha
Sub total			3.5 ha
Sub total active open space (PCC baseline active O/S - 3.5ha)			3.5 ha
Local Park (0.5-3ha)			
	8	1.2 ha	1.2 ha
Sub total			1.2 ha
Pocket Park (0.25-1ha)			
	9	0.7 ha	0.7 ha
	10	0.6 ha	0.6 ha
Sub total			1.3 ha
Open Space to corridors			
	E	0.7 ha	0.7 ha
	F	0.5 ha	0.5 ha
Paths to corridors (nominal 2.5m width x 1615 lin/m)	paths	0.4 ha	0.4 ha
Sub total			1.6 ha
Sub total passive open space (PCC baseline active O/S - 4.1ha)			4.1 ha
Total local open space- Central Precinct			7.6 ha
Other Open Space Resources			
Regional Park areas with potential for use as passive open space		17 ha	17 ha
PCC baseline open space requirement		7.6 ha	7.6 ha
Reference Total - Overall Open Space Resources		24.6 ha	24.6 ha

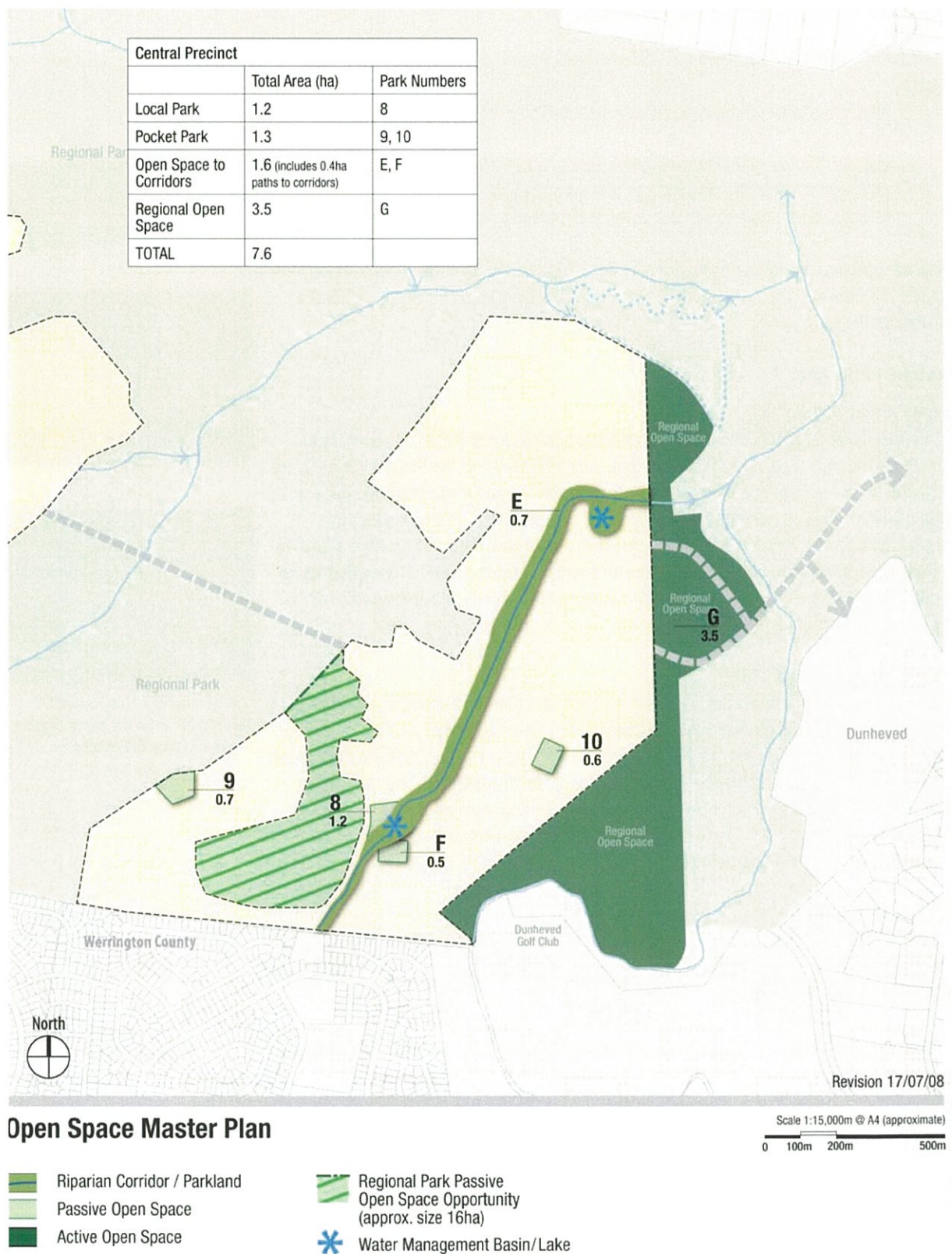


Figure 2.3 Open Space Masterplan

2.6 Distribution of the Open Space Hierarchy

Distribution of open space has been considered in response to several key site planning criteria:

- i. physical factors making areas suitable / attractive for open space / recreational use.
- ii. effective distribution of levels of open space to address accessibility objectives
- iii. provision of a diversity of landscape settings and visual experiences
- iv. linking of open space to corridor zones incorporating shared access

Key locational principles for the open space areas as identified on the Open Space Masterplan (Figure 2.3 - previous page) are listed following. These are based on the numbered parks indicated on the plan.

Locational Principles

Central Precinct Oval (G)

It is proposed that as an offset to the 3.5ha of active open space which would nominally be required for the Central precinct to develop equivalent facilities within the Regional Open Space where their relationship to adjoining facilities can be optimised and a significant recreational facility provided. This will compliment development of other district facilities through the Regional Open Space. Residents in both the Western and Central Precincts will have access to the high quality facilities to be provided in the 40ha Regional Open Space. Playing field layout will optimise retention of existing trees that are scattered through the site and relationship to the Central Precinct Village Centre.

Cultural Heritage Local Park (8)

Located to incorporate a significant European Heritage Item (Site 3 - brickworks associated with Elizabeth Farm - refer Archaeological Assessment by Casey and Lowe - 2008) in order to conserve the heritage fabric and provide opportunities for interpretation. Heritage themes can provide an identity for landscape enhancement and an added focus for use and recreational experiences. The space also potentially integrates with the Regional Park boundary and the drainage / vegetation corridor running north south through the Central Precinct. Space will take advantage of existing tree canopy.

Edge Pocket Park (9)

The park adjoins the Regional Park optimising landscape character and amenity. The park is located to provide optimum accessibility and function to adjoining neighbourhood area. Space will take advantage of existing tree canopy.

Central Pocket Park (10)

The central pocket park is located centrally to the adjoining residential neighbourhood to provide optimum accessibility and function. Space will take advantage of existing tree canopy.

Central Precinct North Corridor Park (E)

The park will be provided as a node in the northern arm of the north south drainage / vegetation corridor to compliment local and pocket parks in serving the adjoining neighbourhoods. Integration with corridor will optimise the landscape and visual amenity of the space and provide good connectivity via the corridor shared access path.



The open space hierarchy will incorporate a variety of open space in varied landscape settings

Central Precinct South Corridor Park (F)

The park will be provided as a node in the southern arm of the north south drainage / vegetation corridor to compliment local and pocket parks in serving the adjoining neighbourhoods. The space will be located to the eastern side of the corridor and will function with the Cultural Heritage Park open space (park no. 8) adjoining the western side of the corridor in forming a consolidated recreational space and entry point from adjoining neighbourhoods

Integration with corridor will optimise the landscape and visual amenity of the space and provide good connectivity via the corridor shared access path.

Corridors

Corridors primarily relate to site drainage lines formalised during the sites previous use to which native tree canopy has either been retained or evolved. In addition to access and habitat conservation the corridors provide a key role in the proposed water cycle management strategy for the site.

The overall width of the corridors will generally be greater than 30 m. A minimum of 10 metres of vegetation buffer will be provided beyond the top of embankment to both sides of drainage channels. To several locations additional open space is provided adjoining the corridor which compliments open space provision of Local and Pocket Parks

All corridors provide potential for provision of off road cycle / pedestrian linkages, of which the path surface is included in complying open space.

The Central Precinct also includes a transmission line easement running generally north south. It is envisaged that the easement may also play a role in cycle / pedestrian access provision in the precinct, along with contributing to landscape amenity through appropriate landscape embellishment in compliance with authority requirements.

Bush Fire Asset Protection zone (APZ)

This zone adjoins the urban development area on all boundaries to the Regional Park varying in different edge conditions but ranging from 10-25 metres in width.

As mentioned previously the zone plays a potential open space role in a number of ways:

- for consolidation with open space within the urban development to supplement open space quality; and
- for provision of additional off road cycle and pedestrian linkages.

It is understood that where possible the APZ will incorporate roadways enhancing the environmental buffer between residential development and the Regional Park.

2.7 Access to Open Space

As mentioned earlier it is proposed that the open space system supports an integrated network of access linkages catering for pedestrian and cycle areas between neighbourhoods, parks and the village centre.

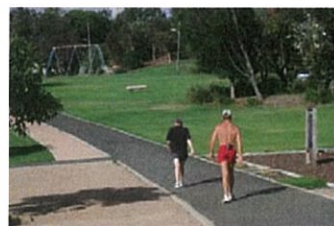
Figure 2.4 Access Masterplan describes the relationship of the access network to the open space system.

A series of access links is proposed to suit the open space categories, and road network:

- shared pedestrian / cycle path to corridors and corridor links through park areas
- dual or split pedestrian and cycle paths where corridors or parks convert to roadside access links
- dual or split pedestrian and cycle paths to roadside situations provided by means of a wider, landscaped setback.

The access network shall be planned and design to maximise safety and security observing all applicable width, signage, and sight line requirements. Planning shall also maximise connections to the street, and park system to optimise security and passive surveillance.

Section 3.0 - item j - Streetscapes and Access provides indicative sectional information on likely road corridors integrating shareway access.



The access network will pass through the drainage and vegetation corridor areas and key road corridors to link the open space system



Access Master Plan

Scale 1:15,000m @ A4 (approximate)
0 100m 200m 500m

- Riparian Corridor / Parkland
- Passive Open Space
- Active Open Space
- Regional Park Passive Open Space Opportunity (approx. size 16ha)
- Water Management Basin/Lake
- 500m Walking Distance

Note: Location of all elements indicative only, subject to confirmation via detailed design.

Figure 2.4 Access Masterplan



Open Space Performance Criteria

3.0

3.1 Generally

The principles identified in section 2.0 outlined in broad terms the general location of the open space components that may comprise the Central Precinct's open space network. The Performance Criteria listed in this section detail the base objectives which will be applied in detailed siting and design of the open space components, as planning for the site develops.

Criteria are generally listed in the following categories:

Definition:

Context and role within natural systems and open space hierarchy.

Intent:

Recreational and community function of open space element.

Locational principles:

Location and parameters for masterplanning and detailed planning.

User catchment:

Anticipated distance to travel for regular park usage.

Access / Linkages:

Relationship to public access networks.

Carparking:

Nature of carparking provision to be constructed.

Recreation Range and Facilities:

Scope of recreational facilities to be provided in open space embellishment.

Natural Systems:

Relationship and treatment of natural systems (vegetation, water, soils, etc) within the open space category.

Landscape Character:

Landscape identity to be pursued through open space planning, design, implementation, and management.

Management and Maintenance:

Potential category of open space in relation to the Local Government Act (Community Land Management) Amendment 1998 under which Council will manage community lands. Also outlines maintenance level applicable to the open space type.



District Park



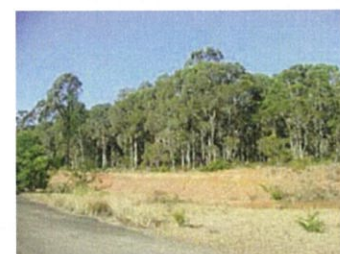
Neighbourhood Park



Local Park



Pocket Park



Corridors

a) Regional Park usage

A major feature of the urban development is its setting within, and relationship to, the Regional Park. The Regional Park provides amenity to the community both local and metropolitan both through the conservation of open space, and habitat values that it provides, along with its potential to provide a level of passive recreational and educational amenity sustainable within conservation objectives.

The St Marys Development Agreement (cl. 11.13) requires the RP POM to provide for certain matters, including:

- make reasonable provision for public access to the Regional Park
- the provision of opportunities, in an outdoor setting, for recreation and enjoyment in natural and modified landscapes
- provision for sustainable visitor use and enjoyment that is compatible with the conservation of the Regional Park's natural and cultural values

In addition, cl. 11.14 of the Agreement requires the consideration of certain principles in the objectives of the POM:

- the principle of environmental sustainability
- the principle of economic sustainability
- the principle of social/community sustainability, involving eg: maximising educational opportunities for school and community groups; maximising opportunities for community interaction and passive recreation within the Regional Park.

Key physical opportunities that may be incorporated in Regional Park establishment and ongoing management subject to the Regional Park Plan of Management include:

- park entries (incorporating parking and access entries);
- walking path access (integrated with access network through urban development);
- regional recreation links / multi-purpose trails;
- bushland setting picnic / barbecue facilities;
- interpretation facilities provided through the regional park;

It is noted that final usage planning is subject to DECC goals and objectives and ongoing discussions between DECC and Council.

As noted earlier in this report, discussions with Department of Environment and Climate Change (DECC) have also identified that the "boot" shaped area of Regional Park projecting into the Central Precinct (17 ha in area) may play a role in the local open space network as bushland type parkland similar to the "Woodlands Park" in the Eastern Precinct.

b) District facilities

The 2007 Penrith Open Space Action Plan identified some general directions for district open space enhancement relevant to the site. The proposed district facilities within the release area include :

- a senior AFL and cricket venue, local level playground, (St Marys Eastern Park Regional Open Space)
- a district level sports pavilion & field / outdoor entertainment venue
- a district level universally designed playground facility, amenities, shared path circuit

This Open Space Masterplan envisages the provision of a range of sporting and recreation facilities in the Central Regional Open Space (total approx. 40 ha), with good physical connection to the proposed Central Precinct Village Centre. The exact facilities to be provided will be determined following further consultation with key stakeholders, including PCC, Dept of Planning and potential user groups. This is consistent with both PCC's District OS Contributions Plan and the developers contractual obligation with the Commonwealth Government

c) Neighbourhood Parks - G Playing fields to Regional Open Space

Definition

A Neighbourhood Park will be up to 5 hectares in area, and typically serves a 'cluster' of suburbs. The park primarily caters for the active recreation of the precinct but usually will be integrated with elements associated with other parks.

Size range

3.5 ha (up to 5.0 ha in Council's Open Space Action Plan)

Intent

The open space will provide for active recreational use by the community, in a landscape context that maximises native tree canopy to provide visual and shade amenity. The open space will provide for multiple activities and act as a community focus

Locational principles

- Located within Regional Open Space to Central Precinct to optimise integration of recreational facilities to suit modern community needs
- Located to compliment other district facilities in Regional Open Space
- Close to retail centre, learning facilities, community facilities
- On major trunk road
- Close to bus routes
- Optimise use of existing level, highly modified, and sparsely treed areas

User catchment

0-2 kilometres to district use

Access / linkages

- located integrated with off road cycle and pedestrian access network

Carparking

- carparking considered in integration with other Regional Open Space uses to maximise shared use

Recreation range and facilities which may be considered for provision

- playing fields
- tennis courts
- basketball / netball courts
- Amenities block
- play space and picnic facilities
- night lighting to fields and courts configured to meet all relevant standards and prevent impacts on adjoining residential areas
- Playing field irrigation

Natural systems

- Optimise opportunities for native shade tree planting to street frontages, boundaries, and all spaces not affecting playing field and court recreational use
- Provide drainage management to control impact of field irrigation on ground water

Landscape character

- Parkland landscape character
- Urban / suburban presentation (park adjoining Village Centre should be of higher presentation)
- Ameliorate open character of fields as far as possible with native tree planting to provide shade and define usage areas
- Protect natural features
- Optimise access to views to west and south west through configuration and tree planting and planning of facilities

Management & maintenance

- Community land categorisation range
 - Sportsground
 - Park
- Suburban maintenance standard
- Playing field maintenance as outlined in Landscape Maintenance and Handover report



d) Local Parks - 8 Cultural Heritage Park

Definition

A Local Park will be from 0.5 to 3 hectares in area, and primarily serves a suburb, or an area up to 2km in radius. The Cultural Heritage park is located to incorporate the site of the former brickworks activities for the Elizabeth Farm Homestead. As such the park is aimed to provide a focus for heritage interpretation of the sites previous use (links to other heritage features and elements through the St Marys site. Around this focus, the park will provide a central open space for adjoining communities.

Size range

1.2ha (range of 0.3-5.0 ha in Council's Open Space Action Plan)

Intent

The cultural open space will provide a focal open space for the adjoining neighbourhoods, and reinforce the character of the Central Precinct - with mixed native and heritage relevant tree canopy for amenity planting. The park will provide a meeting place and place for passive and family recreation activities. The park will adjoin green corridors providing connections to the broader open space network, and will complement other parks and private open space in the provision of recreational opportunities to the community.

Locational principles

- Located on the site of former brickworks
- Linkages to corridor access system
- Optimise use of existing tree canopy

User catchment

0-2 kilometres

Access / linkages

- located integrated with off road cycle and pedestrian access network

Carparking

- parking spaces available on adjoining street frontages

Recreation range and facilities which may be considered for provision

- Interpretive design / signage
- Kick about area
- Shaded seating area
- Toddlers and children's playgrounds
- Path linkages
- Picnic / BBQ facilities
- Native canopy tree planting
- Limited garden bed planting
- Garden bed and grassed area incorporate public art in core design structure and as installations as appropriate
- night lighting of central park facilities to accommodate community use, within appropriate time frames

Natural systems

- Integrate existing tree canopy into park design / layout
- Tree and garden bed planting to focus on native plant species
- Potentially integrate water elements within park with stormwater management system, and water sensitive design generally

Landscape character

- Bushland, Woodland, Parkland, and open space water character
- Natural / suburban presentation
- Passive recreational nodes should develop a natural woodland canopy / character that provides a strong relationship to the Regional Park context and adjoining green corridors. Character transition from road edge to adjoining green corridor from parkland to woodland landscape.

Management & maintenance

- Community land categorisation range
 - Park
 - Natural Area Bushland
 - Natural Area Wetland
- Natural / suburban maintenance standard
- Landscaped Reserve maintenance as outlined in Landscape Maintenance and Handover report

e) Pocket Parks - Village Centre (eg. select areas of park E)

Definition

The Village Centre will incorporate public domain that provides centrally located, focal civic and community space. The spaces should have a strong relationship to the retail uses of mixed use development areas, and provide for a range of community uses including organised gatherings and events.

Size range

N/A

Intent

The Village Centre public spaces will provide both a visual and functional focus for the development that reflects it's identity of a "green urban" community. The design, materials, and activities catered in the village centre shall promote this identity.

Locational principles

- Located at the focus of the neighbourhood
- May be integrated into street network of village centre with strong retail focus
- Close to retail centre, learning facilities, community facilities
- On major collector road
- Close to bus route
- With close relationship to Regional park entry
- Optimise use of existing tree canopy
- Potential integration with water bodies

User catchment

0-2 kilometres serving the precinct - should offer variations in themes and facilities to Village Centre Park provided in Central Precinct.

Access / linkages

- located integrated with off road cycle and pedestrian access network

Carparking

- parking provided for on street frontages and through shared use of town centre commercial parking

Recreation range and facilities which may be considered for provision

- provide a range of spaces integrated with adjoining land uses
- reinforce the civic role of the town centre by creating areas suitable for both informal gatherings and public events, in addition to passive use by residents, visitors to the centre, and the local workforce
- passive use spaces (both hard and soft landscaped) buffered from vehicular traffic but related to pedestrian activity and flow
- incorporate a coordinated range of street furniture
- incorporate water elements as appropriate in core design structure
- incorporate public art in core design structure and as installations
- night lighting of town square within appropriate time frames

Natural systems

- Tree planting selected / designed for seasonal climate amelioration
- Tree and garden bed planting to potentially include both native and exotic species as applicable to meet design intent due to context within urban centre of development
- Potentially integrate water elements within Village Centre to stormwater management system

Landscape character

- Urban landscape character
- Plaza / square presentation
- Town centre character should embody the "green urban" theme of the development. This implies a hybrid landscape character that integrates both the natural vegetation image of the Regional Park setting but also the function of the space as a highly urban space of high usage and intensity of activity. As such it can be expected, that the town square would incorporate a proportion of paved areas catering for pedestrian movement and intensive usage

Management & maintenance

- Community land categorisation range – Park (if to be handed over to Council - subject to discussion)
- Manicured / Garden maintenance standard
- Landscaped Reserve maintenance as outlined in Landscape Maintenance and Handover report



St Marys Central Precinct I

e) Pocket Parks - 10 sub neighbourhood park

Definition

Pocket Parks are to provide smaller areas for passive recreation within close proximity (500 metres distance) within residential villages. The Open Space Hierarchy Plan provides indicative locations of Local Parks to be confirmed during ongoing development design to best suit masterplan requirements.

Size range

0.25-1 ha (range of 0.25-1.0 ha in Council's Open Space Action Plan)

Intent

Pocket Parks shall be provided either as stand alone spaces or integrated with other open spaces to provide greater accessibility to recreational opportunities in close proximity to residents.

Locational principles

- Located in ongoing development of the urban development plan to provide accessibility of residences to open space within walking distance
- Optimise use of existing tree canopy

User catchment

5 minutes walk

Access / linkages

- located integrated with off road cycle and pedestrian access network where possible

Carparking

- no parking required due to local residential use focus
- incidental street parking acceptable

Recreation range and facilities which may be considered for provision

- Open grassed area
- Shaded seating areas
- Internal / street path linkages, and connections to green corridor links
- Native canopy tree planting
- Limited garden bed planting
- Public art may be integrated with design of open space and facilities
- No parking spaces on site

Natural systems

- Integrate existing tree canopy into park design / layout
- Tree and garden bed planting to focus on native plant species
- Potentially integrate water elements within park with stormwater management system, and water sensitive design generally

Landscape character

- Bushland, Woodland, and Parkland landscape character
- Natural / suburban presentation
- Local Parks should develop a natural woodland canopy / character that provides a strong relationship to the open space network and Regional Park context

Management & maintenance

- Community land categorisation range
 - Park
 - Natural Area Bushland
 - Natural Area Watercourse
 - Natural Area Wetland
- Natural / suburban maintenance standard
- Passive Reserve maintenance as outlined in Landscape Maintenance and Handover report



e) Pocket Parks - bushland / corridor interface parks - 9

Definition

Bushland or corridor Interface parks are to provide smaller areas for passive recreation within close proximity (5 minutes walk) within residential neighbourhood (development sub-precincts), through consolidation adjoining corridor bushland areas. The Open Space Masterplan provides indicative locations of these parks to be confirmed during ongoing development design to best suit masterplan requirements.

Size range

0.7 ha (range of 0.25-1.0 ha in Council's Open Space Action Plan)

Intent

Bushland / Corridor Interface Parks shall be provided to supplement accessibility to recreational opportunities in close proximity to residential neighbourhoods, and to provide entry points to the pedestrian / cycle access network through the bushfire protection zone and corridors.

Locational principles

- Located in ongoing development of the urban development plan to provide accessibility of residences to open space within 5 minutes walking distance
- Optimise use of existing tree canopy
- Located adjoining bushfire protection zone or green corridors

User catchment

5 minutes walk

Access / linkages

- located integrated with off road cycle and pedestrian access network of the bushfire protection zone or green corridors

Carparking

- no parking provided due to local residential use focus

Recreation range and facilities which may be considered for provision

- Open grassed area
- Shaded seating areas
- Internal / street path linkages, and connections to cycle / pedestrian links in fire protection zone and green corridors
- Native canopy tree planting - non linked canopies within fire protection zone
- Limited garden bed planting
- Public art may be integrated with design of open space and facilities
- No parking spaces on site

Natural systems

- Integrate existing tree canopy into park design / layout
- Tree planting to focus on native plant species – canopy not to be linked through bushfire protection zone
- Potentially integrate water elements within park with stormwater management system, and water sensitive design generally

Landscape character

- Bushland, Woodland, and Parkland landscape character
- Natural / suburban presentation
- Bushland Interface Parks should develop a natural woodland canopy / character that provides a strong relationship to the Regional Park context

Management & maintenance

- Community land categorisation range
 - Park
 - Natural Area Bushland
- Natural / suburban maintenance standard
- Passive Reserve maintenance as outlined in Landscape Maintenance and Handover report



f) Open Space to Corridors -E, F

Definition

Open space nodes provided in addition to drainage and buffer requirements within corridors to supplement the local open space network. These spaces will benefit from proximity to vegetation and access corridors and water edge situations to specific locations (adjoining drainage basins). Access paths within the corridors may also be included as complying open space (based on Council's 2007 OSAP). The Open Space Masterplan provides indicative locations of open space to corridors to be confirmed during ongoing development design to best suit masterplan requirements.

Size range

0.5 - 0.7 ha

Intent

Open Space to Corridors shall be provided to supplement accessibility to recreational opportunities in close proximity with residential neighbourhoods, to provide open space adjoining feature water bodies, and to provide entry points to the pedestrian / cycle access network through the bushfire protection zone and green corridors.

Locational principles

- Located in ongoing development of the urban development plan to provide accessibility of residences to open space within 5 minutes walking distance)
- Located outside of functioning channel banks and required vegetation buffer zone (buffer zone totalling 20m both sides)
- Locate to optimise recreational opportunities adjoining permanent water bodies
- Optimise use of existing tree canopy

User catchment

5 minutes walk

Access / linkages

- located integrated with off road cycle and pedestrian access network of the bushfire protection zone or green corridors

Carparking

- no parking provided due to local residential use focus

Recreation range and facilities which may be considered for provision

- Open grassed area
- Shaded seating areas
- Internal / street path linkages, and connections to cycle / pedestrian links in fire protection zone and green corridors
- Native canopy tree planting - non linked canopies within fire protection zone
- Limited garden bed planting
- Public art may be integrated with design of open space and facilities
- No parking spaces on site

Natural systems

- Integrate existing tree canopy into park design / layout
- Tree planting to focus on native plant species – canopy not to be linked through bushfire protection zone
- Potentially integrate water elements within park with stormwater management system, and water sensitive design generally

Landscape character

- Urban presentation as appropriate to sections adjoining / interfacing with Village Centre - park E
- Bushland, Woodland, and Parkland landscape character
- Natural / suburban presentation
- Natural woodland canopy / character integrating with adjoining corridor

Management & maintenance

- Community land categorisation range
 - Park
 - Natural Area Bushland
- Natural / suburban maintenance standard
- Passive Reserve maintenance as outlined in Landscape Maintenance and Handover report



g) Corridors (including transmission easement)

Definition

Green corridors are established in areas of existing drainage and / or vegetation linkages.

Intent

Green corridors shall provide for the conservation of quality existing stands of vegetation in addition to providing the key elements of a natural drainage network. Significantly the corridors will provide linkages of the regional park bushland across the urban development.

Locational principles

- Located along existing drainage lines and vegetation corridors
- Optimise use of existing tree canopy

User catchment

The adjoining residential sub precincts and users of the access system from the Western Precinct and potentially beyond.

Access / linkages

- incorporating off road cycle and pedestrian access network

Carparking

- no parking provided for corridors

Recreation range and facilities which may be considered for provision

- shared pedestrian and cycle paths

Natural systems

- natural regeneration facilitated through the green corridor
- weed management and revegetation through degraded areas of corridor

Landscape character

- Bushland landscape character (note: for transmission easement - nature of bushland to consider height and maintenance requirements in easement)
- Natural presentation
- Corridors shall reflect the character of the natural vegetation systems of the Regional Park

Management & maintenance

- Community land categorisation range
 - Natural Area Bushland
 - Natural Area Watercourse
 - Natural Area Wetland
- Natural maintenance standard
- Green corridor maintenance regime as outlined in Landscape Maintenance and Handover report



h) Regional Park Interface

The Regional Park interface is a significant zone which must be effectively managed to conserve the environmental integrity of the Regional Park's natural systems.

Where possible ongoing urban planning will integrate an active road edge to the Regional Park interface as the most effective means of environmental buffer between residential housing and the park.

The provision of the required Bushfire Asset Protection zone (APZ) between the Regional Park and urban development is also relevant. In the APZ vegetation extent and density must be managed providing potential for multiple uses to be effected including fire protection, road alignment, and or pedestrian cycle access, and open space / recreational amenity (refer item J Asset Protection Zone on the following pages).

i) Bushfire Asset Protection Zones

Definition

Asset Protection Zones (APZ) are the setback zones provided between the bushland of the Regional Park and the urban development which must incorporate a reduced level of tree and understorey vegetation.

Intent

The management Zones are aimed to provide for multiple objectives including fire protection, pedestrian / cycle access, and open space / recreational usage to select locations. The cross sections for the Regional Park interface (refer i.) indicate the type of uses that will occur in the Management Zones which may include:

- Residential front gardens (fuel managed)
- Roads
- Pedestrian cycle paths
- Fuel reduced and managed open space

Locational principles

- Located at all junctions of the Regional Park to the urban development

User catchment

- The adjoining residential sub precincts and users of the access system from the eastern precinct and potentially beyond.

Access / linkages

- incorporating off road cycle and pedestrian access network

Carparking

- no parking provided for users of access network

Recreation range and facilities

- shared pedestrian and cycle paths
- other facilities integrated with adjoining open space

Natural systems

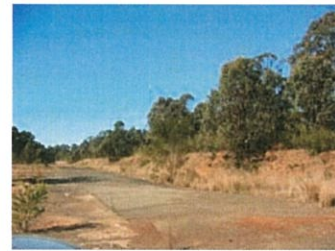
- tree canopy managed to provide interrupted canopies
- slashing maintenance of native grass understorey
- weed management and appropriate revegetation through degraded areas of setback

Landscape character

- Woodland landscape character
- Natural / suburban presentation
- The protection zones shall reflect the woodland character incorporating principally trees in grassed groundcover.

Management & maintenance

- Community land categorisation range
- Park
- Natural / suburban maintenance standard
- Green corridor maintenance regime as outlined in Landscape Maintenance and Handover report



Above: APZ zones will occur to junction with Regional park

j) Streetscapes / access -Collector Main Street

Definition

Village Centre Streets are the main street corridors through the village centre.

Intent

Landscape treatment must reflect the civic and village centre role (based on pedestrian access and on street trading use) of these roads.

Landscape character

- Urban landscape character
- Urban presentation
- The Village Centre streets should incorporate an avenue planting of an appropriate deciduous tree species to provide for year round street amenity
- Ground surfaces shall be predominantly paved

Pedestrian / cycle service level

- Paved pedestrian access to both sides of the road corridor
- Cycle access to the village centre precinct and related cycle rack facilities to be provided

Management & maintenance

- Urban maintenance standard



Above: Village Centre Street

j) Streetscapes / access - Collector Street / Employment Street

Definition

Collector roads are the major vehicular access routes into and through the development.

Intent

Landscape treatment must reflect the civic and visual importance (based on frequency of use) of these roads. Road corridor may include pedestrian / cycle access way and pedestrian only path links

Landscape character

- Urban landscape character
- Urban presentation
- The Collector Roads should incorporate a strong / formal avenue planting of an appropriate evergreen tree species to provide visual continuity and legibility of the road route
- Ground surfaces to verges and medians may vary from maintained native grasses (adjoining Regional Park) to maintained garden bed / pavement through the village centre
- Soft landscape treatments where provided should be kept simple to reduce recurrent maintenance needs and variation

Pedestrian / cycle service level

- Paved pedestrian access to minimum one side of the road corridor
- Cycle ways to nominated roads

Management & maintenance

- Urban maintenance standard
- The Collector Roads require a regular and coordinated approach to landscape maintenance



Above: Collector Street

j) Streetscapes / access - Local Streets

Definition

Local Streets link neighbourhoods.

Intent

Landscape treatment must recognise the nature of these streets fronting residential properties and the implications of varied landscape treatments to private domain areas fronting the streets. As such landscape should provide a simple continuous native street tree canopy located within the grassed nature strip of the roadway, or swale water sensitive urban design treatment

Landscape character

- Urban / Parkland landscape character
- Suburban presentation
- Maximise retention of existing tree canopy
- Local Streets should incorporate avenue planting of an appropriate evergreen native tree species to provide visual continuity and legibility of the road route
- Ground surfaces will generally be grassed nature strips.

Pedestrian / cycle service level

- Paved pedestrian access to minimum one side of the road corridor
- Cycle ways to nominated roads

Management & maintenance

- Suburban maintenance standard
- Local Streets require a regular and coordinated approach to landscape maintenance

j) Streetscapes / access - Access Streets

Definition

Local Streets provide local access within the development sub precincts.

Intent

Whilst the streetscape treatments of the other road elements develop continuity in layout and species to promote legibility and identity, the local streets offer potential for more varied layout and application of species to suit street layout and other issues such as conservation of existing trees etc.

Landscape character

- Parkland landscape character
- Suburban presentation
- Maximise retention of existing tree canopy
- The Local Streets should incorporate intermittent planting of an appropriate evergreen native tree species to reinforce stands of existing trees and enhance street corridors
- Ground surfaces will be grassed nature strips to street.

Pedestrian / cycle service level

- Paved pedestrian access to minimum one side of the road corridor

Management & maintenance

- Suburban maintenance standard
- Local Streets require a regular and coordinated approach to landscape maintenance

j) Streetscapes / access -Road edge cycle ways

Definition

Road edge cycle ways will be provided to enhance linkages through the development on wider road setbacks as required.

Intent

The road edge cycle ways should provide legible and safe connections between off road sections of the network.

Landscape character

- Of the relevant street corridor on which it lies

Management & maintenance

- Suburban maintenance standard as applicable to the road corridor



Above: Road edge cycleways

j) Streetscapes / access - Off road cycle ways / pedestrian links

Definition

Off road pedestrian / cycle links shall be the major access elements located through the green corridors, open space areas, and Bushfire Asset Protection Zones.

Intent

Shared off road pedestrian / cycle links are located through green corridors to minimise impacts on the biodiversity values of the corridor, and to form an edge between bushland and Woodland landscape character types. Through parkland areas the links may provide an edge between parkland and woodland landscape types.

Landscape character

- Of the relevant green corridor or park open space in which it is located
- It is desirable that all pedestrian / cycle paths have a consistent material and width to promote legibility and identity of the access network (colour changes may reflect individual village identity)

Management & maintenance

- Suburban maintenance standard



Above: Shared Paths

j) Streetscapes / access -Pedestrian pathways

Definition

Pedestrian pathways shall occur along street corridors and through open space areas as defined in streetscape types.

Intent

Pedestrian pathways should provide direct clear access between usage areas and catering for through site access by users

Landscape character

- Path alignment principles will vary between open spaces to optimise the recreational or functional requirements of the particular link. However in general it is desirable that all pedestrian paths other than those in the Civic Square have a consistent material and width to promote legibility and identity of the access network (colour changes may reflect individual village identity)

Management & maintenance

- Suburban maintenance standard



Above: Pedestrian Path



Public Domain Character

4.0

4.1 Issues relating to all public domain

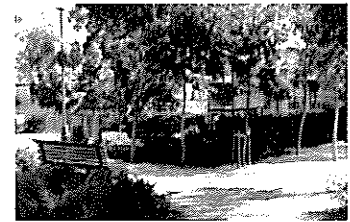
Public domain can be defined as the publicly accessible network of open space, streets, paths, and squares that frames our urban environments.

The quality of public domain as perceived by its users is influenced by a number of factors including:

- landscape including trees and lower level natural and planted vegetation
- built form
- pavements
- street and park furniture
- signage and information
- public art



Streetscapes



Open Space

The public domain for the St Marys Central Precinct must function at a number of levels:

- within the Penrith LGA;
- within the district including the adjoining residential suburbs;
- within the overall St Marys Development (ie including the Western and Central precincts);
- adjoining the Regional Park;
- for the community of the Central Precinct; and
- within Regional Open Space Corridor Linkages

This requires that whilst developing an identifiable and appropriate landscape character for the Central Precinct that treatments must also have reference to and context with the St Marys Development, and the Regional Park.

Landscape design and materials themes should be developed in such a way that the area's natural features and site characteristics will be conserved and recognised. The open space system which the landscape themes support should have diversity, interest and accommodate the needs of a wide range of users.

The application of landscape themes to individual public domain elements should be done based on a number of criteria:

context within the development	from denser urban centre to less dense suburban outer areas	Public domain within the denser village centre should develop a more urban character in context with built form, density of development. This will be reflected in elements such as footpaths and a mix of deciduous and native evergreen plantings
the function and usage of the public domain	type and intensity of usage	Open spaces that cater for a higher intensity of usage (eg. a Civic Square) should incorporate design and materials treatments that cater for high pedestrian traffic and recurrence of use during the week. Passive recreational open spaces in less dense suburban areas will have periods of peak usage (but of a more low key nature) ie. weekends, with recovery periods ie. during the week. As such native planting and tree canopy and an emphasis on soft landscape surfaces is appropriate
relationship of the public domain to the Regional Park	Whether the open space or streetscape has a visual or functional relationship to the Regional park	Open spaces and streetscapes that have a more direct relationship with the Regional Park must be compatible both in visual character and in usage of plant material that reflects the local indigenous plant communities and assists in conserving / enhancing biodiversity values

The following section of the report describes the intended landscape themes to be developed through ongoing masterplanning and design and in implementation of the public domain system of the development.

Section 5 outlines objectives for the implementation and management of private domain landscape outcomes which are also important in the overall character and environmental integrity of the development

4.2 Detailed public domain character

The landscape character of the Central Precinct urban development will need to reflect a range of scenarios of development context, use and relationship to the Regional Park. The characters for landscape presentation which reflect these situations include:

- bushland
- woodland
- parkland
- open space water
- plazas / squares

The nature and application of these characters is identified on Figure 4.1 below and in the descriptions following:

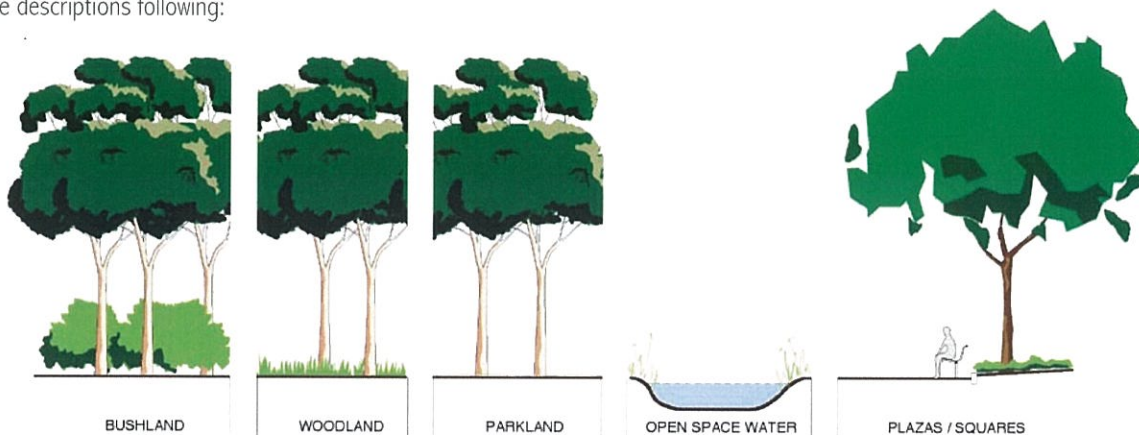


Figure 4.1 Landscape presentation categories

Bushland Character

Bushland character is the key landscape theme for the site in its context within the Regional Park. Bushland character will provide a direct visual and ecological link to the plant communities of the Regional Park, and its deployment through the development open space will provide green corridor linkages of flora and fauna habitat, and fauna movement.

Bushland character will be conserved and enhanced through the green corridors, and will be developed to varying extents through the level three and level two reserves based on their context and nature of usage. Through open spaces, streetscapes, and residential lots, existing character of native trees, understorey shrubs (to open spaces), and grasses (to open spaces and streetscapes) will be retained as far as practical within fire security and safety requirements. The resultant emphasis through corridors and open spaces is of the bushland character as the dominant / identity / landscape character through the public realm of the Central Precinct.

The bushland character will integrate with and complement the more formal landscape themes of the village centre and denser urban areas of the development.

Bushland character will generally be associated with low levels of recreational use, pedestrian cycle access paths being the key use other than interpretive / educational access. The bushland environments will generally be self sustaining in terms of maintenance (other than establishment maintenance of revegetation planting), requiring minimal recurrent maintenance other than weed monitoring, and for management as determined by the separate Bushfire Management Plan.



Existing bushland character



Existing woodland character

Woodland Character

Woodland character provides a transition from Bushland areas to parkland character. Woodland generally retains a strong visual context to the native bushland of the regional park through its retention and enhancement of native tree canopy. The woodland areas however will focus on understorey regimes incorporating trees in native grass and groundcover understorey. This is aimed at maintaining sight lines for safety and security and reducing understorey level fuels for bushfire risk. Woodland areas will assist in providing a buffer between bushland areas and parkland areas and can be expected to be incorporated at the interfaces to the Regional Park, through the Asset Protection Zone and adjoining access linkages through green corridors.

As for bushland areas the recurrent maintenance requirements of woodland areas are proposed to be low, focussing on removal of non endangered or vulnerable shrub understorey and on fire management. Built form may be incorporated through structures and awnings to provide shade and shelter, along with high quality paving, street furniture, lighting, signage, and water elements. Public art will be incorporated as a formative design direction.

Parkland Character

Parkland character will vary between open spaces based on existing features, their context within the urban development, and usage. The essential elements of the parkland character will be trees in maintained grass, predominantly native canopy to further reflect the indigenous bushland context of the Regional Park. Non native trees may be used in select locations such as parks within denser urban areas to provide winter solar access. Neighbourhood Parks (sports fields) are included in this character. Parkland character will involve recurrent maintenance of recreational grassed areas. Sportsfields may also be irrigated.

Built form may be incorporated through change rooms, public amenities, structures and awnings to provide shade and shelter, along with high quality paving street furniture, lighting, signage, and water elements. Public art will be incorporated as a formative design direction.

Open space water character

Within the open space network a variety of water bodies / elements are proposed as part of the developments water sensitive design approach, stormwater management, and as landscape features. Wetland character will be a combination of ephemeral and permanent water bodies incorporating various edge treatments. Open space water character will be located adjacent to other landscape character abutting open space water bodies through the development. Typically key water bodies will incorporate wetland macrophytes to their perimeter

Water edge treatments may vary in relation to adjoining / related design use, and can be expected to include both hard and soft edge situations. Selection of edge use will take into account habitat corridors, maintenance requirements and salinity constraints.

Urban plaza / square character

Within the village centre the opportunity must be pursued to provide urban spaces that complement the density of built form and uses, and provide a focus for community gathering and events.

These spaces can be expected to include a larger proportion of hard pedestrian surfaces and "structural" landscape. Plazas / squares may be developed as an integrated public access within a commercial site. Maintenance of these structured landscapes will be inherently higher commensurate with their higher intensity of usage.

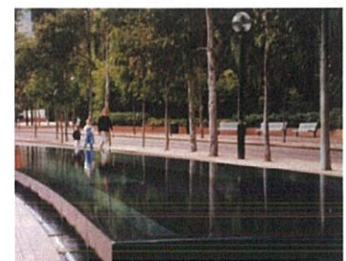
Deciduous trees may be used in select locations (such as Civic spaces) to provide winter solar access.



Parkland character



Open space / water character



Urban plaza / square character

4.3 Landscape presentation and maintenance standards

Landscape presentation within this report is the term used to indicate the level of landscape detail that is proposed to be applied to embellishment of open space areas.

Presentation is typically linked to landscape character. As such open spaces of plaza / square type character may be generally associated with an urban (or higher) presentation / maintenance standard, whilst bushland character is sustainable with a natural (or lower) presentation / maintenance standard.

This concept is illustrated in Figure 4.2 below which identifies through the shaded boxes the maintenance standard applicable to the landscape character type. The concept is used in this report to relate presentation and maintenance standards to performance standards for open space and streetscape elements of the public domain as identified in section 3.0

The presentation / maintenance standards are referenced and further detailed in the identification of maintenance levels in the separate Landscape Approvals, Maintenance, and Handover Plan Report.

		LANDSCAPE CHARACTER				
		BUSHLAND	WOODLAND	PARKLAND	PLAZAS / SQUARES	OPEN SPACE WATER
MAINTENANCE / PRESENTATION STANDARD	NATURAL					
	SUBURBAN					
	URBAN					

Figure 4.2 Landscape presentation and maintenance standards

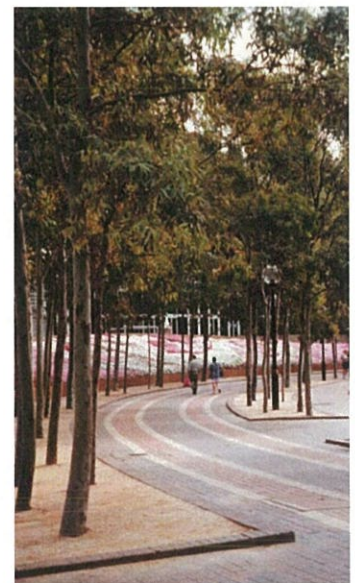
Urban presentation

Urban landscape presentation will apply to those open spaces which lie within the denser development zones of the Central Precinct, and which serve a higher intensity and recurrence of community use.

Levels of presentation are higher than other spaces to meet these usage demands and to compliment the urban character of their locations.

Parks of the Open Space Hierarchy that would typically fall within the urban presentation category include:

- selected area of Park (Park E) at village centre interface



Examples of open space of urban presentation and maintenance standard

Suburban presentation

Suburban landscape presentation will apply to active and passive recreational use spaces catering for moderate levels of usage including family use, social gatherings, fitness and exercise activities, and playgrounds.

This presentation type will typically encompass a combination of landscape character types which will dictate variations in the level of presentation across the open space dependent on the character and type / level of usage it receives.

Suburban presentation will generally be located in a landscape setting that is of woodland, parkland, or open space water character or a combination of each.

Suburban presentation will also apply to Bushfire Protection Zones where recurrent maintenance is required to address fuel management requirements.

Open Space that would typically include the suburban presentation category include:

- Neighbourhood Parks generally
- Local and Pocket Parks not adjoining vegetation corridors or Regional Park (eg park 10)



Examples of open space of suburban presentation and maintenance standard

Natural presentation

Natural landscape presentation will apply to low level and intensity of use spaces areas that incorporate and adjoin natural systems.

Typically green corridors and the interface areas of adjoining parks will fall into this category. Retention of existing vegetation and revegetation (where applicable) with indigenous species will provide a generally self sustaining landscape with low recurrent maintenance demands.

Open Space that would typically include (but generally not solely comprise) the natural presentation category include:

- Selected areas of Local and Pocket Parks adjoining vegetation corridors or Regional Park (eg parks 8,9,E,F)



Examples of open space of natural presentation and maintenance standard

4.4 Public domain materials and treatments

The use of design and materials treatments should aim to recognise both the district and local context of the Central Precinct as part of the Penrith area within the context of adjoining suburbs, as a community within the Regional Park.

At the same time the development needs to provide an identifiable and marketable image to prospective residents that promotes the St Marys development as a desirable and attractive place to live (or to locate a business).

The ongoing masterplanning and design development process will identify and confirm design and materials treatments for the St Marys public domain. Listed below are materials objectives for each of the key public domain elements, that should be observed in this process.

Pavements

Footpath paving for the St Marys development must provide a hard wearing, cost effective and practically maintainable surface that enhances the character and identity of the public domain and provides an aesthetically pleasing visual experience.

A hierarchy of pavement treatments is desirable which will reflect the varied pedestrian and vehicular access roles of streetscapes and open space areas, from urban to natural landscape character contexts. Park and open space areas provide an opportunity to apply a less structured approach to application of pavement materials, as parks tend to be destinations for users, and as such do not need to provide strong visual continuity between different sites.

This is with the exception of:

- pedestrian linkages connecting to systems beyond the individual parks; and
- cycle linkages connecting to systems beyond the park.

There is also a strong justification to limit the range of paving materials incorporated to the public domain (including parks and open space) to make maintenance, renewal and extension works more cost effective and practical for Council.

Potential materials for parkland and open space may provide for a limited range of materials from quality stone (for use as an accent and 'special places' pavement) to asphalt or exposed aggregate in situ concrete as a pathway surface through green corridors, and fire protection zones.

Cycle Routes

The development of the pedestrian and cycle network through the St Marys development is an important component of the ongoing planning for the site.

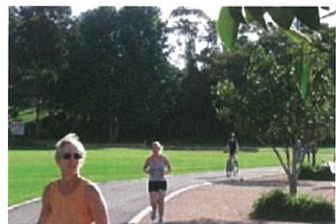
The success of the cycle routes will depend upon the suitability of the routes in providing effective and safe access, quality of surface, a pleasing visual environment, and clarity in route identification.

Where possible a unified colour surfacing and line marking system is followed as a long term objective for ongoing implementation that identifies cycle routes in their various forms. Major road crossing points will be treated differently to highlight their location.

Liaison with adjoining councils and the RTA is desirable to ensure that the continuity of such treatments is developed where possible.



Above: pavements



Above: cycle routes

Street Furniture

Street furniture provides a secondary series of streetscape elements after kerbs and footpath materials and street tree planting, whilst also providing fundamental visual and functional elements within open space areas. Furniture items provide both functional and aesthetic contributions to the quality of public domain and are most successful when part of a recognisable thematic approach.

The location of furniture items must be both functionally and aesthetically based. Facilities are required at locations where users are most likely to require them (eg. seats, bins etc. within village centre), however they should also relate to an overall location theme that integrates with paving, open space character themes and other furniture elements.

The ongoing planning and design for the St Marys development may consider two categories of furniture for application to public domain. An “urban” palette may be appropriate through the village centre and denser urban areas, with a “parkland” palette applied through suburban open space areas, and green corridor areas (potentially through to the Regional Park). It is desirable that there be some thematic design / materials reference between the palettes to reinforce continuity and identity, but that the parkland palette may slightly more affordable to install / replace and be of a highly robust nature. It is also suggested that to civic and street squares and open spaces that opportunities may arise to incorporate site specific furniture items as artwork elements adding to the individual character and identity of these areas within the public domain. Opportunities may arise to develop site specific furniture installations where they have public art or cultural references to a specific site.

The application of furniture elements to open space areas determines a varied set of functional criteria to that of street footpaths and urban plaza areas. Adaptable and multifunctional elements are more appropriate for parkland settings where usage is significantly less ordered than that to street environments. The less structured visual setting of open space areas also determines that park furniture should be very simple in design to adapt to a variety of settings and design themes including picnic tables and table/seal units which can be used in a variety of ways.

For both maintenance, cost, and replacement purposes it is preferable that a simple palette of furniture be incorporated into park designs. Again opportunities may arise for specific “one off” designed elements such as artwork sitting walls or other elements to have design themes or interpretation in open spaces.

Street tree planting

Street tree planting is a fundamental component of streetscape quality. The proposed street hierarchy for the St Marys development incorporates a range of street corridor widths with varying requirements and opportunities for street tree planting. The selection and implementation of street planting must be directed to achieve the benefits of street tree canopy whilst minimising long term maintenance and structural problems to road and kerb structures. This requires an integrated design process whereby street tree requirements are considered in road cross sectional widths.

It is a reality that street tree planting requires ongoing maintenance to optimise the visual and functional impact (and maintain health). In a stressful and constrained environment such as the urban street there will also be potential for mature trees to cause damage to rigid street treatments as they are moving, living organisms. The objective should be to minimise potential for such problems through preparation and construction of tree planting pits.



Above: street furniture elements



Above: cafe furniture is managed by traders



Above: street tree planting

It is proposed that establishment irrigation potentially using recycled water be provided to major street trees in the urban Civic Centre. Irrigation control would be tailored to limit water cycle / salinity impacts.

In terms of streetscape design approach it is proposed that tree species be used to reflect the road hierarchy developed in the precinct plan including collector roads and neighbourhood roads in which a coordinated species and avenue alignment is desirable within the hierarchy types.

In Suburban zones trees to appropriate Australian native trees. To Urban character areas tree planing will generally be more structural and may include a mix of native and exotic species.

To local streets it is proposed that street tree species define neighbourhood zones to promote the subtle differences between residential areas.

Street understorey planting

Landscape treatments at ground level should be limited to simple turfed or paved treatments with street tree planting to provide a clear definition of the extended public domain in these areas. Generally lower level planting such as street beds and floral displays should be minimised due to recurrent problems with public safety and with provision of adequate maintenance. The use of lower level garden planting may be appropriate however to the village centre to provide definition and to enhance these environments.

Open space planting

Park and open space areas provide the opportunity to apply a more diverse range of site specific approaches to tree and garden planting. In general it is recommended in the design principles for open space areas that tree planting themes to adjoining corridors maintain the appropriate species for that corridor. Spacing may be varied to highlight entries or provide views into the open space from footpath and road areas.

Within park and open space areas it is proposed that edge and structured planting (ie. the majority of tree canopy) should be site indigenous native species. For feature planting, native species should also be used where possible. To seating areas within parkland - natural character parks where native evergreen canopy only is provided, it is proposed that design schemes incorporate a proportion of seating in locations accessible to winter sun. To parks in urban settings, deciduous shade tree planting may be appropriate.

Major tree and garden bed plantings within open spaces may be irrigated with recycled water sources subject to a strict management regime.

Local area traffic management

Local area traffic management comprises the measures undertaken to control and direct traffic through neighbourhood areas to reduce impacts to the quality of the residential environment. In terms of design and materials finishes it is important that LATM measures relate to the street environment on which they are located, and maintain the visual and functional access of footpath zones.

The balance of paving to soft landscape treatments should again reflect the specific street environment, noting that planted areas require ongoing maintenance for aesthetic quality.



Above: street tree planting



Above: Open space planting



Above: Open space planting



Above: streetscape lighting

Streetscape lighting

Two forms of street lighting are required to street corridors:

- Vehicular Street Lighting
Mast top street lighting to meet relevant RTA and Austroads standards.
- Pedestrian Lighting
Pole mounted or under awning pedestrian lighting to meet relevant Australian Standards.

Vehicular street lighting is generally treated as a purely functional requirement, without regard for the aesthetic role of the light pole as a

Street Furniture Element. Various 'Smart Pole' types (eg. City of Sydney, Homebush Bay) are an exception to this rule which the street lighting pole becomes a positive furniture element meet a number of functional requirements including lighting, signage, and traffic signals. Such a treatment may be applicable within the Village Centre.

Pedestrian lighting requires a much closer relationship to footpath level (usually 3.5 - 4.5 metres at 20 metre intervals) to provide optimum illumination.

To the village centre where a high level of night pedestrian access is to be encouraged street treatments must provide a minimum level of illumination in accordance with Australian Standards. The pedestrian light pole should be treated as part of the streetscape furniture approach and should aesthetically integrate with other furniture elements.

The use of feature lighting such as tree uplighting, and facade lighting to attractive building facades are also ways in which the street environment can be enhanced for night time use and appreciation.

Open Space lighting

There are a range of issues that must be considered in determining the level of lighting to be provided to open space areas. The situations to which lighting will apply are:

1. Sports facility lighting for training/event purposes
2. Lighting of major cycle routes and pedestrian access paths for night time usage
3. Feature lighting of elements as visual displays (eg. sculpture/artwork elements, uplighting trees)

Sports field lighting is generally provided by mast top fittings adjoining the playing field or courts, and is undertaken on a site specific basis. Pedestrian lighting of path access ways through parks should be evaluated for each specific site based on linkage value, impacts on pedestrian amenity, and safety/security considerations. The use of pole top fittings to match those to pedestrian streets is the recommended approach to provide visual continuity where lighting is agreed to be required.

Other forms of lighting that may be considered for individual open space sites include feature flood lighting or uplighting of park elements (artworks, significant trees), and bud lighting of major street tree avenues for special events or festivals.



Above: Open space lighting

Art in Landscape

Opportunities to incorporate public art into the public domain will occur in a range of situations. Art should be incorporated as formative design input not just as overlay elements to a design. Opportunities may include:

- At focal intersections and locations to street corridors
- To squares
- To parks and open space areas
- To playgrounds / play spaces
- To the village centres
- To street corridors with a vehicular access emphasis to be interpreted from the motor vehicle
- On walking / cycle trails where applicable

The potential for integration of public art into these elements should be identified at the initial stages of a project. This will enable complete integration into the design process, and incorporation of the artwork as a functional and integral component of the scheme rather than an overlaid installation.

Public art expression may take place in various forms:

- Formal display commissioned art (eg. sculpture displays)
- In paving patterns and paving inlays
- On flag and banner displays to neighbourhood main streets and commercial centres
- On wall murals and facade treatments
- Plaques - providing local history references - mounted to walls and other elements
- Incidental art installation to reinforce detailed character and history of neighbourhoods
- Playgrounds
- As statuary or artwork installations
- As street furniture to specific sites
- Fences
- "Arty" design

In all cases the public art component can provide a reference and educational tool related to physical or cultural characteristics of a location or it's natural / cultural heritage. Public Art can also provide cultural expression reflecting social or cultural values, or alternatively may provide a purely visual element, enhancing the appreciation and diversity of the public domain.

In all cases public art should contribute to the identity and character of open space and landscape and engage users of open space in an ongoing way.



Above: Examples of public art in landscape

Appendix

5.0

5.1 Responses to planning policies and controls

The following chart outlines the responses of this open space and landscape strategy to the planning policies and controls defined for the site:

These include:

- St Marys Open Space and Recreation Plan, 1999 (included as a base reference as open space guidelines in the EPS - 2000 were based its on this document)
- Environmental Planning Strategy, 2000
- Regional Environmental Plan No. 30, 2001, and any associated Development Agreements
- Penrith City Council Sustainability Blueprint for Urban Development 2005
- Penrith City Council, June 2007, Open Space Action Plan

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
St Marys Open Space and Rec'n Plan 1999 (Clouston)	Western & Central Precinct
Section 3.1 New approaches to open space and recreation planning	
Open space and recreation planning linked to human services planning	open space planning has been carried out in coordination with human services planning within the project team and through liaison with Council. Key strategies include the relationship of the Level One park and town square within the village centre and the fully integrated access system linking all open space to the urban development and related facilities
Open space and recreation planning linked to infrastructure planning particularly considering natural systems	open spaces to be located adjoining corridors in the majority of cases to increase connectivity potential and take advantage of the natural amenity and character of the corridors
Greater emphasis on the quality of open space provision	performance criteria to clearly identify the nature of embellishment in terms of character, facilities and ongoing maintenance
Mechanisms for monitoring and responding to emerging communities needs	open space design to provide flexibility in layout and fixed elements to enable adaptation to meet varied and changes needs
refer Human Services planning for ongoing monitoring	
Flexibility in development and management principles	
	see above
Multipurpose facilities to cater for a range of uses	provision of facilities to "build in" adaptability to future change, capacity for shared use, and suitability to varied levels of intensity of use
Grouping of facilities for shared use	District park to incorporate ovals and multi- purpose courts located in close relationship to village centre
Opportunity for shared use related to community and educational facilities	
Baseline provision at early stages of development with specialised facilities once characteristics and needs of population are ascertained	park design to allow for future "overlay" of more specialised facilities or facilities related to shared use between development "precincts"
Section 4.1 Planning principles – key stakeholder objective: for comprehensive OS system that:	
Is needs based	in addition to meeting community open space requirements for urban development the strategies to address the metropolitan recreational focus (as identified by DOP Metropolitan Open Space Team) for regional access trail linkages
Adopts best practise and current benchmarks	planning and design of open space will integrate water sensitive urban design strategies along with sustainable maintenance and management techniques
Is fully integrated into the proposed and existing social and planning fabric	the open space network is to be planned to strongly reinforce its context to the Regional Park (which essentially encloses it) whilst being highly accessible to surrounding communities.
Accessibility promoted through hike and bike network	
Ensures equity of access and opportunity	the open space network will provide equitable distribution of open space to all areas of the urban development based on accessibility and size
Provides a wide recreation spectrum	the open space network will provide for a wide range of active and passive recreational types with built in adaptability for future change
Is provided in a timely manner	to be provided in relation to staged urban development to meet development of community
Is flexible to changes in demand and opportunity	refer responses above related to flexibility
Works in concert with an agreed masterplan	the open space strategy has been prepared in coordination with the precinct framework plan
Conserves areas of significant ecological, landscape or heritage value	the 900ha regional park conserves areas of core habitat significance whilst the open space plan incorporates a range of existing tree canopy and habitat into park areas
Is matched by an agreed funding programme	developer to build and maintain open space until handover

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
Is based on principles of sustainability	<ul style="list-style-type: none"> open space plan reflects water sensitive urban design integrated with the urban development
design of open space to have regard for sustainability of ongoing maintenance requirements	
Section 4.2 Social outcomes to be met	
Integration	<ul style="list-style-type: none"> the open space plan will reinforce access links to adjoining access corridors and communities
Community diversity	<ul style="list-style-type: none"> the range of proposed density within the development promotes community diversity adaptability and flexibility of open space will facilitate diversity of perspectives and uses of open space by different demographic groups provide a range of open space and recreational choices
Timely provision of facilities	<ul style="list-style-type: none"> to be provided in relation to staged urban development to meet development of community
Enhancement of regional amenity	<ul style="list-style-type: none"> the establishment and facilitation of community access to the Regional park is the urban development's key contribution to regional amenity the linking of corridor open space to Regional Corridors (eg. South Creek) and related areas Provision of high quality of open space embellishment
Access and equity	<ul style="list-style-type: none"> refer responses to 4.1
Community identity and regional integration	<ul style="list-style-type: none"> the identity of the development and the open space system which supports it will be focussed upon its relationship to the Regional park and the habitat and environmental values it provides.
Community facilitation	<ul style="list-style-type: none"> refer Human Services planning
Flexibility and innovation	<ul style="list-style-type: none"> refer responses to 4.1
Cultural development	<ul style="list-style-type: none"> Subject to the Regional Park POM, the Regional Park and the open space network can incorporate coordinated interpretation programmes which will increase accessibility to and understanding of the natural and cultural heritage of the site and of responsible and sustainable environmental management. Develop identity and character of community through setting, sustainability, quality and function of open space
Section 6. methodology and provisional outcomes	
Open space planning is to be derived from the unique qualities of the site	
Its importance in the regional open space system	<ul style="list-style-type: none"> 900ha Regional Park conserved as part of regional open space system is a focus for character and identity of urban development Strong links to Regional Open Space System
Biodiversity values	<ul style="list-style-type: none"> Conservation role of Regional Park recognised in urban planning at park junctions and design of internal open space and coordinated with Regional Park Plan of Management Vegetation retention optimised through planning of open space system and tree retention optimised in urban development
Topography	<ul style="list-style-type: none"> Opportunities for views from open space in the Western Precincts optimised to ridgetop locations
Drainage systems	<ul style="list-style-type: none"> Open space planning retains key natural / evolved drainage lines in particular where supported by existing vegetation
Heritage values	<ul style="list-style-type: none"> Cultural values for Aboriginal heritage to be considered in POM for Regional Park and Regional Open Space Open space which incorporates site 3 - brickworks for Elizabeth Farm homestead can interpret former site use and function in open space design and facilities Interpretation of site natural and cultural heritage throughout open spaces
Potential for linkages both regional and within site	<ul style="list-style-type: none"> Open space linked by network of access ways through corridor open space and along landscaped setbacks to roads Access networks links to local / regional access system linking to Central Precinct
6.1 Settings – open space to provide diversity but with an emphasis on the existing site characteristics and natural settings as these are difficult to recreate	<p>A variety of settings are to be provided across the proposed open space hierarchy – these have been cross referenced in the Performance Criteria (section 4.0) as they relate to the categories of community land management (local Govt Amendment Act (1998) and include:</p> <ul style="list-style-type: none"> - natural area bushland - natural area watercourse - park - sportsground - general community use (Civic Square)
<p>Hierarchy to be applied (PCC Open Space Action Plan 2007)</p> <ul style="list-style-type: none"> District park: <ul style="list-style-type: none"> - greater than 5 ha - active and passive needs of the LGA Neighbourhood parks: <ul style="list-style-type: none"> - up to 5 ha - active and passive recreation of a neighbourhood Local parks: <ul style="list-style-type: none"> - 0.5 to 3 ha - passive recreation of a neighbourhood Pocket parks: <ul style="list-style-type: none"> - 0.25 to 1 ha - passive recreation of a precinct 	<p>The proposed open space masterplan shall reflect the PCC Open Space Action Plan 2007 hierarchy with the addition of the following additional category that responds to site opportunities:</p> <ul style="list-style-type: none"> -Open space within corridors -Shared access paths within corridors -Active recreational facilities proposed to be provided with Regional Open Space as offset to open space provision

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
6.5 Distribution Key locational criteria: - provision and distribution related to population catchments for each stage	<ul style="list-style-type: none"> distribution of open space has related to the neighbourhood structure developed in the precinct masterplan to provide equitable access to and distribution of the quantum of open space
proximity of level one and two parks to urban cores, major public transport routes and schools	<ul style="list-style-type: none"> Level One park located adjoining village centre Level Two parks distributed through the urban development with access to major roads and linked to the pedestrian / cycle access network
ease of pedestrian access particularly to level three parks	Level Three parks predominantly located adjoining corridors or with a nominated wide setback street to allow for comfortable linkages and related landscape
location in areas of appropriate topography	All open space located on generally level usable land, some with a variety of slopes to add to design opportunities
location of all parks close to natural drainage corridors / basins wherever possible	<ul style="list-style-type: none"> The majority of parks linked to green / drainage corridors – note that this will require that a proportion (no more than 15%) of the open space system will be subject to some flood inundation / storage role. However this will not compromise their recreation role and function.
maximised retention of existing vegetation / minimised ground disturbance	<p>Open space incorporates tree retention where possible</p> <ul style="list-style-type: none"> design of open space will focus on using existing levels where practical to minimise impacts on soils and salinity

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
St Marys Environmental Planning Strategy (EPS) 2000	
A summary of performance objectives of the EPS of relevance to open space and landscape planning are listed below. Specific strategies recognised in this Landscape and Open Space plan and / or to be developed in ongoing project planning and designated listed opposite. This generally reflect the strategies provided in the EPS	
Conservation	
a representative and significant proportion of the natural values of the land are to be conserved within a regional park.....	<ul style="list-style-type: none"> 900ha Regional Park to be established over lands of high habitat and conservation significance Management of the park boundary proposed to control access to Regional park Regional park – to incorporate no development other than “appropriate park related uses” POM for Regional Park will identify access to the park that provides for community use and benefit compatible with natural conservation values
urban design and site planning in the employment and urban areas are to have regard for significant tree stands and where practical retain those trees	<ul style="list-style-type: none"> Retention of significant stands of trees in open space areas and road corridors is incorporated where possible into urban planning. Road planning will be developed during ongoing design to maximise tree retention where practical seed collection and propagation programme proposed to provide plant material for revegetation works Tree removal for urban development will be balanced through new plantings to open space and road corridors. vegetation links to be further developed through open space subtle visual separation between active and passive recreation will be provided through tree planting to create open space “rooms” local indigenous species to be used to majority of open space areas and where practical (sustainable) to road corridors
adverse impacts on the vegetation and fauna habitats within the Regional Park and Regional open space zones resulting from the urban development are to be minimised	<ul style="list-style-type: none"> Compatible land uses are provided adjacent to park – park edges will be defined where possible by a roadway edge that will provide for environmental management and surveillance of the boundary and reduction of edge impacts active frontage to bushland (for passive surveillance / buffer) is desirable
Infrastructure is to be designed and located to minimise potential adverse impacts on the conservation values of the land	<ul style="list-style-type: none"> planting along roads will extend vegetation canopy Information kit to be developed for residents – education and incentives for good environmental practise and appreciation of conservation values
Infrastructure and recreational facilities within the Regional park are to be sited and constructed to minimise impact on the parks natural values	<ul style="list-style-type: none"> Pedestrian and cycle access through regional park will be considered as part of the Regional Park Plan of Management and can preferably be planned and linked to the urban development areas of the Central Precinct weed management plan has been prepared fire management plan has been prepared
Cultural heritage	
regard for and education and understanding of the identified items of environmental heritage on the land.....	<ul style="list-style-type: none"> Interpretation of the environmental and cultural heritage of the site is to be integrated into the design of open space and embellishment of park and other public domain Open space which incorporates site 3 - brickworks for Elizabeth Farm homestead can interpret former site use and function in open space design and facilities Refurbishment to be balanced with proposed use, maintenance, and safety Community plan identifies public art as having a key role in heritage interpretation
Water and soils	
Water cycle	
no net adverse impact on water quality in South Creek and Hawkesbury Nepean Catchment	<ul style="list-style-type: none"> Water sensitive urban design strategies including wetland water bodies integrated with open space will assist in water quality management
water usage on and the importation of potable water onto the site is to be minimised	<ul style="list-style-type: none"> Design of open space embellishment is to generally focus on sustainable / low maintenance landscape with the exception of focal areas Use of recycled water for landscape irrigation purposes is to be pursued
no significant increase to water table and salinity impacts	<ul style="list-style-type: none"> Tree retention is to be maximised through open space and where possible to road corridors, and allotments In the long term native tree cover to be increased Irrigated areas are to be effectively managed through subsoils treatments and regime management
drainage lines are to be constructed and vegetated so that they approximate as natural a state as possible.....maximise the conservation of indigenous flora....	<ul style="list-style-type: none"> Key existing drainage lines and related vegetation are to be conserved and enhanced Drainage corridors within the Central Precinct to be subject to additional planting / regeneration to reinforce riparian cover
Transport	
6. urban form is to maximise the potential for public transport walking and cycling to replace car travel	
Urban form	
Environmentally sustainable development	
1. development is to be planned and carried out so that it supports the goal of ecologically sustainable development	

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
Urban form	
Environmentally sustainable development	
1. development is to be planned and carried out so that it supports the goal of ecologically sustainable development	
Urban form	
2. development is to result in an attractive and safe built environment satisfying a diverse range of community needs	
4. development is to include:	
c) clearly distinguishable public and private spaces	
5. urban design measures to discourage crime and facilitate safety and disabled access	
Energy and Waste	
5. development should contribute to improved regional air quality by achieving higher than normal public transport use, encouraging walking and cycling	
Human services	
Community services	
1. Integrate community services with land use planning	
Open space and recreation	
6. a range of open space and recreation areas and facilities for passive and active recreation is to be provided including playgrounds and neighbourhood parks	
7. the accessibility and utility of open spaces are to be maximised for use by the community	<ul style="list-style-type: none"> Open space is to be accessible via integrated access network and shall be fronted either by other open space types or roadways All urban development areas shall be within walking distance of an open space area. Active use open space located at the centre of the precinct related to the village centre and community / educational facilities Passive recreational open space distributed equitably through the development sited to take advantage of existing tree canopy and relationship to drainage corridors (natural landscape character)
8. Recreation activities and facilities are to be located and designed to maximise conservation of cultural and natural values	<ul style="list-style-type: none"> Open space planning optimises tree conservation design of open space shall integrate conservation of required vegetation / other items see above
Sydney Regional Environmental Plan No. 30 - St Marys and associated Deed of Agreement	
10 Content of draft Precinct Plan	
2. A draft precinct plan os to include proposals for and information about the following for the land to which it applies	
(g) location of open space, its function and landscaping intent	<ul style="list-style-type: none"> The location of open space is defined on the open space masterplan Figure 2.3 the function of open space and landscaping intent is identified in section 4.0 Open Space Performance Standards for each of the components of the open space hierarchy
(m) the impact of the proposed development on any adjoining land that is zoned Regional Park or Regional Open Space	<ul style="list-style-type: none"> Performance standards for the interface of the development with the Regional Park These include the provision of "active" edges incorporating roads where possible to the boundaries of the Regional Park to control the edge impacts of residential housing including potential garden escape etc. and providing enhanced potential for passive surveillance of vandalism and dumping.
24 Performance Objectives - Conservation	
2. Urban design and site planning in the Employment and Urban zones are to have regard to significant stands of trees and where practicable retain those trees	<ul style="list-style-type: none"> Retention of significant stands of trees in open space areas and road corridors is incorporated into urban planning. Road planning will be developed during ongoing design to maximise tree retention where practical seed collection and propagation programme proposed to provide plant material for revegetation works Tree removal for urban development will be balanced through new plantings to open space and road corridors. vegetation links to be further developed through open space subtle visual separation between active and passive recreation will be provided through tree planting to create open space "rooms" local indigenous species to be used to majority of open space areas and where practical (sustainable) to road corridors
27 Open space and recreation	
(1) A range of open space and recreation areas and facilities for passive and active recreation is to be provided including local playgrounds and neighbourhood parks	<ul style="list-style-type: none"> Open space masterplan provides a hierarchy of functional open space distributed within an accessible framework of corridor open space Play spaces incorporating stimulating design and artwork themes will be incorporated within open spaces in the hierarchy to meet Penrith Council requirements Flexibility in open space provision shall be achieved through design: <ul style="list-style-type: none"> to provide multi purpose spaces within parks that can adapt to changing needs minimise construction of inflexible / permanent structures that could compromise future flexibility maximise potential for temporary / moveable facilities provision (such as toilets, shelters, stages etc) build into park establishment provision of services outlets to provide for temporary use / future adaptation

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
(2) the accessibility and utility of open spaces are to be maximised for use by the community	<ul style="list-style-type: none"> Open space is to be accessible via integrated access network and shall be fronted either by other open space types or roadways All urban development areas shall be within 5 minutes walk of an open space area. Active use open space located at the centre of the precinct related to the village centre and community / educational facilities Passive recreational open space distributed equitably through the development sited to take advantage of existing tree canopy and relationship to drainage corridors (natural landscape character)
(3) Recreation activities and facilities are to be located and designed to maximise conservation of cultural and natural values....	<ul style="list-style-type: none"> Open space planning optimises tree conservation design of open space shall integrate conservation of required vegetation / other items see above
Penrith Sustainability Blueprint for Urban Release Areas - 2005	
Principle 1: Value the Site Attributes - preserve ecosystems, protect biodiversity, air, water, and conserve heritage	<ul style="list-style-type: none"> establish corridor open space to key drainage lines and or vegetation corridors improve and manage corridors adhering to riparian management objectives retain good quality existing vegetation where possible in open spaces, road corridors and allotments
Principle 2: Create Localised Landscapes and Quality Public Domains - based on the indigenous landscape attributes	<ul style="list-style-type: none"> landscape enhancement of corridors, open space, and streetscapes to respond to relevant indigenous plant communities to the site
Principle 3: Create Communities - not just housing estates	<ul style="list-style-type: none"> open space and access network planned to provide an accessible and integrated system of open space provide varied landscape settings through open spaces landscape to parklands and streetscapes promotes sense of identity
Principle 5: Save Water - Water Sensitive Urban Design (WSUD)	<ul style="list-style-type: none"> predominant use of locally indigenous plant species which are low water demand recycled and / or harvested water reuse to landscape irrigation
Principle 6: Save Energy and Greenhouse Gases	<ul style="list-style-type: none"> access network promotes cycle use and walking within the precinct
Principle 7: Maximise Liveability & Longevity	<ul style="list-style-type: none"> landscape enhancement to provide simple robust quality landscape setting open space planning and enhancement to maximise ongoing flexibility of use
Principle 8: Reduce Resource Consumption - energy, land, water and materials	<ul style="list-style-type: none"> as for principle 5 and 6
Principle 9: Minimise Waste - return, reuse, recycle	<ul style="list-style-type: none"> recycling facilities provided in public domain areas and key open spaces
Principle 10: Build-in Community Safety & Crime Prevention Measures - thoughtful design of the public domain	<ul style="list-style-type: none"> open space design to integrate CPTED principles
Penrith Open Space Action Plan, June 2007	
Objective 1 – Maximise use of existing cultural and recreation facilities	<ul style="list-style-type: none"> New facilities to focus on gaps in existing provision
Objective 2 – Rationalise recreation and cultural resources in the Penrith Local Government Area	<ul style="list-style-type: none"> Consider the quantum of open space required in the context of the adjoining Regional Park and Regional Open Space to avoid "over supply" of space that it not effectively used by the community given the range of options available Provide quality open space areas focussing resources on key areas rather than "spreading too thin"
Objective 3 – Provide new recreation and cultural facilities that are under supplied in the Penrith Local Government Area	<ul style="list-style-type: none"> New facilities to focus on gaps in existing provision
Objective 4 – Encourage Community Involvement in Facility and Service Provision	<ul style="list-style-type: none"> Potential community involvement in planning and design of facilities Close liaison with sporting clubs for ongoing management of facilities
Objective 5 – Facilitate Diverse Recreational & Cultural Program Development	<ul style="list-style-type: none"> Provide resources to co-ordinate and facilitate recreation and cultural activities to meet community needs Ensure that Council managed community, sport and recreation facilities offer a variety of relevant recreational cultural activities and services Provide appropriate recreation and cultural facilities for a wide range of cultures in Penrith Facilitate participation in arts and cultural activities by community artists Encourage the programming of recreation and cultural activities that support and assist the tourism objectives of Council Encourage sports development activities
Objective 6 – Provide Effective and Sustainable Management, Support and Resources	<ul style="list-style-type: none"> park planning and design to consider ongoing maintenance with the aim of minimising where possible recurrent maintenance requirements focus higher maintenance demands in areas of high usage volume and impact, and key landscape zones of importance to civic identity

RELEVANT POLICY / CONTROL	LANDSCAPE AND OPEN SPACE PLANNING RESPONSE
<p>District Facilities</p> <p>The 2007 Open Space Action Plan identified general objectives for the St Marys site</p> <ul style="list-style-type: none"> Establishing a new Regional Park to ensure appropriate flora and fauna habitat areas are preserved Establishing a large park that provides for a range of passive and active recreational and sporting facilities, and to accommodate the needs of future residents Investigating the feasibility of establishing a sports facility to service a catchment beyond the immediate residential base, and Investigating the feasibility of establishing an 'environmentally sustainable' centre for research and educational purposes (pending the outcome of any proposals planned for the Castlereagh site). <p>The proposed district facilities within the release area may include -</p> <ul style="list-style-type: none"> a senior AFL and cricket venue, local level playground, (St Marys Eastern Park Regional Open Space) a district level sports pavilion & field / outdoor entertainment venue provision of 6 full size playing fields, 4 mini fields, basketball / netball courts to serve local needs, lighting, car parking, spectator seating / shelter a district level universally designed playground facility, amenities, shared path circuit 	<ul style="list-style-type: none"> Ongoing planning will investigate provision of a range of sporting and recreation facilities in the Central Regional Open (total approx. 40 ha), with good physical connection to the proposed Central Precinct Village Centre. Exact facilities to be provided will be determined following further consultation with key stakeholders, including PCC, Dept of Planning and potential user groups.
<p>7.1 Quantum of Open Space</p> <p>The Local Open Space Action Plan 2007 identifies a target quantum of 3.04ha per 1000 population.</p> <p>Central Precinct 970 dwellings 2500 population</p> <p>Active Open Space 3.5 ha</p> <p>Passive Open Space 4.1 ha</p> <p>Total Open Space 7.6 ha (3.04 ha / 1000)</p>	<p>The open space masterplan provides 7.6ha open space at a rate of 3.04 ha / 1000 population</p> <p>This includes open space additional to local open space as identified in Council's 2007 Open Space Action Plan definitions:</p> <ul style="list-style-type: none"> open spaces within drainage and vegetation corridors that are additional to lands required for drainage lines and vegetation buffers (20m total buffer to drainage line as per DWE requirements for St Marys site) Shared access paths within corridors active facilities provided in Regional Open Space to Central Precinct as offset to 3.5ha requirement in Central Precinct <p>The quantum recognises the following factors:</p> <ul style="list-style-type: none"> distribution of open space adequately addresses the minimum target for accessibility to residences of 5 minutes walk generally the Regional Park and Regional Open Space accessible to the Central Precinct in addition to Regional Park areas suitable for use as passive open space supplement local open space in providing a "quantum" of space for recreational use the Regional Park context and the accessibility of corridor open space and linkages provides a high level of landscape amenity The Regional Open Space will also provide passive recreational facilities that will supplement the passive use local and pocket parks open space embellishment will provide a high level of landscape amenity that promotes "quality" of open space and recreational experiences the capacity of Council to effectively and sustainably maintain open space area must be considered - oversupply of poor quality open space is not a good or sustainable community outcome. in the context of the above factors the proposed open space masterplan reflects the needs based and qualitative approach as recommended in Council's PLANS strategy.

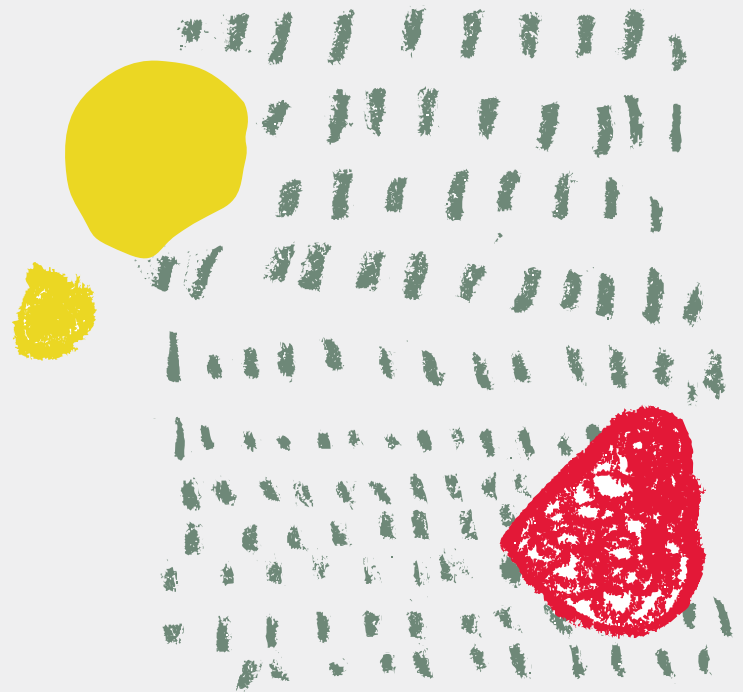


September 2015

Central Precinct (St Marys Development)

Vegetation Management Plan

Issue F



September 2015

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Appendix

- A Riparian Corridor Reconstruction Overall Plan
- B Transgrid Easement Guidelines for Third Party Development
- C Species Impact Statement (Cumberland Ecology)

1 Introduction

1.1 Background

The St Marys Development is one of the States major developments and as such is subject to the Sydney Region Environmental Plan (SREP) No. 30 – St Marys and accompanying St Marys Environmental Planning Strategy 2000 (EPS). Significant planning and investigation has already been undertaken on the site relating to the above planning process.

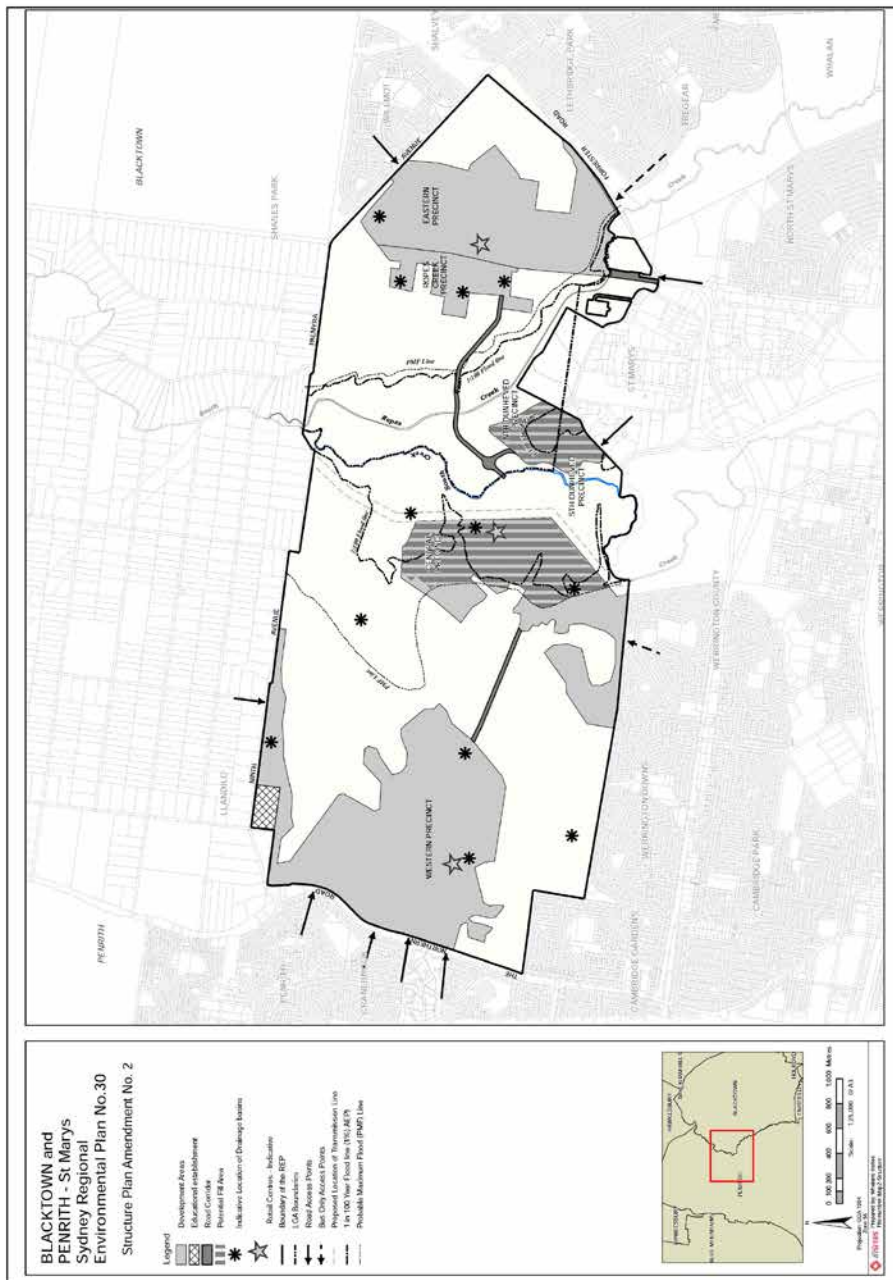


Figure 1: SREP No. 30 Structure Plan

The St Marys Development site is a 1,545ha site located east of Cranebrook, and north of Penrith and St Marys. The site is 7km in length east west and 2km in length north south. Central Precinct is located between Ropes Crossing (to the east) and Jordan Springs (to the west) and is the last residential precinct on the site to be developed.



Figure 2: Site Plan

1.2 Purpose

This Vegetation Management Plan (VMP) has been prepared for Maryland Development Company by JMDdesign PTY LTD, Landscape Architects. The VMP outlines the existing conditions, proposed development, regeneration and revegetation strategy and maintenance and monitoring regimes associated with the development of the Central Precinct at the St Marys Development site. The aim of the VMP is to satisfy the requirements of the Water Management Act and Controlled Activity Statement relating to riparian works within Central Precinct, and the Transgrid Easement Guidelines for Third Party Development for works relating to the landscape embellishment of the Transmission Easement. In doing so the VMP will outline a description of the site, the proposed development, stormwater management and treatment, riparian corridor reconstruction and vegetation management works as well as maintenance and management regimes and monitoring.

1.3 Application of this VMP

This VMP applies to the proposed riparian corridor and the transmission easement within Central Precinct as identified on Figure 3 below.



Figure 3: Vegetation Communities/VMP Areas

2 Site Assessment

2.1 Site Description

The St Marys Development site has an interesting history. Post Aboriginal occupation the site was used for agricultural purposes until the Defence occupied the site as a munitions manufacturing and storage facility. As a result of these land uses much of the site was cleared and old aerial photographs of the site show it is almost completely devoid of vegetation (refer images below with overlay of Central Precinct in Orange). Defence land uses resulted in many landform changes and the replacement of natural water courses with concrete channels in some locations. The South Creek corridor is located immediately east of the site.

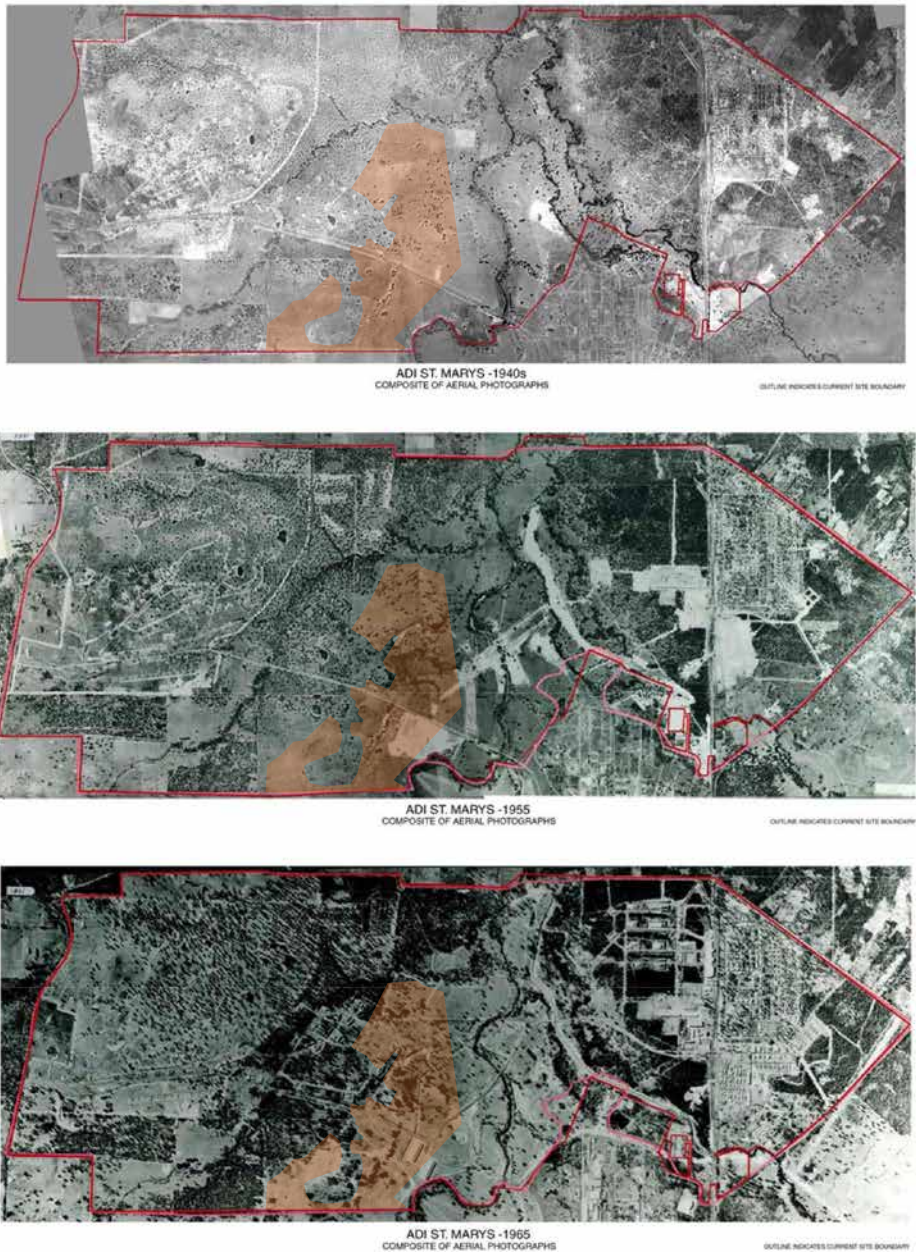


Figure 4: Historical Aerial Photos (1940s, 1955 and 1965)

2.2 Flora & Fauna

A Species Impact Statement (SIS) has been prepared by Cumberland Ecology to assess the impacts of the proposed development of Central Precinct for residential, employment and open space purposes. The SIS was prepared to:

- Identify threatened species issues and identify and provide appropriate amelioration strategies to minimise adverse impacts resulting from the proposal;
- Assist consent and determining authorities in the assessment of the development applications under Part 4 or request for Part 5 approvals;
- The SIS notes that vegetation of the study area can now be separated into various sub-units of the following vegetation types:

1. Cumberland Plain Woodland

The vegetation of the Central Precinct contains Cumberland Plain Woodland (CPW) and grassland derived from the clearing of CPW (“derived native grassland”). CPW in the study area is described in various conditions / forms below:

Mature CPW

The CPW in the central portions of the Regional Park (which have been included in the eastern extent of the study area for the purposes of this SIS) generally contains mature CPW and other woodland types containing a higher diversity of native species, generally more structurally intact than the CPW within the rest of the Central Precinct. The mature areas of CPW contain a shrub layer, mostly of *Bursaria spinosa* (Blackthorn) and *Dillwynia sieberi* (Parrot-pea), characteristic species of CPW.

Regenerating CPW

The CPW present in the Central Precinct is considered to be occurring in a more simplified regenerating form of the community, compared with the regeneration taking place in the Regional Park, possibly because of the historically higher levels of disturbance.

Derived Native Grassland

This grassland has been extensively surveyed, and can be further characterised by a large zone dominated by exotic grasses (predominately *Axonopus fissifolius*) and few native herbs and shrubs.

2. Shale Gravel Transition Forest

Shale Gravel Transition Forest community is dominated by *Eucalyptus fibrosa* with *E. moluccana* also occurring less frequently. Shrub species are similar to those found in CPW but more commonly include shrubs from the pea family, including threatened species such as Parrot pea, and has also been observed to contain high numbers of *Grevillea juniperina subsp. juniperina*. Large areas of SGTF occur in the eastern portions of the SMP, mostly to the east of the current study area extent. This community occurs as a small patch along the western border of the subject site.

3. River-flat Eucalypt Forest

River-flat Eucalypt Forest (RFEF) occurs in the Central Precinct, in simplified regenerating form as patches in the centre of the precinct, associated with Swamp Oak Forest, and to a lesser extent, sedgeland. These communities are present in the lower lying areas of the site, with higher areas occupied by CPW. It has a limited distribution within the precinct (only 28.51 ha), and is largely isolated from the more extensive areas of Alluvial Woodland in the Regional Park.

Canopy species in the patches of RFEF include *Angophora floribunda* (Rough-barked Apple), *Casuarina glauca* (Swamp Oak) and *Eucalyptus amplifolia* (Cabbage Gum), and in some areas *Eucalyptus fibrosa* (Broad-leaved Ironbark). A native shrub layer in these patches is mostly absent, though where occurring consists of juvenile *Casuarina glauca* individuals, and *Acacia parramattensis* (Parramatta Wattle). The native grass *Microlaena stipoides* is common-dominant in some areas, and other native grasses such as *Artistida ramosa* are common in localised patches.

Derived Native Grassland

The vegetation of the Central Precinct contains areas of grassland that have been derived from the clearing of RFEF. These areas contain a number of native grass species and forbs that would have been understorey species of RFEF prior to clearing of the canopy. RFEF Derived Native Grassland occurs as a narrow band in the western side of the centre of the Central Precinct, and is associated with Swamp Oak Forest, Sedgeland, and RFEF.

4. Swamp Oak Forest

Swamp Oak Forest (SOF) is found in the Central Precinct in low lying areas in patches in the centre of the site and along the central western edge, associated with RFEF, and Sedgeland. Typical of the community, the ground storey is sparse, with a dense covering of litter from the monoculture of *Casuarina glauca* (Swamp Oak) individuals comprising the canopy. A native shrub layer is nearly absent, consisting of rare occurrences of *Trema tomentosa* (Poison Peach), *Acacia parramattensis* (Parramatta Wattle) and *Casuarina glauca* juveniles. The shrub layer is predominately exotic with species such as ***Ligustrum sinense*** and *Ligustrum lucidum*.

The ground storey is a mixture of exotic weeds such as *Verbena bonariensis* (Purple Top), *Solanum pseudocapsicum* (Jerusalem Cherry), and *Sida rhombifolia* (Paddy's Lucerne), and native species such as *Einadia trigonos* (Fishweed), *Carex inversa*, *Oplismenus aemulus* (Basket Grass), and *Microlaena stipoides*. The exotic vines *Araujia sericifera* (Moth Vine), and *Asparagus asparagoides* (Bridal Creeper) are common in the community on the subject site. This community occurs as scattered patches mainly in the central parts of the subject site and often intergrades with RFEF and wetland communities.

5. Freshwater Wetlands

Sedgeland, a form of Freshwater Wetlands, occurs in very small local patches throughout the precinct, generally artificially created by a small scraping of the soil that results in a small depression. These areas usually are too small to warrant mapping, being only a few square metres in area and have therefore been included in the grassland mosaic. Three areas of Freshwater Wetlands have been mapped: the area surrounding the dam in the south western corner of the study area, largely included in the Regional Park, a small soak in the centre of the subject site, and also an area along a drainage line near the western section of the precinct.

(Refer Figure 5: Vegetation Communities and Disturbance (Cumberland Ecology) over page)

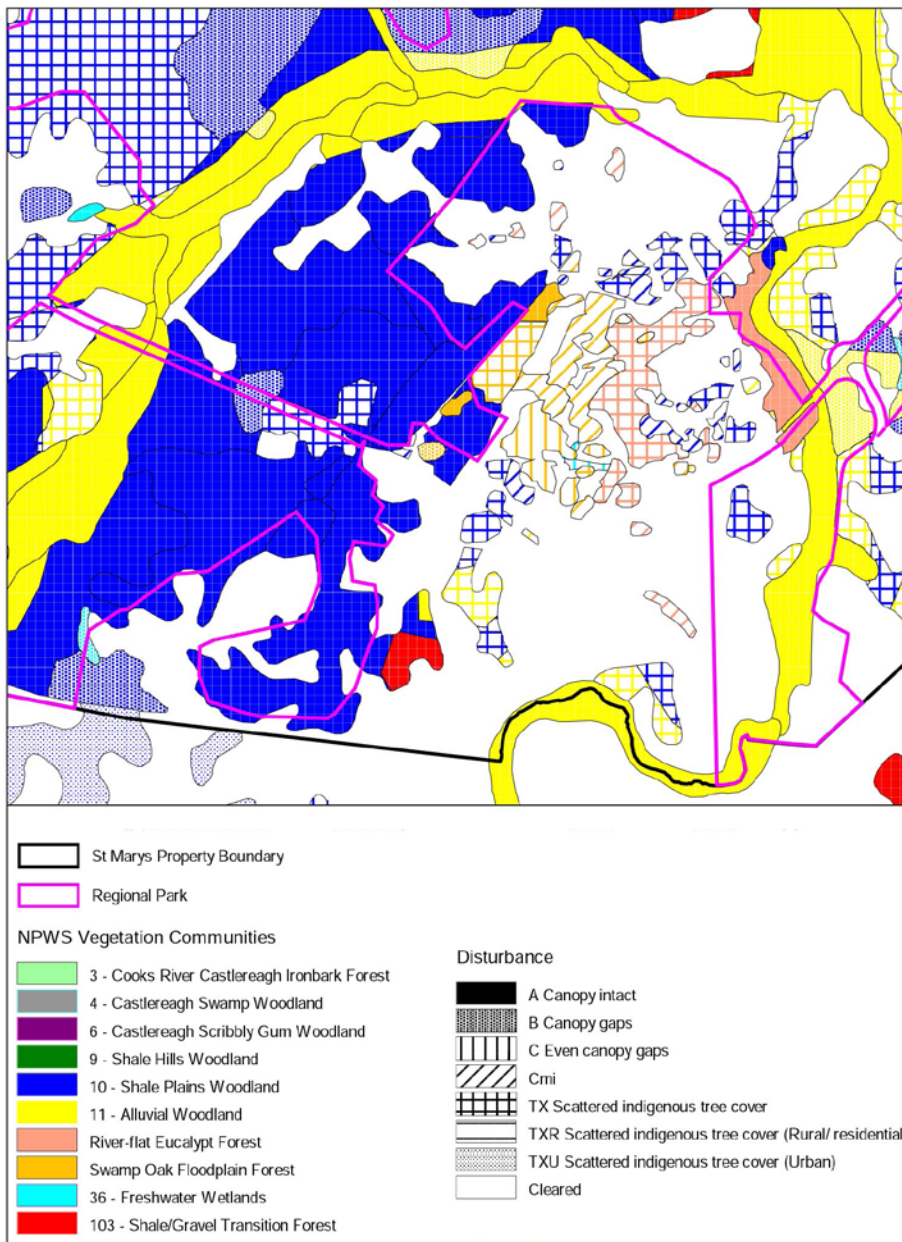


Figure 5: Vegetation Communities and Disturbance (Cumberland Ecology)

2.3 Soils

The sites soils consist of Wianamatta Group – Ashfield Shale, Bringelly Shale which display the limitations of being moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage. South Creek soil landscape occurs along drainage depressions and is prone to erosion and frequent flooding. (ref: Soil Landscapes of Penrith 1:100,000 Sheet, SM Bannerman & PA Hazelton 1990)

2.4 Landform & Drainage

The existing landform in Central Precinct is relatively flat with little undulation. Elevations vary between 29m Australian Height Datum (AHD) and 40m AHD. The site is located to the west of South Creek and a portion of the site is currently below the 1:100 year ARI event in South Creek and a concurrent 1:20 year Average Recurrence Interval (ARI) flood in the Hawkesbury Nepean River. The precinct is also affected by the possible maximum flood (PMF).

Drainage lines across the site are not clearly defined except for some minor drainage lines to the east of the site draining to South Creek.

3 Proposed Development

3.1 Residential Development

The proposed residential development on the site will consist of roads, detached and attached dwellings, parks and open space and a mixed use village centre. A sporting precinct (regional open space) will sit to the east of Central Precinct between the development and South Creek.

As part of the development described above, extensive filling will take place on the site as some areas of the site are currently below the 1:100 year ARI event in South Creek and a concurrent 1:20 year ARI flood in the Hawkesbury Nepean River. The amount of filling required is further increased as an evacuation route is required in the form of a continually rising escape route for areas of the site affected by PMF. This affects the overall design levels and results in additional filling to the site and resulting internal catchments (refer Figure 6 Contour and Internal Catchment Plan on Page 8).



Figure 6: Contour and Internal Catchment Plan (Cardno)

3.2 Integrated Open Space Network

The open spaces and parkland network at Central Precinct is defined by a range of landscape types. These include areas for passive recreation, active recreation and facilities for the community as well as areas for hydraulic (drainage) and environmental purposes. These open spaces have been planned to form an interconnected network with access via pedestrian and cyclist paths. The open space hierarchy includes:

- Regional Park
- Regional Open Space
- Transmission Corridor Park (Transmission Easement)
- Local Park (Edge and Central Pocket Parks)
- Riparian Corridor
- Stormwater Management Devices

Refer Figure 7: Open Space Hierarchy

The embellishment of these open spaces will be done in such a way as to provide a seamless transition between the different open space types throughout the Precinct. The open space network will be enhanced by:

- Minimising the visual impact of the Transmission Corridor Park (Transmission Easement) by integrating a range of adjacent open spaces including the Riparian Corridor;
- Integrating the Regional Park with a range of open space typologies to continue the bushland character into the Precinct;
- Connecting the Riparian Corridor with Stormwater Management Devices by linking the corridor with the broader landscape and the Regional Park; and
- Regenerating indigenous vegetation from the site along the riparian corridor and adjacent landscape to improve environmental connectivity.

Refer Figure 8: Green Links and Figure 9: Central Precinct Indicative Landscape Master Plan



Figure 7: Open Space Hierarchy



Figure 8: Green Links



Legend

- | | | |
|------------------|-----------------------------|----------------------------|
| Sports fields | Interpretation - Signage | Macrofauna fence |
| Hard Courts | Interpretation - Public art | Vehicle bridge crossing |
| Fitness Stations | Walking + cycle connections | Pedestrian bridge crossing |
| Playgrounds | Possible trees for retain | |
| Picnic | | |

CENTRAL PRECINCT INDICATIVE LANDSCAPE MASTER PLAN

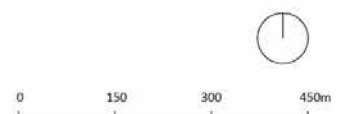


Figure 9 : Central Precinct Indicative Landscape Master Plan

3.3 Stormwater Management and Treatment

A preliminary stormwater management strategy has been prepared for the Central Precinct by Cardno. The preliminary stormwater management strategy has been prepared in accordance with the requirements of SREP30, relevant Council guidelines and work documented within St Marys Project Central Precinct Plan Water, Soils and Infrastructure Report, SKM, May 2009.

The preliminary stormwater management strategy will treat stormwater runoff prior to it discharging into existing water courses located in the vicinity of the site. Measures include:

- gross pollutant traps
- bio-filtration basins
- riparian corridor
- on-line basins within the riparian corridor.

Refer Figure 10 Stormwater Management Devices on Page 12.

During construction phases of the development, appropriate sediment and erosion control measures will be implemented as part of the works. The sediment and erosion control measures will reduce the potential for sediment migration downstream of the site and will include the following:

- Sediment basins
- Sediment fencing
- Hay bale check dams
- Diversion drains
- Stabilised site access.

3.4 Proposed Riparian Corridor Reconstruction Works

A fully reconstructed riparian corridor is proposed through Central Precinct as part of the development of the site. This will consolidate existing poorly defined channels on the site to one core riparian zone. The riparian zone will also be defined due to the amount of fill required for the development. As a result the riparian corridor will be fully reconstructed, with little existing vegetation. In some locations it may be possible to retain existing vegetation and trees where changes to site levels are not required. This is subject to further detailed design and investigation.

The objectives for the riparian corridor are:

- where possible due to levels, retain existing vegetation in the riparian corridor;
- establish a core riparian zone;
- establish aquatic habitat zones;
- improve environmental linkages through Central Precinct between South Creek and the Regional Park.
- provide creek crossings in line with Office of Water (Department of Primary Industries) guidelines to allow for movement of aquatic fauna;
- enhance biodiversity as a result of the corridors regeneration; and
- provide vegetated batter slopes at 1(V):4(H) or greater.

3.5 Proposed Transmission Easement Regeneration Works

Regeneration works associated with the landscape embellishment of the transmission easement will be subject to the Transgrid Easement Guidelines for Third Party Development (Refer Appendix B). The guidelines also apply to areas of the riparian corridor that occur within the easement. Regeneration works in accordance with the guidelines require that proposed vegetation plantings within the transmission line easements be compatible with maintenance requirements, namely that tall growing species are removed and that shrubs and other vegetation of a lower mature height be provided.

Turfed areas will be provided in key locations along the transmission easement to extend passive recreation areas adjacent to the corridor, for example adjacent to local open space. These locations would avoid key environmental links or habitat connections.

The objectives for landscape embellishment of the transmission easement will be :

- where possible due to levels, retain existing vegetation in the transmission easement, for example where *Bursaria spinosa* has regenerated providing habitat and refuge;
- continue a riparian corridor functions through the easement with low vegetation provided;
- provide maximum batter slopes 1(V):5(H) for turfing areas and vegetated batter slopes at 1(V):4(H) or greater.



Figure 10: Stormwater Management Devices locations (Cardno)

- establish habitat links between the riparian corridor, Wiannamatta Regional Park and South Creek; and
- improve environmental linkages and enhance biodiversity through Central Precinct;
- facilitate pedestrian and cycle networks through corridors; and
- accommodate passive recreation/kickabout spaces adjacent to local open space.

The above works will apply to the landscape treatments described below:

Treatment 1 – Riparian Corridor Reconstruction and Transmission Easement

Establishment

- Replacement planting where survival drops below 90%;
- Weed control to facilitate establishment of native species; and
- Remove rubbish that has been dumped in this zone.

Ongoing

- Monitor for feral pest species including rabbits and foxes – follow up control if necessary;
- Monitor establishment of local provenance CPW species; and
- Follow up weed control.

Key Performance Indicators

- Follow up weed control, weed control at post construction maintenance phase to be less than 5% and at then end of the maintenance period;
- Keep are clear of dumped rubbish;
- Area affected by weeds reduced to enable dense cover of planting; and
- Density of CPW (tree and shrub and ground layer species) increased in cleared and partially cleared areas.

Treatment 2 – Stormwater Management Devices

Establishment

- Replacement planting where survival drops below 90%;
- Weed reduction to provide for regeneration of native species.
- Control for rabbits and foxes.

Ongoing

- Manage for the protection of biodiversity, including aquatic and riparian flora and fauna;
- Follow up weed control;
- Monitor for feral pest species including rabbits and foxes – follow up control if necessary;
- Monitor for regeneration of native species after weed control;
- If insufficient natural regeneration after 1st year, revegetate with local provenance CPW species.

Key Performance Indicators

- Follow up weed control, weed control at post construction maintenance phase to be less than 5% and at then end of the maintenance period;
- Area affected by weeds reduced to enable dense cover of planting; and
- Density of CPW (tree, shrub and ground layer species) increased in cleared and partially cleared areas

Area	Performance Measures	Method and Parameters	Frequency of Monitoring	Responsibility
1 Riparian Corridor Planting of trees, grasses and shrubs	Establishment of vigorous growth of trees, shrubs and grasses	Establish: 1 tree/20m ² 1 shrub/2m ² 6 grasses/ groundcovers /m ²	Initial recording at planting. 2 monthly assessment and reporting.	Bushland supervisor.
2 Transmission Easement Planting of grasses and shrubs	Establishment of vigorous growth of shrubs and grasses Mowing in turf locations as required during maintenance period	Establish: 1 shrub/2m ² 6 grasses/ groundcovers /m ² Turf in key locations	Initial recording at planting. 2 monthly assessment and reporting.	Bushland supervisor.
3 Weed control	Control weed infestation to satisfactory levels	Nil noxious weeds. 5% visible perennial weeds. 5% visible annual weeds.	Initial treatment prior to planting. 2 monthly assessment and reporting.	Bushland supervisor.
4 Pest and disease control	Control pest and diseases to satisfactory levels utilising integrated pest management strategies.	15% visible damage	2 monthly assessment and reporting.	Bushland supervisor.

The Central Precinct Riparian Corridor is to consist of:

- A core riparian corridor of 82.905 metres squared (CRZ);
- A buffer zone of min. 10m on both sides of the CRZ. Requirements for bush fire management should be considered in this zone and Asset Protection Zones (APZ's) may apply to these areas.

Works proposed as part of the riparian corridor reconstruction include:

1. Undertake detailed site assessment and planning relevant to proposed levels and existing vegetation. As a result of this investigation, determine existing vegetation to be retained where levels and drainage permit. Mapping should include:

- a. extent of existing viable bushland to be retained;
- b. extent of water bodies to be retained;
- c. extent of earthworks on site;
- d. existing weed growth and type; and
- e. extent of areas to be revegetated/regenerated.

2. Prepare plans and specification outlining the extent of vegetation management and regeneration works required.

3. Approved plans and specifications are to be used to call tenders from qualified Bushland Management Contractors experienced in working in Cumberland Plain Woodland communities.

4. Undertake locally indigenous plant propagation program to ensure adequate species and numbers are available for the project in line with key project milestones. Ensure all relevant licences are obtained from Penrith City Council (PCC) and National Parks and Wildlife (NPWS) prior to collecting plant material.

5. Implement a Pest Management Strategy with appropriate approvals as required.

6. Install silt fencing and temporary protective measures/signage for existing vegetation to be retained prior to civil works taking place.

7. Maintain silt fencing and temporary protective measures/signage for entire duration of construction period.

8. Prior to creekline works commencing, ensure erosion control works have been installed as per the Soil and Water Management Plan prepared by Cardno.

9. On completion of permanent erosion control measures as part of civil works, bushland reconstruction works can commence. Coordination and site handover may be required and consideration should be given to contractor coordination and OH&S issues. Given the nature of reconstruction works temporary erosion control measures may be required during plant establishment.

10. Bushland reconstruction/revegetation works will include:

- a. cultivation, mulching and planting;
- b. installation of temporary landscape erosion control measures;
- c. weed control including spraying and hand removal;
- d. installation of jute matting below 1:20 year flood zone; and
- e. installation of growing medium to rock lined creek areas and planting.

11. Installation of temporary and permanent protective fencing. Consideration should be given to installing rabbit proof mesh fences to the perimeter of reconstruction zones for the duration of establishment in place of individual rabbit proof surrounds.

4. Vegetation Management Works

4.1 Propagation

Plant suppliers utilised in the sourcing of plant stock will be required to certify that all plant material supplied for the project is locally indigenous in line with Office of Water requirements. The following species listed below will be collected from, in and around the site.

Family Name	Botanical Name	Riparian Corridor	Transmission Easement
Trees			
Fabaceae	<i>Acacia falcata</i>	Y	N
Fabaceae	<i>Acacia floribunda</i>	Y	N
Mimosoideae	<i>Acacia implexa</i>	Y	N
Mimosoideae	<i>Acacia parramattensis</i>	Y	N
Casuarinaceae	<i>Allocasuarina littoralis</i>	Y	N
Myrtaeae	<i>Angophora floribunda</i>	Y	N
Malvaceae	<i>Brachychiton populneus</i>	Y	N
Casuarinaceae	<i>Casuarina glauca</i>	Y	N
Myrtaceae	<i>Eucalyptus amplifolia</i>	Y	N
Myrtaceae	<i>Eucalyptus crebra</i>	Y	N
Myrtaceae	<i>Eucalyptus eugenioides</i>	Y	N
Myrtaceae	<i>Eucalyptus fibrosa</i>	Y	N
Myrtaceae	<i>Eucalyptus moluccana</i>	Y	N
Myrtaceae	<i>Eucalyptus tereticornis</i>	Y	N
Myrtaceae	<i>Melaleuca styphelioides</i>	Y	N
Shrubs			
Phyllanthaceae	<i>Breynia oblongifolia</i>	Y	Y
Pittosporaceae	<i>Bursaria spinosa ssp. spinosa</i>	Y	Y
Fabaceae	<i>Daviesia ulicifolia</i>	Y	Y
Phormiaceae	<i>Dianella longifolia</i>	Y	Y
Fabaceae	<i>Dillwynia sieberi</i>	Y	Y
Sapindaceae	<i>Dodonaea viscosa subsp. cuneata</i>	Y	Y
Cannabaceae	<i>Trema Tomentosa</i>	Y	N

Family Name	Botanical Name	Riparian Corridor	Transmission Easement
Ground Cover			
Lamiaceae	<i>Ajuga australis</i>	Y	Y
Amaranthaceae	<i>Alternanthera nana</i>	Y	Y
Amaranthaceae	<i>Alternanthera nodiflora</i>	Y	Y
Anthericaceae	<i>Arthropodium milleflorum</i>	Y	Y
Pteridaceae	<i>Cheilanthes sieberi</i>	Y	Y
Commelinaceae	<i>Commelina cyanea</i>	Y	Y
Cyperaceae	<i>Cyperus brevifolius</i>	Y	Y
Cyperaceae	<i>Cyperus eragrostis</i>	Y	Y
Cyperaceae	<i>Cyperus gracilis</i>	Y	Y
Fabaceae	<i>Desmodium varians</i>	Y	Y
Convolvulaceae	<i>Dichondra repens</i>	Y	Y
Anthericaceae	<i>Dichopogon fimbriatus</i>	Y	Y
Blechnaceae	<i>Doodia caudata var. caudata</i>	Y	Y
Chenopodiaceae	<i>Einadia hastata</i>	Y	Y
Chenopodiaceae	<i>Einadia trigonos</i>	Y	Y
Scrophulariaceae	<i>Eremophila debilis</i>	Y	Y
Fabaceae	<i>Glycine clandestina</i>	Y	Y
Fabaceae	<i>Glycine microphylla</i>	Y	Y
Fabaceae	<i>Glycine tabacina</i>	Y	Y
Goodeniaceae	<i>Goodenia bellidifolia</i>	Y	Y
Goodeniaceae	<i>Goodenia hederacea</i>	Y	Y
Proteaceae	<i>Grevillea juniperina ssp juniperina</i>	Y	Y
Dilleniaceae	<i>Hibbertia diffusa</i>	Y	Y
Dilleniaceae	<i>Hibbertia obtusifolia</i>	Y	Y
Poaceae	<i>Oplismenus Aemulus</i>	Y	Y
Polygonaceae	<i>Persicaria decipiens</i>	Y	Y
Thymelaeaceae	<i>Pimelea curviflora var. Sericea</i>	Y	Y
Thymelaeaceae	<i>Pimelea curviflora var. subglabrata</i>	Y	Y
Lobeliaceae	<i>Pratia purpurascens</i>	Y	Y
Violaceae	<i>Viola betonicifolia</i>	Y	Y
Campanulaceae	<i>Wahlenbergia communis</i>	Y	Y
Campanulaceae	<i>Wahlenbergia gracilis</i>	Y	Y

Family Name	Botanical Name	Riparian Corridor	Transmission Easement
Native Grasses			
Poaceae	<i>Aristida ramosa</i>	Y	Y
Poaceae	<i>Aristida vagans</i>	Y	Y
Poaceae	<i>Aristida warburgii</i>	Y	Y
Poaceae	<i>Austrodanthonia bipartita</i>	Y	Y
Poaceae	<i>Austrodanthonia fulva</i>	Y	Y
Poaceae	<i>Bothriochloa decipiens/macra</i>	Y	Y
Cyperaceae	<i>Carex appressa</i>	Y	Y
Cyperaceae	<i>Carex inversa</i>	Y	Y
Poaceae	<i>Chloris ventricosa</i>	Y	Y
Poaceae	<i>Cymbopogon refractus</i>	Y	Y
Poaceae	<i>Dichelachne micrantha</i>	Y	Y
Poaceae	<i>Echinopogon caespitosus</i>	Y	Y
Poaceae	<i>Entolasia stricta</i>	Y	Y
Poaceae	<i>Eragrostis brownii</i>	Y	Y
Poaceae	<i>Eragrostis leptostachya</i>	Y	Y
Poaceae	<i>Imperata cylindrica</i>	Y	Y
Juncaceae	<i>Juncus australis</i>	Y	Y
Juncaceae	<i>Juncus usitatus</i>	Y	Y
Lomandraceae	<i>Lomandra filiformis ssp. filiformis</i>	Y	Y
Lomandraceae	<i>Lomandra longifolia</i>	Y	Y
Lomandraceae	<i>Lomandra multiflora</i>	Y	Y
Poaceae	<i>Microlaena stipoides</i>	Y	Y
Poaceae	<i>Poa labillardieri</i>	Y	Y
Poaceae	<i>Sporobolus creber</i>	Y	Y
Poaceae	<i>Sporobolus elongatus</i>	Y	Y
Poaceae	<i>Themeda australis</i>	Y	Y
Climbers			
Ranunculaceae	<i>Clematis glycinoides</i>	Y	Y
Legume	<i>Hardenbergia violacea</i>	Y	Y
Macrophytes			
Cyperaceae	<i>Eleocharis sphacelata</i>	Y	Y

4.2 Weed Control

Following the installation of erosion control and protective fencing measures, weed removal and control will be undertaken in the following ways:

1. Following earthworks and prior to the revegetation works the site shall be reviewed by the Bushland Management Contractor to determine appropriate means of weed removal by either herbicide or manual removal.
2. Following eradication of visible weed cover, the site will be cultivated.
3. Soil conditioners, compost and mulch added as specified and erosion control matting installed as required.
4. Following final planting of the site the area will be maintained for a three year period.

4.3 Revegetation

Revegetation of the riparian corridor will occur following the completion and certification of bulk earthworks and civil infrastructure associated with the development. Weeds established during the bulk earthworks stages will be removed under that contract prior to handover.

Plant species to be used in revegetation works are those identified in section 4.1 Vegetation Propagation. Detailed Rehabilitation Plans will be developed for the riparian corridor including planting plans. These planting plans will be developed with the proposed species in mind and with consideration of site specific characteristics such as aspect, microclimate, grades, drainage, levels and inundation. The exact placement of species will be reviewed on site and determined based on the above conditions, while trees and shrubs will be planted in thickets and copses at rates consistent with CPW spacing. These will be identified on the planting plans. Groundcovers will be planted at a min. of 6 plants/m² to achieve a dense ground cover, helping reduce competition from weeds once plants are established.

4.4 Maintenance and Management Regimes

The specification for riparian corridor restoration works will include a maintenance specification. The Bushland Management Contractor is required to maintain the riparian corridor for a period of two years from final planting. This may be completed and handed over in stages, so long as adjoining stages to not adversely impact already completed stages of work.

i. Vegetation Maintenance

Vegetation maintenance includes watering, weeding, fertilizing, pest and disease control and plant replacement.

ii. Watering

Further detail on watering will be included in the maintenance specification.

iii. Weed and Pest Control

Weed control is essential during plant establishment as they compete for moisture, nutrients and sunlight. Effective weed control during establishment may lead to increased growth rates and vegetation cover, thus reducing the success of future weeds.

4.5 Maintenance Criteria and Reporting

The following maintenance criteria will need to be satisfied in order to complete the maintenance period:

- Replace mulch as bare ground becomes visible for the first two years of the maintenance period.
- Replace failed plants monthly for the first 12 months.
- Retain plant stakes for the first 12 months, after which they can be removed.
- Meet the KPI's as identified in section 3 above.

A Maintenance log shall be maintained by the bush regeneration contractor for the entire two year maintenance period in accordance with the schedule below. The contractor shall submit reports every 6 months during the three year maintenance period addressing the issues below. Reports are to be reviewed by the superintendent and issued to the NSW Office of Water for review and comment.

4.6 Handover to Council

Open space areas including the riparian corridor will be handed over to PCC for ongoing maintenance once agreed timeframes and performance goals are met as defined in the development deed. Handover to PCC will occur at the completion of the contract maintenance period once the following activities have been completed:

1. Final inspection undertaken and defects list prepared.
2. Defects rectified and signed off.
3. Relevant stage of works achieves practical completion.
4. Two year maintenance period commences.
5. Ongoing monitoring during maintenance period.
6. Works signed off at end of maintenance period.

From handover as agreed between the parties, ongoing maintenance of the open space by PCC will include:

- Rubbish removal
- Clearing of GPT's and trash devices
- Weed monitoring and control (terrestrial and aquatic)

Riparian corridor areas will be maintained for a period of two (2) years, while the transmission easement will be subject to a 12 month maintenance period similar to that of local open space, prior to handover to Penrith City Council.

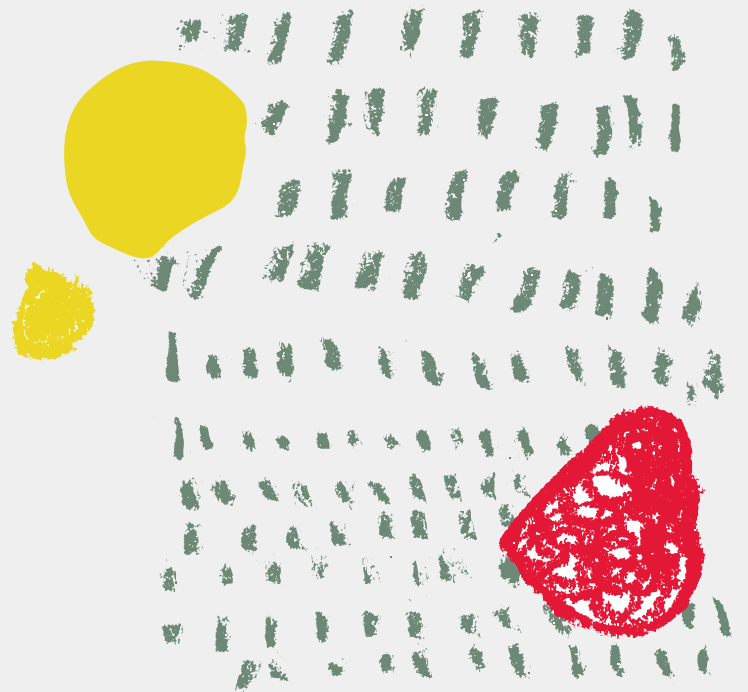
5 Monitoring and Review of Terrestrial Vegetation

A monitoring program will be carried out by the contractor to provide data for maintenance and establishment including plant replacement, weed control and pest/ disease control over the 2 year maintenance period. This is outlined in the table below.

VEGETATION MANAGEMENT TASK	Monthly Monitoring / Activities	Bi-Monthly Monitoring / Activities	6-Monthly Monitoring / Activities
Plant replacements	As req'd by three yr establishment period		
Weeding	As req'd by three yr establishment period	As req'd by three yr establishment period	
Watering	As req'd by three yr establishment period		
Mulching			Supplement in first 2 years.
Pest & Disease Monitoring	For three yr establishment period		
Attack by rabbits, birds etc.		Monitoring and record on occurrence for duration of three yr establishment period	
Vandalism		Monitoring and record on occurrence for duration of three yr establishment period	
Storm events	Additional inspection on occurrence.		

Appendix A

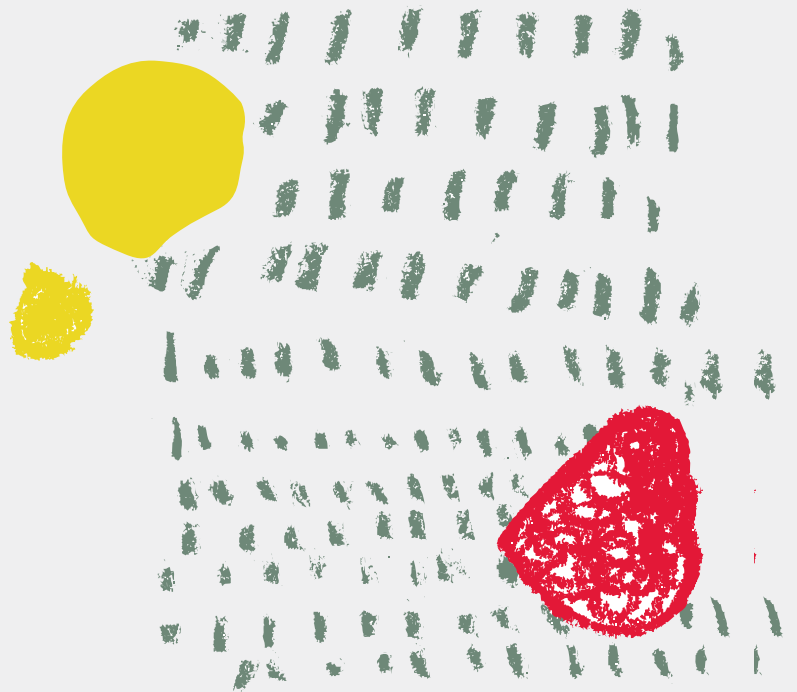
Riparian Corridor/Transmission Easement Reconstruction Overall Plan





Appendix B

Transgrid Easement Guidelines for Third Party Development



TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

Background

Transmission Line (TL) and cable easements are acquired by TransGrid to provide adequate clearance along the route of a transmission line for construction and maintenance work and also to ensure that no work or other activity is undertaken under or near the TL or cable which could create an unsafe situation either for persons or for the security of the TL or cable. The easement area contributes to the *prudent avoidance* of exposure by persons to EMF (Electric and Magnetic Fields).

The TL or cable easement area and its ongoing maintenance are control measures that cannot be compromised. The easement is established to prevent and mitigate against the following electrical safety risks:

- Infringement of electrical safety clearances e.g. due to an activity or vegetation growth.
- Electrical Induction e.g. due to parallel conducting materials.
- Step and touch potentials under fault conditions e.g. due to lightning or bushfire.
- Failure of structures or line equipment e.g. due to third party vehicle or plant impact.
- Transfer off easement of dangerous voltages, e.g. by services installed within the easement area.
- Blowout of a conductor under high wind (or blow in of vegetation) e.g. into an adjacent structure.

Safety to people and property is of paramount concern. TransGrid is also bound to maintain its infrastructure efficiently and cost effectively. TL and cable easements along with accesses thereto have been designed to facilitate effective operational maintenance.

Development Approval Process

Where the Environmental Planning and Assessment Act 1979 makes Local Councils the consent authority for development applications, proponents to a proposed development on land are to prepare a development application and submit same to the Local Council for development consent.

The *State Environmental Planning Policy (Infrastructure) 2007* (SEPP), which commenced on 1 January 2008, requires local councils to consult with Electricity Network Operators before granting development consent for proposals that might adversely affect:

- existing electricity infrastructure;
- easements for electricity purposes, even if no infrastructure has yet been constructed in the easement.

Local Councils must give written notice to the network operator of any proposals for development:

- within or immediately adjacent to an easement for electricity purposes;
- immediately adjacent to a substation;
- within 5 metres of an exposed overhead power line;
- involving excavation within 2 metres of an underground power line or a pole or within 10 metres of a tower;
- involving a swimming pool within 30m of a transmission tower or within 5m of an overhead line.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

Any comments made by the Electricity Network Operator within 21 days of receiving Local Council's written notification must be taken into consideration by the Local Council before it determines the development application.

The *proponent* is required to consult with TransGrid in accordance with the *State Environmental Planning Policy (Infrastructure) 2007* (SEPP); the *NSW Occupational Health and Safety Act 2000*, and; the *NSW WorkCover Code of Practice for Working Near Overhead Power Lines 2006*.

TransGrid Approval

The approving statutory authority will require written approval from TransGrid for all proposed activities within an easement area in accordance with section 45 of the *State Environmental Planning Policy (Infrastructure) 2007* (SEPP).

To assess and respond to an approving statutory authority, TransGrid will require the following information from the development proponent. TransGrid will object to any development where the development proponent has not provided the following information to TransGrid prior to Local Council's notification:

- Detailed specifications and plans drawn to scale and fully dimensioned, showing property boundaries and other relevant information.
- An *Impact Assessment* of the development on TransGrid infrastructure and associated interests (including easements). Further, details as to how any impacts thereto are proposed to be managed, mitigated or resolved (see below – *Impact Assessment*).

Upon receipt of the abovementioned documentation, the proponent's proposed development will be assessed in relation to its impact on TransGrid infrastructure, easements and means of access thereto. The proponent should note that for complicated proposals the consultation process will be iterative and the proponent should allow sufficient time for this process (see *Timeframes* below).

General Development Proposal Guidelines

1. Prohibited Activities and Encroachments

A number of activities and encroachments are not permitted within the easement area. These are detailed in the "TransGrid Easement Guide" (see Appendix 1 - *Prohibited Activities*).

Any *Development Proposal* should be designed in such a way that:

- It does not involve these activities, nor introduce these encroachments; and
- Does not to encourage other parties to undertake such activities or introduce such encroachments in the future.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

2. Development

The *Development Proposal* should be planned with the adoption of The Right Honourable Harry Gibbs Report (*Inquiry into Community Needs and High Voltage Transmission Line Development*) recommendations, that being a policy of "*prudent avoidance*".

This report placed recommendations on the design of new transmission lines having regard to their proximity to houses, schools, work sites and the like and is equally valid when considering new developments proposed in proximity to existing powerlines and associated easements.

Electric and Magnetic Field (EMF) strength rises from the easement edge to beneath the conductors and the most practical way to achieve the *prudent avoidance* policy is to keep the development entirely outside the easement area.

If it is desired to place any part of a development within an easement the proponent shall, in conjunction with the *Development Proposal*, undertake an [Impact Assessment](#) to be provided to TransGrid that covers the changes in risk and mitigation measures proposed.

Relocating Infrastructure and Interruption to Transmission

The developer will be liable for any costs involved in having to relocate TransGrid infrastructure as part of any proposed development. Further, the developer will also be liable for any costs and penalties incurred as a consequence of interruptions to TransGrid's transmission operations arising from the development, whether planned or inadvertent.

Impact Assessment

An *Impact Assessment* shall be completed and is to accompany the development proposal when it is submitted to TransGrid for consideration.

The *Impact Assessment* shall cover:

1. Detailed description of the development
2. Health and safety risk assessment and control measures
3. Operational risk to the TL or cable due to the development
4. Maintenance risk to the TL or cable due to the development
5. Design and construction risk to the TL or cable and associated with the proposed development
6. Physical impact risk to the TL (vehicle collision, vegetation or other impact)
7. Risk to TransGrid's rights and entitlements
8. Impact of the proposed development re TransGrid's access to the easement and along the easement.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

Checklist

The following checklist may assist in the completion of the *Impact Assessment*. A template is provided in *Appendix 3*.

Refer also to *Appendix 1* and *Appendix 2* for guidance on prohibited activities and TransGrid's requirements for developments and subdivisions.

1. Detailed Description of the Development

- Street Address;
- Land and Title references;
- Physical proximity of the proposed development to TransGrid's easement boundary (distance dimensions to be provided on a scaled plan); and
- Horizontal and vertical clearances of the proposed development to TransGrid's Infrastructure and associated easements

2. Health and Safety Risk Assessment

- **Safety Risk to General Public**
 - i. Have ground levels been changed that would compromise design clearances?
 - ii. Has the easement been altered in any way that would encourage prohibited activities to occur within the easement?
 - iii. Has the easement or the nature of the land in the vicinity of the easement, been altered in any way that would encourage prohibited encroachments to occur within the easement?
 - iv. Is it possible for proposed structures to transfer voltages off easement, or bring remote earths into the easement?
 - v. Has development been proposed that increase step and touch potential hazards, or that would encourage people to congregate within the step/touch potential zone of a structure?
- **Safety Risk to Non-electrical Workers and Emergency Service Personnel**
 - i. Has infrastructure been proposed that can be climbed compromising design clearances?
 - ii. Has infrastructure been proposed that can be accessed by maintenance persons using Elevated Work Platforms (EWPs) compromising design clearances?
 - iii. Has infrastructure been proposed that can bring remote earths onto the easement?

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

- iv. Has infrastructure been proposed that is a fire hazard, or that would encourage the storage or use of flammable material on the easement?
- v. Has infrastructure been proposed that would require emergency workers (such as fire fighters) to come near, or their equipment to come on or near high voltage conductors?

- **Safety Risk to TransGrid Employees & Contractors**

- i. Has access around any TransGrid structure been altered preventing EWPs, crane or other plant access or introduced other risks to maintenance staff?
- ii. Has the proposed development complied with TransGrid's horizontal clearances?
- iii. Has access to the easement been altered that would introduce risks to personnel, including although not limited to asset inspectors or patrol staff?

- **Health Risk to the General Public**

- i. Have public spaces been proposed *within the easement* that would encourage persons to congregate for lengthy periods of time?
- ii. Have facilities been provided outside of the easement but immediately adjacent thereto that would encourage persons to congregate within the easement?

3. Operational Risk

- Have any ground level developments been proposed (including roads, driveways, parking lots and turning bays etc) that would expose TransGrid transmission structures and lines to impact risk?
- Has change in water flows or drainage been proposed that could impact on the foundations of any TransGrid structure (or guy)?
- Are excavations or surface activities proposed that would impact a TransGrid structure's foundations, stability or earthing systems?

4. Maintenance Risk

- Have roads, driveways or landscaping been proposed that would prevent or hinder TransGrid maintenance, or increase maintenance costs, for the above or below ground components of the transmission line structure?
- Has access to the easement or within the easement, been obstructed, restricted or altered?
- Have access roads, bridges, crossings and the like been designed to cater for the weight and size of TransGrid maintenance plant (EWPs and Cranes)?
- Does the development encourage the placement of obstructions that would prevent access for routine or emergency works?

5. Development Design and Construction Risk

- Has the development been designed so that during the construction phase TransGrid is not restricted from undertaking normal maintenance and inspection activities?

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

- Has the development been designed so that during the construction phase prohibited activities or encroachments are not required in the easement area?
- Has the design health and safety risk assessment taken into account the requirements of the NSW WorkCover Code of Practice for *Working Near Overhead Powerlines* 2006?

6. TransGrid's Rights

- Have TransGrid's existing rights been preserved?
- Has TransGrid been exposed to new maintenance costs (e.g. landscaping or other development changes impacting easement access, use and maintenance)?
- Does a new deed of easement need to be negotiated?

Post Construction Compliance Statement

The development proposal shall include as-built plans of the final construction that must be provided to TransGrid. The as-built drawings must be accurate, scaled and display distances/measurements, demonstrating compliance to the agreed plans and implementation of agreed control measures.

Timeframes

TransGrid will respond to a Local Council notification of a proposed development within 21 days as required in the SEPP, however that response may not be an approval (or a disapproval). If the development proposal does not meet the requirements of these Guidelines, or in the event further detailed engineering analysis is required, TransGrid will require the development proposal to be revised and resubmitted.

Developers are advised to consider TransGrid's requirements early in the process (and not as an afterthought that could result in project delays).

Further Assistance

For any further development enquiry assistance please contact the Development Enquiry Services Coordinator on Telephone (02) 9620 0777.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 1

Prohibited Encroachments and Activities

TransGrid will use its powers under the Electricity Supply Act, involve WorkCover or take other legal action as required to prevent or halt prohibited activities.

1. Transmission Lines

Activities and encroachments that are **prohibited** within a Transmission Line (TL) Easement include, but are not limited to (*Note 2*), the following:

- The construction of houses, buildings, substantial structures, or parts thereof.
- The installation of fixed plant or equipment.
- The storage of flammable materials, corrosive or explosive material.
- The placing of garbage, refuse or fallen timber.
- The planting or cultivation of trees or shrubs capable of growing to a height exceeding 4 metres.
- The placing of obstructions other than timber boundary fences within 20 metres of any part of a transmission line structure or supporting guy.
- Camping or the permanent parking of caravans or other camping vehicles.
- The parking or storage of flammable liquid carriers or containers.
- The installation of site construction offices, workshops or storage compounds.
- Flying of kites or wire controlled model aircraft within the easement area.
- Flying of any manned aircraft or balloon within 60m of any structure, guy or conductor.
- Flying of remote controlled or autonomous aerial devices (such as UAVs) within 60m of any structure, guy or conductor.
- Placing any obstructions on access tracks or placed in the easement area that restricts access.
- Any vegetation maintenance (such as felling tall trees) where the vegetation could come within the *Ordinary Persons Zone* – refer to the NSW WorkCover '*Working Near Overhead Powerlines - Code of Practice 2006*'.
- Any substantial excavation within 10 metres of a pole or supporting guy or guy foundation or within 20 metres of a tower
- The climbing of any structure (*any development that encourages or facilitates climbing will not be permitted*).
- Any change in ground levels that reduce clearances below that required in AS7000.
- The attachment of any fence, any signage, posters, or anything else, to a structure, or guy.

Note: Interference to electricity infrastructure is an offence under the Electricity Supply Act.

- The movement of any vehicle or plant between the tower legs, within 5m of a structure, guy or between a guy and the pole.

Note: Any damage to electricity infrastructure is an offence under the Electricity Supply Act.

- The storage of anything whatsoever within the tower base or within 10m of any tower leg.

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- Any structure whatsoever that during its construction or future maintenance will require an *Accredited* person to access. *Note: The final structure may meet AS7000 clearances, but may be accessible (e.g. by EWP) by Ordinary Persons within the Ordinary Persons Zone.*
- Any work that generates significant amounts of dust or smoke that can compromise the TL high voltage insulation.
- The erection of any structure in a location which could create an unsafe situation work area for TransGrid staff.
- Any activity by persons not *Accredited* or not in accordance with the requirements of the WorkCover 'Working Near Overhead Powerlines - Code of Practice 2006' that is within (*Note 1*):
 - 3m of an exposed 132kV overhead power line
 - 6m of an exposed 220kV or 330kV overhead power line
 - 8m of an exposed 500kV overhead power line

Note: Distances quoted are to the design conductor position (i.e. maximum sag and blowout)

The following activities may be approved with conditions. TransGrid's prior written consent is required. The proponent will have to demonstrate (using the *Impact Assessment* process) that the risks associated with the activity have been satisfactorily mitigated. Guidance on how to achieve this is provided in Appendix 2.

- Burning off or the lighting of fires. Lighting of fires directly under energised conductors will not normally be approved.
- Operation of mobile plant or equipment having a height when fully extended exceeding 4.3 metres.

Note: Approval would be based on the need to maintain adequate clearance between the equipment and the line, having regard to the particular situation. Note that plant may require trailing earths and supervision by TransGrid staff.

- *Temporary* parking of caravans and other large vehicles in the outer 3m of the easement area, subject to a 4.3 metre height restriction and metallic parts being *earthed*.
- The erection of flagpoles, weather vanes, single post signs, outdoor lighting, subject to a 4.3 metre height restriction and metallic parts being *earthed*.
- The erection of non-electric agricultural fencing, yards and the like.

Note: Fencing that exceeds 2.5 metres in height or that impedes would not be approved. Metallic fencing may require earthing and will generally not be approved if located within 20 metres of any part of a transmission line structure or supporting guy or within 4 metres of the vertical projection of the overhead conductors.

- The erection of electric fencing provided that the height of the fencing does not exceed 2.5 metres and provided that the fence does not pass beneath the overhead conductors.

Note: Approval may be given for a portable electric fence to pass underneath the conductors provided that it is supplied from a portable battery-powered energiser that is located remotely

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

from frequented areas. Where it is necessary for a permanent electric fence to pass beneath the overhead conductors, or where an extensive permanent electric fencing system is installed in proximity to a transmission line certain additional safety requirements may be required.

- The installation or use of irrigation equipment inside the easement.

NOTE: An irrigation system will not be approved if it is capable of coming within 4 metres of the overhead conductors; exceeds 4.3 metres in height; consists of individual sections of rigid or semi-rigid pipe exceeding 4.3 metres; and/or is capable of projecting a solid jet of water to within 4 metres of any overhead conductors.

- The installation of low voltage electricity, telephone, communication, water, sewerage, gas, whether overhead, underground or on the surface.

Note: Services that do not maintain standard clearances to the overhead conductors that are within 15 metres from the easement centre-line, 20 metres from any part of a transmission line supporting structure or are metallic and within 30 metres of any part of a structure will not be approved. TransGrid may impose additional conditions or restrictions on proposed development.

- The installation of high voltage electricity services, subject to there being no practicable alternative and provided the standard clearances are maintained to the supporting structures.

Note: Where extensive parallels are involved certain additional safety requirements may be imposed by TransGrid, depending on the particular case and engineering advice.

- Swimming pools, subject to TransGrid's strict compliance criteria.

Note: Above ground pools will not be approved. In-ground pools will not be approved if there is a practicable alternative site clear of the easement area. If there is no practical alternative site, in-ground pools including coping will not be approved if it encroaches more than 4.5 metres, or is less than 30 metres away from a transmission line structure.

- Detached garages, detached carports, detached sheds, detached stables, detached glass houses, caravans, site containers, portable tool sheds, pergolas and unroofed verandahs attached to residences. (Easement encroachments of more than 3m will not be approved).
- Prefabricated metal (garden) sheds. TransGrid approved sheds must be earthed.

Note: Sheds exceeding 2.5 metres in height, with a floor area exceeding 8 m², encroaching more than of up to 3 metres or within 20 metres of any part of a transmission line structure will not be approved. Connection of electric power will not be approved.

- Single tennis courts.

Note: Tennis courts that hinder access, are for commercial use or do not provide adequate clearances shall not be approved.

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- Sporting facilities and open recreational areas.

Note: Facilities associated with the use of firearms and public sporting venues are discouraged.

- Subdivisions. See **Appendix 2** requirements.
- Roads, subject to horizontal and vertical clearances. Restrictions and other conditions on consent may also apply.

Note: Roads located within 20 metres of any part of a transmission line structure will not be approved.

Where it is proposed that a road passes within 30 metres of a transmission structure or supporting guy, TransGrid may refuse consent or impose restrictions and other conditions on consent. Where a road passes within 30 metres of a transmission structure or supporting guy, the structure's earthing system may require modification for reasons including, but not limited to, preventing fault currents from entering utility services which may be buried in the road. The option of raising conductors or relocation of structures, at the full cost of the proponent, may be considered.

- Cycleways, walking tracks and footpaths, provided *standard clearances* are maintained and the proposal does not alienate large sections of the easement area.
- Excavation – subject to restriction criteria.

Note: Substantial excavations located within 10 metres of a general purpose pole structure or supporting guy, or within 20 metres of any part of a steel tower or major pole structure and exceeding a depth 3 metres will not be approved.

- Quarrying activities, earthworks, dam or artificial lake construction.
- Mining. Approval would be based on the merits of the proposal and any related circumstances.
- Use of explosives.
- Vehicle access or parking facilities.

Note: Vehicle access and/or car parking facilities will not be approved if within 30 metres of a TL structure without adequate precautions provided to protect the structure from any accidental damage.

Note 1: An encroachment or activity that is located outside the prohibited distance of the infrastructure but still within the easement will not necessarily be permitted. It will generally need to be addressed in the [Impact Assessment](#) and remains subject to TransGrid prior consent.

Note 2: The above list is not exhaustive and if there is any uncertainty as to whether an activity or encroachment is acceptable within an easement, please contact TransGrid. TransGrid may impose additional conditions or restrictions on proposed development.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

2. Cables

The activities listed below are prohibited within cable easements:

- The storage of flammable liquids or explosives.
- The planting or cultivation of trees or shrubs with extensive root systems.
- The construction of houses, buildings or substantial structures.
- The installation of fixed plant or equipment.
- The placing of garbage, refuse or fallen timber.
- Vertical boring directly over the cable lay (eg. the installation of fencing or safety railing).
- The raising or lowering of existing ground surface levels.
- Any excavation within 2m of an underground cable.

The following activities may be approved with conditions. TransGrid's prior written consent is required. The proponent will have to demonstrate (using the *Impact Assessment* process) that the risks associated with the activity have been satisfactorily mitigated. Guidance on how to achieve this is provided in Appendix 2.

- Parking of vehicles.

Note: Parking will be prohibited if the surface is not capable of supporting the vehicles likely to be parked, risking the crushing of the cable/ducts or erosion of the ground.

- The operation of mobile plant and equipment.

Note: Such operations will be prohibited if the surface is not capable of supporting the vehicles likely to be parked, whereby risking the crushing of the cable/ducts or erosion of the ground.

- The erection of structures spanning the easement.
- Excavation.
- Concrete driveways.
- The installation of metal pipes, metal fences, underground or overhead cables.
- Road-boring in the vicinity of a high voltage cable.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 2

General Requirements for Developments and Subdivisions

The following list of current general requirements is provided for your information. It should be noted that the list is not exhaustive and, where there is any doubt concerning a particular activity within the easement area advice should be sought from TransGrid.

1. Completed Works

The completed works shall provide for the following considerations:

- A safe unobstructed working platform shall be preserved around the transmission line structures for access by EWP, cranes as well as other large plant and equipment. No obstructions of any type shall be placed within 30 metres of any part of a transmission line structure.
- Roads, streets etc (including kerb to property boundaries) and intersections shall not be located within 30 metres of any TL structure.
- Roads crossing the easement require 12 metre clearance between the finished road surface and the conductor at it's maximum operating temperature.
- Roads paralleling the transmission line are not to be within the easement area.
- Proposed roadway locations shall also take into consideration any street lighting requirements to ensure that statutory clearance requirements are followed. The design clearances should include future maintenance safety issues. TL outages will not be provided for street light maintenance.
- Details of the levels of proposed roadways where they cross the easement shall be submitted to TransGrid for written approval prior to construction to ensure that adequate clearances to the TL conductors are maintained. It should be noted that formal approval will not be given to the subdivision if such clearances are not maintained.
- Access to the TL and its structures shall be available at all times for TransGrid plant and personnel. In this regard a continuous and unobstructed access way shall be retained along the easement.
- Where fences are required for security purposes access gates will be installed in an agreed location and a TransGrid lock will be fitted.
- All underground services installed more than 20 metres but within 30 metres of a TL structure shall be non-metallic. Utility services (including street lighting), whether above or below ground, shall not be installed without prior written approval of TransGrid.
- Excavation work or other alterations to existing ground levels shall not be carried out within the easement area without the prior approval of TransGrid. Approval will not normally be granted for such work within 20 metres of any supporting structure.
- Fenced boundaries for all new properties in the subdivision shall not be within 30 metres of any TL structure.
- A "Restriction-as-User" (88B Instrument) shall be placed on the titles of the lots affected by the TL easement. Any proposed activity within an easement area will require the prior written approval of TransGrid (appropriate wording will be advised when required).
- Any proposed development does not impact on TransGrid's costs of inspecting, maintaining or reconstruction the transmission lines.
- Vegetation Control
In order to comply with its statutory responsibilities to maintain adequate clearance between the conductors and any forms of vegetation. TransGrid maintains its easements as follows:

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

- Tall growing species likely to infringe safe clearances are to be removed regardless of existing height at time of construction.
- Trees likely to fall onto conductors or towers are also to be removed whether on the easement or off the easement (ref. Sec 48 of the Electricity Supply Act 1995).
- Shrubs and other vegetation of lower mature height within the easement will be reduced and managed, generally by slashing with ground level retained.
- Vegetation management will aim to reduce available fuel and subsequent bushfire risks in accordance with NSW Rural Fire Service Bush Fire Environmental Assessment Code, which sets out requirements for hazard reduction strategies such as Asset Protection Zones and Strategic Fire Advantage Zones
- Removed vegetation will be mulched or chipped and removed from site or retained on site in accordance with owner/stakeholder requirements and
- Other works considered necessary in order to provide a safe working environment for maintenance staff, contractors and for the property owner/manager will be undertaken.

Proposed vegetation plantings, such as Riparian corridors, within the transmission line easements shall be compatible with the above maintenance requirements.

2. Construction

During construction, the development plans shall also provide for the following considerations:

- Vehicles, plant or equipment having a height exceeding 4.3 metres when fully extended shall not be brought onto or used within the easement area without prior TransGrid approval.
- Where temporary vehicular access or parking (during the construction period) is within 16 metres of a transmission line structure, adequate precautions shall be taken to protect the structure from accidental damage. Plans need to be submitted to TransGrid for prior approval.
- The easement area shall not be used for temporary storage of construction spoil, topsoil, gravel or any other construction materials.

3. Costs

The Developer shall bear all costs of any reconstruction or modification of the transmission line, including consultation and design required to maintain clearances due to proposed ground level changes; road crossings within the easement; or due to any damage to the TL arising from the development.

TRANSGRID EASEMENT GUIDELINES FOR THIRD PARTY DEVELOPMENT

APPENDIX 3

Impact Assessment Template

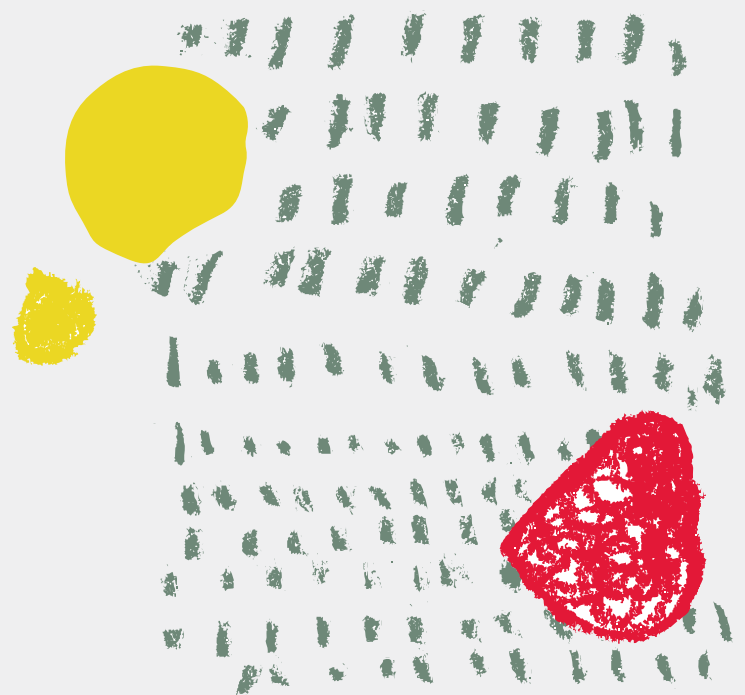
Detailed Description of the Development

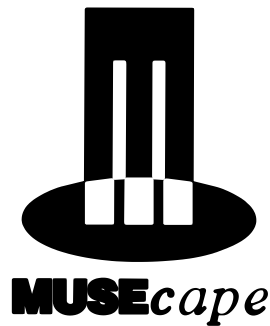
Risk Type	Aspect	Drawing Reference	Assessment	Risk Level	Control Measure	Residual Risk
Health and Safety						
Operational						
Maintenance						
Design and Construction						
Rights and Entitlements						

Compliance plan

Appendix C

Species Impact Statement (Cumberland Ecology)





**Draft Interpretation Strategy
for historic brick making site (Site 3, Central Precinct)
and
former Naval Radar Calibration Range (proposed
Wianamatta Regional Park / Regional Open Space),
St Marys Development, St Marys, NSW**



prepared by Chris & Margaret Betteridge,
Betteridge Consulting Pty Ltd t/a **MUSEcape**
for JMD Design

2nd draft, 15 January 2015

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Figure 1 (Front cover, left to right): Outline of brick kilns on ground, Site 3, Central Precinct; brick scatter at kilns site; hoop for radome at former Naval Radar Calibration Range. (Photos: Chris Betteridge, 18 November 2014)

1.0 Introduction

1.1 Background

The former Australian Defence Industries (ADI) site at St Marys was endorsed by the NSW Government for inclusion on the Urban Development Program (UDP) in 1993. The site is presently owned by Maryland Development and is being jointly developed by ComLand Limited and Delfin Lend Lease Development Pty Limited through their joint venture company, Maryland Development Company.

The site is located approximately 45 km west of the Sydney CBD, 5 km northeast of the Penrith City Centre and 12 km west of the Blacktown City Centre. The main western railway line is located approximately 2.5 km south of the site. The Great Western Highway is located another 1 km south and the M4 Motorway a further 1.5 km south.

One of the six development 'precincts' within the overall site, the 'Central Precinct' contains a brickmaking area associated with the building and development of 'Dunheved' homestead. This rare archaeological site on the Cumberland Plain, believed to have been in use intermittently from circa 1807 to the 1860s for brickmaking has been identified as being part of the State significance of the Dunheved estate. The archaeological remains on the brickmaking site are protected under the 'relics' provisions of the NSW Heritage Act 1977, as amended, and under State Regional Environmental Plan 30. The brickmaking site has been subject to an archaeological investigation carried out by Casey and Lowe Archaeology and Heritage Consultants.

Another interesting site, partially within the area proposed for Wianamatta Regional Park and partially within the proposed Regional Open Space, is the former Naval Radar Calibration Range, operated by ADI for testing radar defence systems. Due to its sensitive nature, little information is available on this site, but it retains a number of structures including an unusual steel and timber hoop with supporting cables and detached radome which is a prominent element in the local landscape.

Betteridge Consulting Pty Ltd t/a **MUSEcape** Pty Ltd were engaged by JMD Design on behalf of Lend Lease to prepare an Interpretation Strategy for the brickmaking site as part of the public open space within the central Precinct and to provide advice on the interpretive potential of the former Radar Range, particularly the arch and radome.

1.2 Methodology

This strategy has been prepared in accordance with the Interpretation Policy & Guidelines published in 2005 by the former NSW Heritage Office (now Heritage Division, Office of Environment and Heritage).

Development of an interpretive strategy involves the following process.

1. Identification of place;
2. Assessment of significance;
3. Development of conservation policies, strategies and actions;
4. Identification of interpretation principles;
5. Identification of interpretation policy;
6. Identification of detailed objectives;
7. Identification of major and minor interpretive themes;
8. Identification of potential interpretive media;

9. Identification and profiling of audience groups, including multicultural and international audiences and preferred communication methods;
10. Identification of and commencement of dialogue with key stakeholders and communities;
11. Preparation of draft storyline, prioritized messages;
12. Linkage of messages to audiences to locations;
13. Linkage with the NSW Department of Education school curriculum and the NSW Environmental Education Plans;
14. Identification and evaluation of resources.

Steps 1 to 3 have been carried out as part of the archaeological investigations of Site 3. This report addresses steps 4 to 8. Steps 9 to 14 will require more detailed research and development for a comprehensive Interpretation Plan for the brick making site (Central Precinct) and the former naval radar calibration range (proposed Wianamatta Regional Park / Regional Open Space) and as part of an integrated plan for all the development precincts and public open space areas.

1.3 Authorship

This draft Interpretation strategy has been prepared by Chris Betteridge BSc (Sydney), MSc (Museum Studies) (Leicester), AMA (London), MICOMOS and Margaret Betteridge BA (NSW), Grad. Cert. (Museum Studies) (Leicester), AMA (London). The authors are directors of Betteridge Consulting Pty Ltd trading as **MUSEcape**, specialists in the conservation and interpretation of cultural heritage for more than 23 years.

1.4 Acknowledgments

The authors would like to thank the following individuals for their kind assistance in the preparation of this document.

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 James Grant, JMD Design;
 Isabel Sanders, JMD Design;
 Richard Ward, Lend Lease.

1.5 Definition of Terms

The following terms from the Burra Charter of Australia ICOMOS have been used in this report.

Place means site, area, land, landscape, building or other work, group of buildings or other works, and may include components, contents, spaces and views.

Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the *place* itself, its *fabric*, *setting*, *use*, *associations*, *meanings*, records, *related places* and *related objects*. Places may have a range of values for different individuals or groups.

Fabric means all the physical material of the *place* including components, fixtures, contents, and objects.

Conservation means all the processes of looking after a *place* so as to retain its *cultural significance*.

Maintenance means the continuous protective care of the *fabric* and *setting* of a *place*, and is to be distinguished from repair. Repair involves restoration or reconstruction.

Preservation means maintaining the *fabric* of a *place* in its existing state and retarding deterioration.

Restoration means returning the existing *fabric* of a *place* to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material.

Reconstruction means returning a *place* to a known earlier state and is distinguished from *restoration* by the introduction of new material into the *fabric*.

Adaptation means modifying a *place* to suit the existing use or a proposed use.

Use means the functions of a *place*, as well as the activities and practices that may occur at the *place*.

Compatible use means a use which respects the cultural significance of a *place*. Such a use involves no, or minimal, impact on cultural significance.

Setting means the area around a *place*, which may include the visual catchment.

Related place means a place that contributes to the *cultural significance* of another place.

1.6 Limitations

Research was limited to those sources available to the authors within the timeframe of the study. No physical intervention in the sites was carried out. Investigation of the brickmaking site and the former radar range and their settings was limited to visual inspection of built and natural fabric. Little information on the history of the former radar calibration range was available within the timeframe of the study.

1.7 Disclaimer

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2.0 The heritage resource

2.1 The brickmaking site

The following account of the history of the area and the brick making site is adapted from sections of the 'Archaeological Assessment, Site 3, Elizabeth Farm brickmaking Area, Central Precinct, St Marys Development, St Marys NSW' by Casey and Lowe, updated July 2014.

2.1.1 The Dunheved Estate and Elizabeth Farm

The brickmaking site is part of 'Elizabeth Farm' which was a section of the 'Dunheved' estate established by Governor King and created from grants made by Governor Bligh to King's wife and children. Occupation of the property by staff of the King family appears to date to c1807. Discussions of Dunheved typically include 'Elizabeth Farm'. Historical evidence indicates that it was used for grazing and there is no real historical evidence to say that the property was used for brickmaking although this is an expected typical activity within many early properties.

'Dunheved' homestead was probably built in the early 1820s as a brick-nogged structure¹. John King Lethbridge and his family left 'Dunheved' about 1877 for their new house called 'Tregeare' ['Tregear'], a not dissimilar homestead which had brick chimneys, so bricks would have been required in 1876 and 1877.² Perhaps these were also from 'Dunheved', either newly made or from stocks held there, left over after some bricks were sent to 'Werrington' in 1871.

By 1941, when the Commonwealth was purchasing much of the former King estate, the old 'Dunheved' homestead buildings were said to be 'in such a state of dis-repair that only a conservative value can be attached to them'. The complex by the Commonwealth valuer was described as a:

¹ Casey and Lowe, p32

² Ibid. p34

'Brick Cottage of about seven rooms, numerous out-buildings of weatherboard and large slab sheds'.³

2.1.2 Brick making at St Marys

The King family was staunchly Anglican and Governor King's widow, Anna Josepha, on her return to New South Wales, desired that a church be built for the use of her family, surrounding property owners and others in the area. To accommodate her wishes, her son, Phillip Parker King, donated land to allow the construction of the church of St Mary Magdalene beside the main western road near South Creek. This church was named after the church of the same name in Launceston, Cornwall.

On 22 November 1837 Bishop Broughton laid the foundation stone of a new church on the land given by the Kings and construction of St Mary Magdalene Church took place between this date and April 1840 when the church was consecrated by Broughton. The philanthropic King family donated the bricks for the church's construction and in the June 1920 obituary for a local identity, George Shadlow, who died at the age of 89 years, and who had talked of his father, Thomas Shadlow, he recalled how:

'He knew all about the building and opening of the Church of St Mary's Magdalene. The bricks used in the construction on the building were made on Dunheved Estate and donated by Mr King, and the carting of these was the contribution of the late Mr [Thomas] Shadlow.

The bricks were made on 'Dunheved' by a free immigrant tenant farmer, James Payne and where they are visible today under the present cement rendering are pale yellow in colour, as accords with the local clays. He made the bricks somewhere on Dunheved estate. Little is known of his activities as a brickmaker, although he is thought to have worked at some stage with a later local brickmaker named Potts.⁴

Much building took place on the five properties which constituted the King family's 'Dunheved' and acquisitions that were added to the original Concern over the years. Most of the structures that involved bricks in their fabric appear mostly to have been built on 'Phillip Farm' or on 'Elizabeth Farm' over a period of around 30 years, between 1806 and 1838. Many of these bricks were most likely made during the period that Phillip Parker King began taking an interest in the New South Wales properties at South Creek up to 1832, even though he spent little time in the colony during this period. The works were delegated to his agent Rowland Hassall to organize and his overseer on the property, William Hayes, to implement. Whilst she was in the colony, Phillip's wife Harriet was the catalyst for some of the work.

The records for the period 1807 up to 1820 are extant and so the works during this time are well-documented, although still somewhat ambiguous. During this time it is known that 2,600 bricks were ordered for use on 'Phillip Farm' for a variety of uses, mostly to repair and gentrify the earliest cottage on the site, the house of overseer William Hayes. A few of these may have been used on 'Elizabeth Farm' where the stockman's house was built in 1807 (seemingly the only building fabric apart from the two modern sheds on that farm) because the house probably had some brick fabric such as a hearth or a chimney.

More bricks could have been used in ongoing expansion of the main homestead after 1827, until Phillip Parker King moved to Port Stephens in 1839, but this does not

³ Ibid.

⁴ Casey and Lowe, p35

appear to relate to extensive works. Tough economic times leading into a depression in the early 1840s, did not favour home extensions, so as far as is known there was no building or renovating undertaken on the homestead or any other part of 'Dunheved' during the period from the late 1830s into the 1860s. Little change to the fabric was to be expected for the next 30 years as the Robert Copland Lethbridges farmed 'Phillip Farm', and then their son John King Lethbridge followed them as a temporary measure until he could commence his own farm 'Tregeare' ['Tregear'] on the eastern side of Ropes Creek. Other resident members of the family, like the Goldfinches, did not own the property and so are unlikely to have erected any substantial structures.

After 1840 the first direct reference to bricks on 'Dunheved' comes from John King Lethbridge. These bricks are referred to briefly in 1871 as being transported by Lethbridge from 'Dunheved' to 'Werrington'. Few bricks seem to have been carried and there were no repeat trips noted. They are most likely, therefore, to have been bricks left over from a previous phase of building on 'Dunheved'. Only those bricks made especially to construct the philanthropic donation of St Mary Magdalene Church to the community, between 1837 and 1840, are firmly and directly documented by a contemporary source, as actually made on 'Dunheved'. George Shadlow had made it well known locally before his death that he remembered the construction details, and knew the bricks to have been 'made on Dunheved Estate'.

Word of mouth recorded in the local newspaper from descriptions given by a man who remembered the church's erection, gives a firm basis for the belief that bricks were made on 'Dunheved' for the construction of the Church of St Mary Magdalene at St Marys. A site study of the bricks at the church confirm the compatibility of the bricks in their colour and size with those found at Site 3. No historical documentation has been found, however, to confirm that 'Elizabeth Farm' on 'Dunheved' was the site of this activity, however the bricks on Site 3 site on 'Elizabeth Farm' are consistent with the 1837–1840 bricks made on 'Dunheved' and used to build St Mary Magdalene church.

The likelihood of 'Elizabeth Farm' being a site for estate brickmaking is also suggested by the lack of agriculture and house sites there during the period in question, as well as its proximity to the 'Dunheved' homestead complex where the earliest bricks were mostly used. On the other hand, on the 1869 estate map, there is only one relevant annotation. To the southeast of 'Dunheved' homestead, close to the west bank of Ropes Creek, there is an area marked 'yellow clay'. Between this area of clay deposit and the creek there is a smallish enclosure.

The Ropes Creek site has the advantage of being close to a reliable water source and water was essential to puddle the clay. Site 3 is less well placed, some distance from South Creek, but it was not without a seasonal water supply in the 19th century. Two small tributary creeks running south and east through this sector of 'Elizabeth Farm' are shown in faint pencil on the 1869 estate map and their junction is close to Site 3.

Because of land movements after the Commonwealth acquired the land, the line of these original small watercourses is now obscured, and the ground modified by modern earthworks. No bricks can be brought to hand to offer additional confirmation of the use of bricks made on the property with regard to 'Dunheved' homestead, its outbuildings and the men's houses. Likewise, the identities of brickmakers employed by the King family in the period up to 1814 have proved elusive, although it is known there has always been an abundance of clay on 'Dunheved' and the surrounding areas suitable for brickmaking. The three

brickmakers known by name (Morgan, Webb and Payne), and the one brick-layer (Rope) who are associated with the building work on 'Dunheved' have no specific recorded location for the origin of their bricks.

The exact date that bricks were first used in chimneys on the estate is likely to have been during or soon after 1806 but nowhere has mention been found, at this time, of where the bricks were made. It is likely the bricks were manufactured on the 'Dunheved' property as the necessary clay existed on all the farms there including 'Elizabeth Farm', and self-sufficiency was usual on large Concerns. The contemporary dwellings built by John Stogdell and Andrew Thompson used bricks made nearby at Windsor.

This, however, does not rule out the possibility that the bricks were made elsewhere locally, for they would then have still been made from similar clays and could have been made by one of the brick makers at nearby Castlereagh. The sandstock bricks known to have been made in the St Marys district and surrounding areas, like Castlereagh, are pale yellow to yellowy-pink in colour, flecked with impurities like grass and small stones. The names of the early Castlereagh brick makers are unknown, but their handicraft survives, as, for example, at 'Minnaville'.

Brickmakers in the Castlereagh area or the adjoining district of Hawkesbury in private employ at that time were rare. Some of the houses on the nearby Castlereagh plain in the early Macquarie period were the brick-nogged 'Hadley Park' (circa 1812), the Reverend Samuel Marsden's house 'Mamre' nearby and William Cox's 'The Cottage' at Mulgoa. The last-mentioned were both built around the time of the renovations to Hayes' cottage at 'Dunheved', or possibly a little later.

Later, in the district, bricks with a frog shaped in the form of a 'P' (or possibly an 'R') were made in the St Marys district. In this form, a single initial usually indicates the brick maker's surname and it was a most common form of identification in the 1840–1850 period. Only two brick-makers have surnames beginning with 'P' and one of these is James Payne. The other is Potts, with whom Payne is thought to have worked for a time. These bricks are also the distinctive local colour.

Site 3 is therefore a possible site for local brickmaking from 1806 to 1840, and to a lesser degree after that. The lack of agriculture and the lack of houses on 'Elizabeth Farm', and particularly this low part of 'Elizabeth Farm', make it hard to postulate a residential site. For industrial purposes, it benefited from easy access to seasonal water nearby and the substantial remains of early bricks on the site are compatible with those known to have been made by James Payne in the late 1830s. It is also quite close to the 'Dunheved' homestead complex where most of the need for bricks was generated in the early period, and to the 'Elizabeth Farm' stockman's cottage of 1807 which likely had a brick chimney and hearth.

2.2 The former naval radar calibration range

2.2.1 Location of the radar range

The former Naval Radar Calibration Range (the Range) is located within the former Australian Defence Industries (ADI) site at St Marys, west of Links Road St Marys, on the western side of South / Wianamatta Creek and approximately 2 km west of the Ropes Crossing Shopping Centre. The remaining structures are located partially within the area designated for the proposed Wianamatta Regional Park to be managed by the NSW National Parks & Wildlife Service / Office of Environment and Heritage, and partially within the area designated as Regional Open Space to be managed by Penrith City Council.



Figure 2 Location of the former naval radar calibration range (edged blue). (Source: Google Maps / Eco Images Pty Ltd)

2.2.2 Function of the radar range

Little detailed information on the history or precise function of the radar range was available during the preparation of this report. It is possible that archival material relating to the site survives in Lend Lease archives inherited from ADI.⁵ It is understood that the National Parks and Wildlife Service intends to commission historical research of the radar range in the 2015 calendar year. It appears that the site was operated by ADI's Technology Group, responsible for radar and signals. The unusual arched structure or hoop with its (now detached) radome was apparently used for the testing of ship (and possibly aircraft) radar profiles to assist the Australian Defence Forces in distinguishing friendly military assets from the enemy.

No images of the hoop and radome in their original, intact condition have been located to date. There is brief movie footage of the site in a video prepared by the Friends of the ADI site but this shows the radome lying on the ground. It appears to have been vandalised relatively recently. Other structures surviving on the radar range site include various sheds and towers but how these interrelated requires further research.

During the 1960s and '70s, the Royal Australian Navy calibrated the radars of Australian warships at the former range which employed cut-out brass or copper profiles or models of Australian naval ships to model their magnetic signatures.⁶ These were then used to train radars as Australian naval assets on radar screens. Other ancillary Defence activities carried out on the range including the environmental testing of items relating to temperature, weight, "shake, rattle and roll".⁷

⁵ David Aynsley, pers.comm. 16 December 2014

⁶ NPWS 2001

⁷ Npwas 2007

It is understood that there are at least two model ships associated with the St Marys calibration facility thought to be in either private or public ownership. One may be held at the Royal Australian Navy Heritage Centre at Garden Island.⁸ No model ships remain on site at the calibration facility.

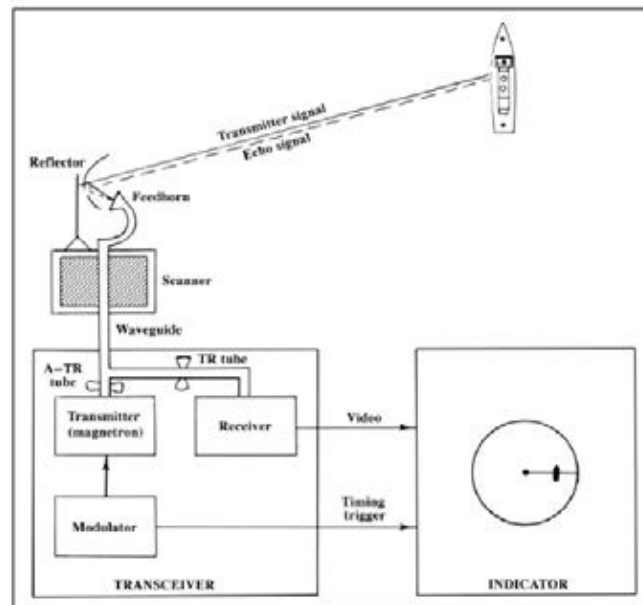


Figure 3 Diagram of a typical radar system. (Source: To be confirmed)

2.2.3 Archival photographic recording of the radar range

In May 2014 Eco Images Pty Ltd prepared an archival photographic record of the former Radar Calibration Range for NSW National Parks and Wildlife Service, Office of Environment and Heritage in accordance with the OEH Heritage Branch guidelines, *Photographic recording of Heritage Items Using Film or Digital Capture* (2006).

⁸ NPWS 2011



Figure 4 Air photo showing the location of the surviving structures on the Naval Radar Calibration Range, with the concrete slab and hoop marked as W04. (Source: Google / Eco Images Pty Ltd)

Structure name ¹	Material / description	Dimensions ²
W04 Hoop antenna	Concrete base, hoop antenna and cables attached to two anchor points, cable guide.	Concrete area Approximately 34m x 22m
W01 North	Metal platform tower on concrete base, with ladder to access platform.	Footprint area, Approximately 6m x 6m
W01 South	Metal platform tower on concrete base, with ladder to access two platform levels.	Footprint area, Approximately 4m x 4m
W02 North	Concrete base (ground and level one), tin sheeting (level two), stairs to level one and two.	Footprint area, Approximately 4m x 4m
W02 South	Concrete structure, (three levels), stairs/ladder to level one and two.	Footprint area, Approximately 2m x 2m
Electrical wiring pit	Stainless steel on concrete base, with electrical box.	Footprint area, Approximately 4m x 11m
East Tower	Metal tower on concrete footings, with electrical box.	Footprint area, Approximately 2m x 2m
West Tower	Metal platform tower on concrete footings, with ladder to access a platform.	Footprint area, Approximately 2m x 4m

Figure 5 Table showing the description and dimensions of surviving structures on the Naval Radar Calibration Range. (Source: Eco Images Pty Ltd)

2.2.4 Structural assessment of the radar hoop

In October 2014, at the request of Lend Lease, structural engineers Cardno conducted a structural condition assessment of the W04 Hoop Antenna at the former Naval Radar Calibration Range. Due to the height of the structure a trailer mounted boom crane was used to observe various structural elements of the W04 Hoop Antenna. It was observed that at various locations along the timber arch significant termite / borer damage was present and appears to pose a threat to the stability of the structure. Whilst the timber sections of the structure were heavily damaged and unsalvageable various other structural components such as the bracing cables, anchor blocks and steel connection gussets were in a reasonable condition and may be retained. Based on Cardno's observations they believe for the most part, the structure is generally beyond economical repair and they would recommend that the structure be dismantled.

JMD Design have been advised⁹ that there has already been a DA approval for the removal of the Hoop Antenna (The Radar Range) Central Precinct, where the removal of the Antenna is dependent on the Interpretation Strategy.

The DA for the removal of the hoop antenna requires:

'Within 3 months of the commencement of works, an Interpretive Strategy for the re-use, relocation or adaption of the salvageable components of the Hoop Antenna, as identified in the Structural Assessment Report prepared by Cardno dated 23/10/14, is to be submitted to Council. The salvageable components should be reused elsewhere within the Central Precinct.'

⁹ Isabel Sanders pers. comm. 7 January 2015

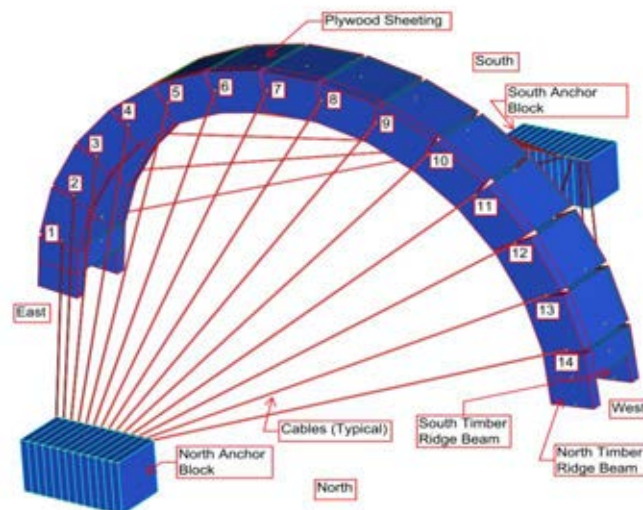


Figure A1. Northern face structure key diagram.

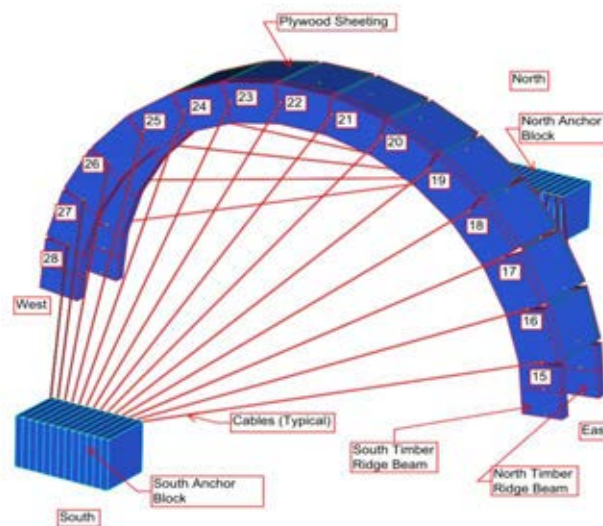


Figure A2. Southern face structure key diagram.

Figure 6 Key diagrams showing the northern (upper illustration) and southern (lower illustration) structural elements of the radar hoop W04. (Source: Cardno)

3.0 Interpretation opportunities

3.1 What is interpretation?

Interpretation has been defined by the NSW Heritage Office as:

“all the ways of presenting the significance of an item. Interpretation may be a combination of the treatment and fabric of the item; the use of the item; the use of interpretive media, such as events, activities, signs and publications, or activities, but is not limited to these”.

In its Heritage Information Series, the Heritage Office published *Interpreting Heritage Places and Items: Guidelines* and a *Heritage Interpretation Policy Statement*.

Underpinning the Heritage Council’s policy and the Australia ICOMOS Burra Charter is the acceptance that:

“heritage interpretation is an integral part of the conservation and management of heritage items and is relevant to other aspects of environmental and cultural management and policy”.

The Heritage Council policy adds that:

“heritage interpretation incorporates and provides broad access to historical research and analysis and provides opportunities to stimulate ideas and debate about Australian life and values, and the meaning of our history, culture and the environment”.

There is little point in conserving places or things if no-one is aware of why they’re important and should be retained and protected. Interpretation to identified target audiences and the wider community should explain why a place is significant and why it should be conserved, in ways that are informative, stimulating and culturally appropriate. While all the heritage values of a place need to be interpreted, it is often the landscape elements and how built elements sit in the landscape that make it easier for people to be able to ‘read the landscape’ and understand how the place has evolved over time.

Existing material in various publications helps to explain the history of the St Marys Central Precinct but it is scattered and variable in extent and veracity. Community awareness and understanding of the significance of the place could be enhanced through implementation of this Interpretation Strategy and development of a more detailed Interpretation Plan which communicates the heritage significance of the place and its setting, in the context of the cultural landscape history of the Penrith City and Blacktown local government areas and NSW generally.

Revealing previously hidden elements and fabric as part of redevelopment of the Central Precinct can be part of interpretation in this context. Relocated fabric can demonstrate significant events / changes of practice, etc. over time. Where such occurs, interpretation on site can assist in the understanding of the original and later uses of the place.

Interpretation measures for the brick making site may include physical site elements (such as the archaeological remains of the brick kilns, bricks and brick fragments, the likely clay source in the banks of the nearby creek and other landscape features), which interpret past features as well as archival material such as historic maps, photographs and written accounts.

3.2 Interpretation Policies

The following policies are provided to guide the interpretation of the brick making site and the former Naval Radar Calibration Range.

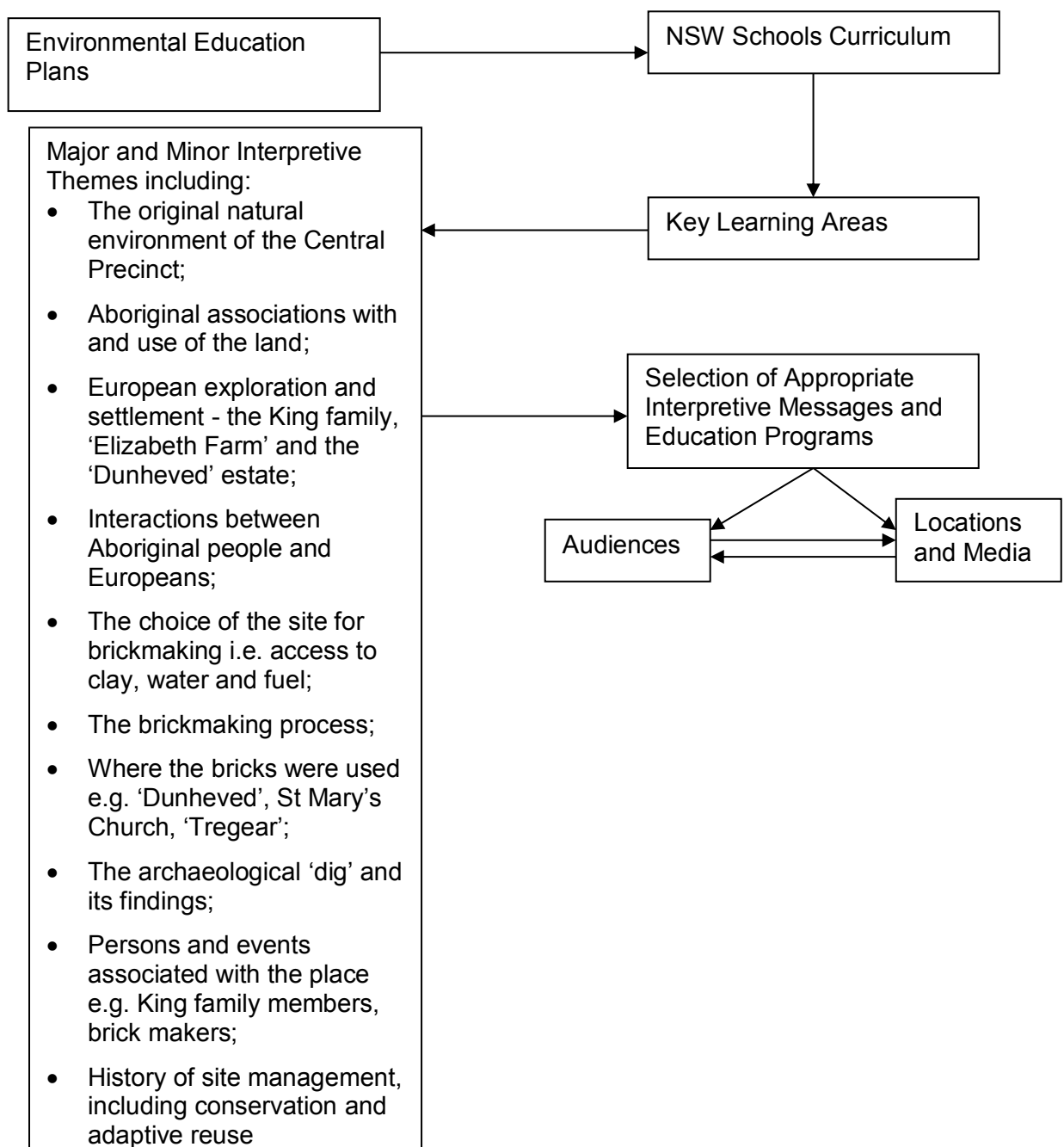
1. Measures to interpret the cultural heritage significance of the brick making site (Site 3, Central Precinct) and the former Naval Radar Calibration Range (proposed Wianamatta Regional Park / Regional Open space) should be incorporated into any conservation and development proposals for the precincts.
2. An Interpretation Plan should be prepared ahead of any sale of land in accordance with Heritage Council policy and guidelines and submitted for approval by the Heritage Council, Penrith City Council and other stakeholders before any site or building works commence on the precincts.
3. The Interpretation Plan should be prepared by suitably qualified interpretation specialists experienced in significant heritage landscapes.
4. The communication of the significance of the sites to future residents, other specific audiences and the wider community should employ culturally appropriate mechanisms that do not detract from the heritage values of the place or offend cultural sensitivities. These may include but are not limited to the following:
 - interpretation by design of new structures and their hard and soft landscaping;
 - naming of internal roadways and buildings;
 - printed and web-based publications;
 - interpretive signage;
 - inclusion on guided or self-guiding walking tours of the area;
 - public artworks;
 - applications for portable electronic media.
5. Way-finding, informational, interpretive and safety signage should be designed in accordance with a style guide that indicates appropriate types of signage for particular parts of the precincts and their settings, including sympathetic locations and fixing methods that result in minimal intervention in or impact on heritage values.
6. Preservation, restoration and reconstruction of key significant landscape views, elements, spaces and fabric are the preferred methods of meaningfully interpreting important attributes and associations of the place. Where adaptation is part of the conservation and redevelopment process, measures should be incorporated to show the location, character and / or role of removed or altered elements, where appropriate, so that all phases of the place's history can be readily understood.
7. Appropriate measures to interpret the history and significance of the precincts as a whole should be incorporated into any future proposals for the development of the precincts and adjoining lands.
8. The original and subsequent configurations of the places, where known, should be interpreted appropriately on the site. Any future alterations and additions should be designed and constructed in a way that preserves and preferably enhances the interpretation of the places. Deliberate differences in

design and finish within the places that reflected developments and changing uses over time should be interpreted.

9. Original, early and more recent elements within and around the precincts should be interpreted in such a way that the historical phases of the places' evolution from natural environment through Aboriginal occupation and European settlement to the present day can be readily understood.
10. Information about the places, including this report and the progressive records of information derived from intervention in the fabric should be deposited in a public archive where it can be accessed by the community.

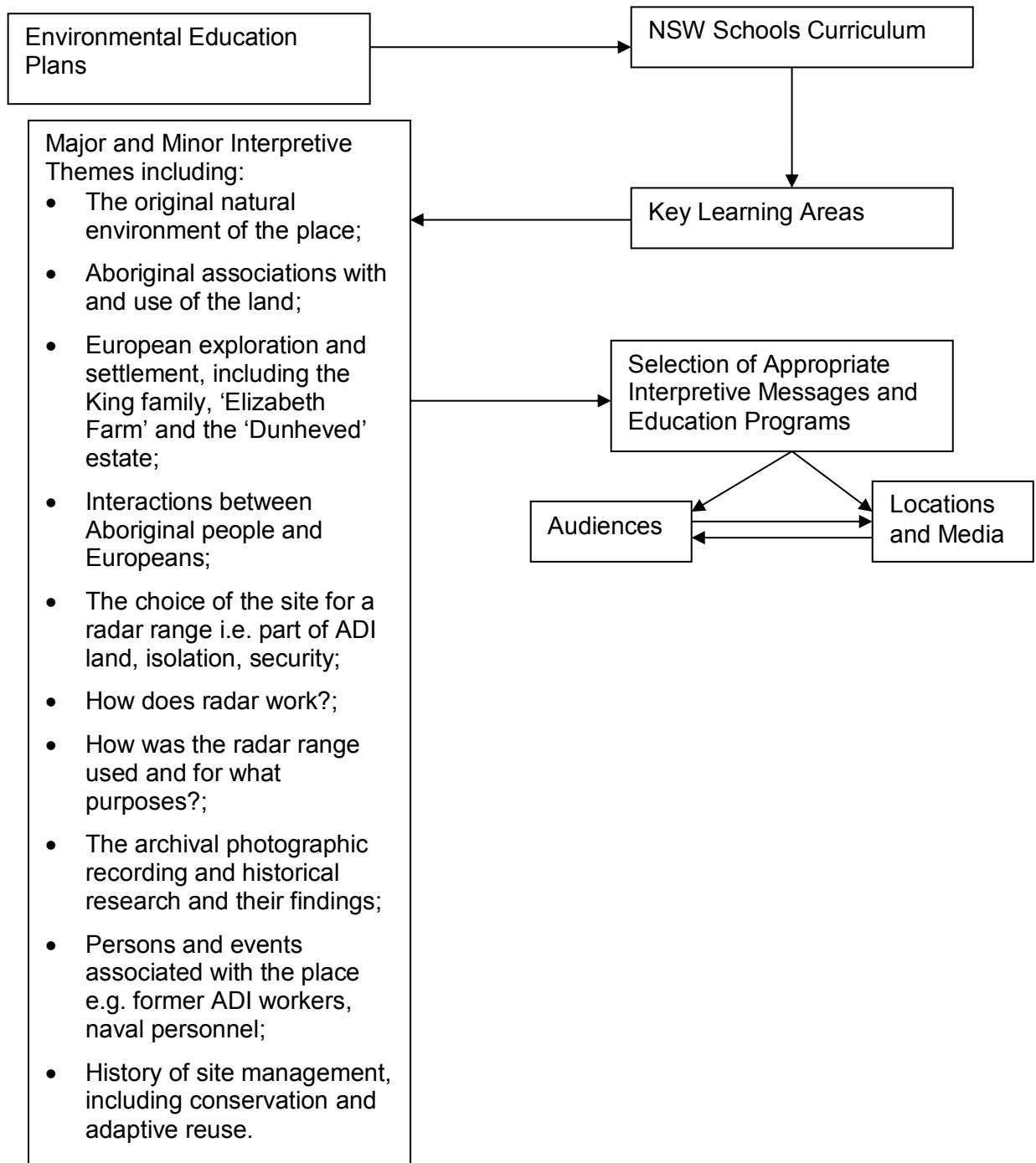
3.3 *A suggested framework for the brickmaking site*

A suggested framework for the Interpretation Plan for the brick making site is shown in the diagram below.



3.4 A suggested framework for the radar range site

A suggested framework for the Interpretation Plan for the radar range site is shown in the diagram below.



4.0 Some interpretive options for the brickmaking site

This section provides some options for the interpretation of the brick making site.

4.1 *The brick making process*

The following summary of the likely brick making process used at the St Marys brick making site is adapted from Ringer (2008, pp13 et seq.).

4.1.1 Pugging the clay

The sodden mass of raw clay would have been won from the banks of the nearby creek and crushed and kneaded into a lumpy texture using the ends of small tree trunks or bare feet. Settling pits may have been created to catch any slurry arising from this process. Stones and plant material would have been removed from the clay to reduce the risk of the bricks cracking during drying or firing. The 'puddled' or 'pugged' clay was left to stand or 'prove' for up to five days. While hand pugging was used in country areas until the late 1840s in NSW and possibly throughout the years of operation of the St Marys site, in urban areas and larger country brick making sites, pug mills driven by horses were used to speed up the pugging process.

4.1.2 Moulding the clay

When the pugged clay was ready for moulding, the heavy, water-saturated mass was carted a short distance to a bench known as a stool, probably made of wood and about 2 metres x 1 metre in size, standing about 1 metre above the ground. Some moulding tables had wheels attached to two of the four legs to make it easier to move the table closer to the source of the clay.

Brick moulding was usually carried out under a rough open-sided timber shelter about 5 metres square, supported on wooden posts and clad with thatching of reeds or covered with bark. Safely under cover and shielded by matting hung from the eaves, the brick maker was protected from the harsh summer sun and was able to work through rainy periods. The matting also helped to prevent hot winds from drying out the clay during the summer months. Small heaps of sand were placed at opposite ends of the moulding table, next to which stood a barrel or water in which a strip of timber, the 'strike' was kept.

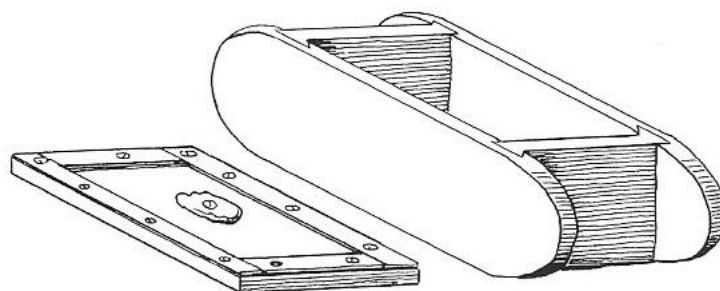


Figure 7 A wooden mould (right) and stock board (left) of a type widely used by hand brick moulders in NSW into the 20th century. (Source: Ringer p14)

The brick mould was a bottomless box slightly deeper than the height of a finished brick. The extra depth allowed for a removable base about 25 mm thick, called the 'stock board', to be fitted snugly into the bottom of the mould. Slightly larger than the base of a finished brick, the stock board was often fitted with a 'kick' which was used to form a depression or 'frog' in the brick. The frog served to identify the brick maker

and also enabled the mortar to bind more effectively with the brick during brick laying. The top edges of the mould were lined with metal strips to prevent wear when the strike was scraped across them during moulding.

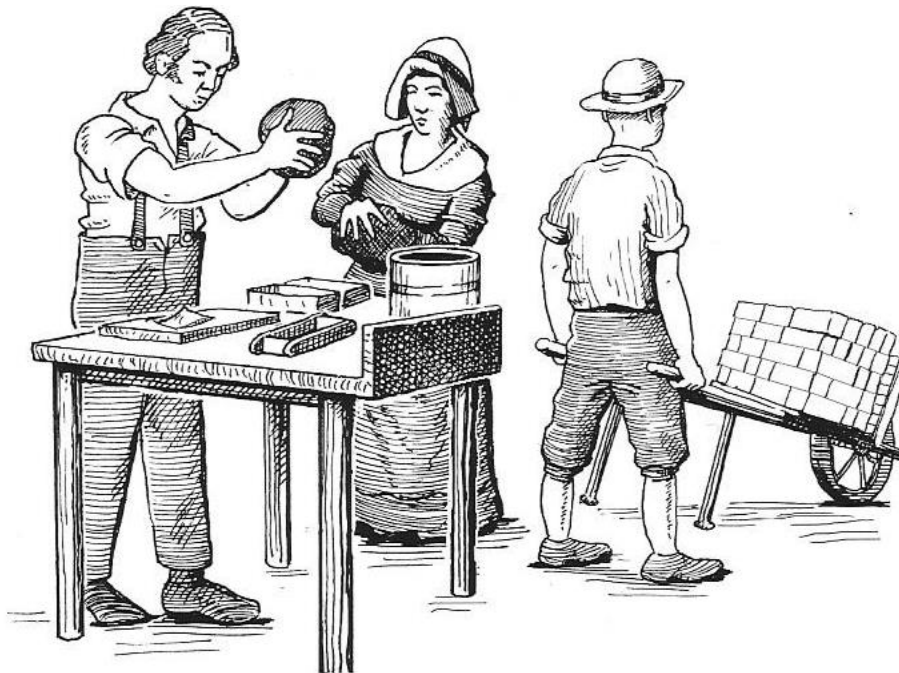


Figure 8 A family at work moulding sandstock bricks at a timber bench and delivering them on a barrow to the hack for drying. (Source: Ringer p14)

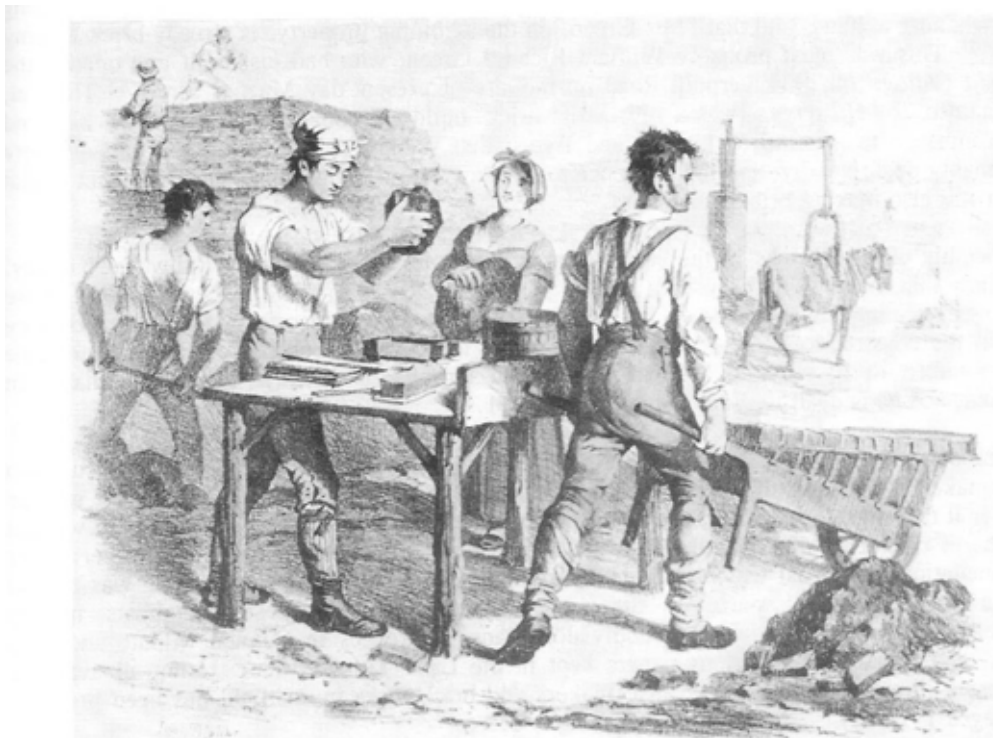


Figure 9 Brick makers at work in England in the early 19th century. The woman is 'rolling the walk' (carrying a load of clay from the horse-driven pug mill in the background); the brick maker is about to throw a clot of clay into the mould and green bricks are being wheeled to the hack for drying. (Source: Peek and Pratten p1, from Woodforde 1976, *Bricks to build a house*).

4.1.3 Sandstock bricks

The process for brick moulding used at St Marys used sand as a lubricant to slip the formed clay from the mould, hence the term 'sandstock bricks'. The brick maker sprinkled the stock board and mould with sand before positioning the mould over the stock board. The clot moulder then dusted the table with sand and picked up a 'clot', a piece of clay slightly larger than the finished brick. Kneading the clay into the rough shape of a brick before rolling it in sand, the moulder passed the doughy lump to the brick maker who threw it forcefully into the mould. The clot was pressed deep into each corner of the mould to ensure a straight edge, later referred to as an 'arris(s)' with the advent of dry pressed bricks.

Any superfluous clay was removed by drawing the strike across the top of the mould, the residue being thrown back onto the heap of clay ready for re-use. The mould and its contents – the un-fired brick – were taken from the stock and placed on a pallet with the frog facing downwards. A sharp tap was sufficient to detach the formed brick, leaving the mould free to receive another clot of pugged clay. Unfired or 'green' bricks as they were called, were left to dry until they could be handled without the loss of shape. A simple test was performed by pressing upon them with the finger which, in theory, left no marks. Occasionally, a brick would fail to slide out, requiring the brick maker to push it free, leaving thumb, finger and hand impressions in the bed and head of the bricks. Thumbprints in particular may also have been made deliberately as tally marks by the overseer to record the number of bricks produced by a convict worker in the course of the day.

4.1.4 Drying the green bricks

At the St Marys site, after they were moulded into shape, the green bricks were then probably loaded directly onto a barrow and taken by the 'wheeler' to the drying area, or 'hack'. Brick barrows fitted with a wheel made of iron or steel were in continuous use from the earliest days of the colony of NSW to the 1930s. At the hack, bricks were unloaded and placed on the ground using two wooden paddles – 'clappers' – intended to avoid damage to the arrisses of the soft brick. Bricks warped through frequent handling were re-shaped using the paddles. Each brick was then laid at an angle ('skintled') to the run of the hack, with a small space left between each brick to aid the drying process. The first row of bricks was skintled in one direction and the second in another to stabilise the structure and to ensure the bricks had equal distribution of weight.

Once the load of bricks on the hack had reached eight courses it was covered by reeds to protect against rain and the sun. Depending on the season, bricks were left to dry for anything up to a fortnight, or until they were ready for burning. In the summer heat two or three days were sufficient. During their time in the hack, bricks were often marked by the paw prints of domestic animals or local fauna such as possums.

4.1.5 Clamp kilns

In the early days of the colony of NSW and in isolated sites such as that at St Marys, the traditional method of building one-off kilns – 'clamps' – was used, although it was greatly modified by individual brick makers. Clamps are the oldest and most basic method of firing bricks and are still in use today around the world, especially in third world countries. Clamp kilns were cheap and easy to construct although it took great skill to build an efficient clamp kiln. Clamps were built on slightly higher ground to allow for adequate drainage. The base was compacted into the shape of a dish, so that

when burning the clamp would tend to lean inwards, which maintained structural integrity.

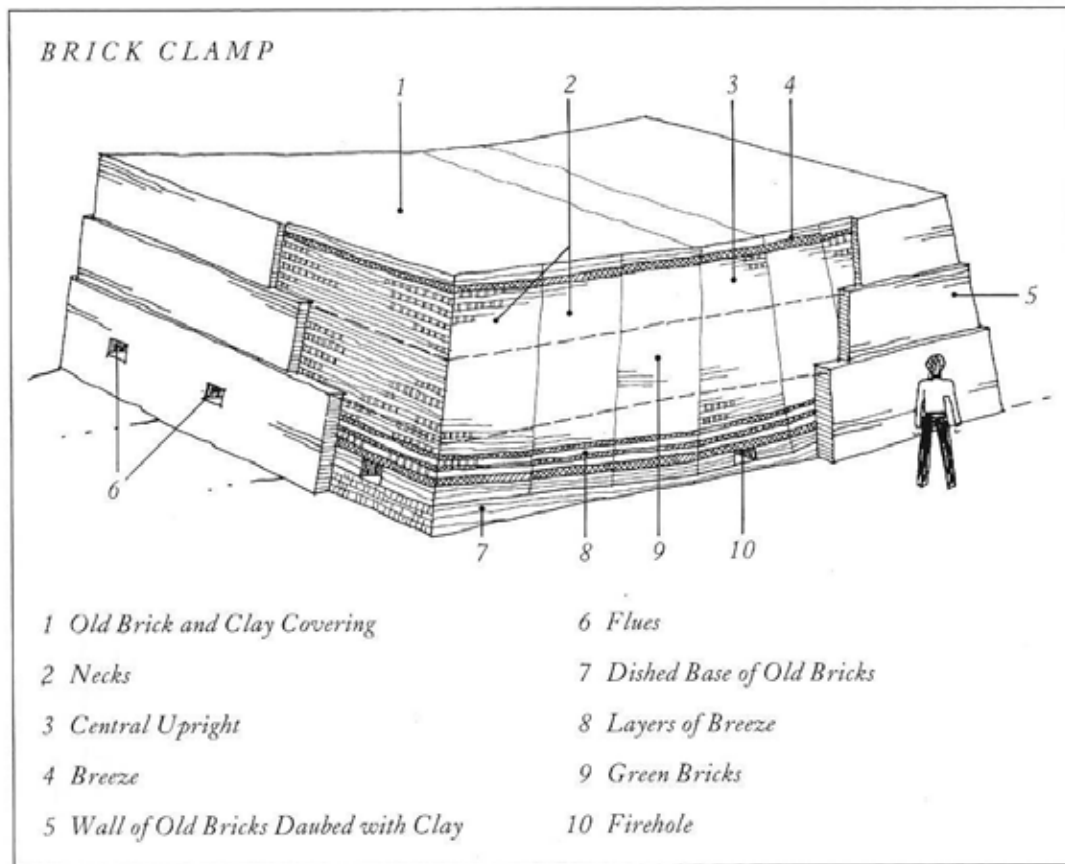


Figure 10 Sketch of a clamp kiln showing the various components. (Source: Plumridge and Meulenkamp, p167).

Generally, a solid foundation of fired bricks was laid, placed diagonally and on edge. The next two courses were made up entirely of green bricks on edge, laid parallel to the sides to form a heat seal. In the lower part of the kiln stoking tunnels ('flues') were created at regular intervals from one to three metres apart. Packed with timber fuel, charcoal and cinders, the flues were used to light the fires in the clamp as well as replenish the fuel supply. Air for combustion also entered through these holes at the base of the clamp. As the clamp evolved, combustible material was scattered between the individual brick courses. Soon the clamp began to assume its familiar shape as rows of green bricks took shape, alternating as headers and stretchers in regular intersecting rows, and sealing the flues in the interior. At the base, a clamp could measure about 8 metres in length by 6 metres wide. At the top, allowing for the tapered effect, the clamp was slightly smaller at 7 x 5 metres, the finished clamp standing three to four metres high. Sometimes an external covering of daubed clay was applied to the clamp to conserve heat, in which case the structure was referred to as a 'scove' clamp or kiln.

4.1.6 Firing the clamp

Initially fire in the clamp was kept low by careful control of the draught, which brought the mass of green bricks slowly up to firing temperature. When the fuel was well alight, the entrances were sealed with bricks and plastered with clay. Fissures would form in the clay plaster as it dried, permitting the entry of air necessary for

combustion. If the fire appeared to dampen in part of the clamp, then flues could be re-opened and additional fuel poked into the heart of the clamp.

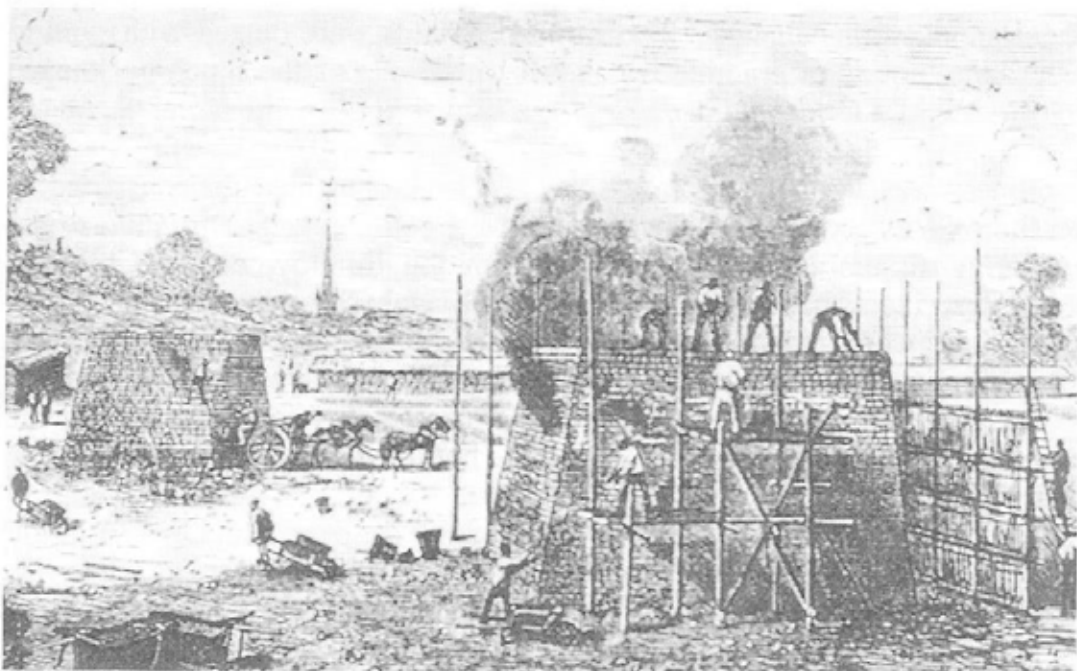


Figure 11 Bricks being fired in clamp kilns in northern France. (Source: Peek and Pratten p. 6, from Woodforde 1976, *Bricks to build a house*).

A pall of dense white vapour would often settle over the brick making site at this stage of the firing process, due to the evaporation of moisture from the green bricks via the top of the clamp. After about three or four days clear air would issue, indicating the bricks were dry and that firing at full heat could proceed. After about a fortnight, or when the brick maker judged the bricks to be properly burned, the fire was quenched and the clamp allowed to cool for a week or more.

4.1.7 Limitations of clamp kiln brick making

Each clamp was a one-off kiln, which had to be demolished to enable removal of the fired bricks. Also, clamp burning tended to produce bricks of extremely variable quality and colour, so that with the exception of bricks fired at the centre of the clamp (which could have vitrified surfaces due to the higher temperature), few bricks were uniform. Due to temperature variations within the clamp, up to 20 per cent of bricks produced by a basic clamp were either over- or under-fired. Over-firing fused the clay and sand sprinkled between the wet bricks to prevent them from sticking between the wet bricks to prevent them from sticking to each other. The result was that these bricks were glass-like or vitrified on the outside but brittle on the inside. Bricks stacked nearer the flues and fuel supply were often distorted, which produced 'clinkers'. On the other hand, bricks from the outer face of the clamp were soft and underburnt, creating the pleasant light-brown or salmon-coloured bricks, termed 'callows' or doughboys'. Since brick makers could exercise no control over the rate of burn during the actual firing, clamps were extremely inefficient users of energy and heat quickly dissipated into the atmosphere during firing and cooling. By about the 1850s in NSW, clamp kilns were being replaced by more efficient Scotch kilns (also known as updraught or open kilns) in which green bricks were loaded inside permanent walls and intense heat could be applied more uniformly for a certain length of time, producing much more uniform bricks.

4.2 Conservation and interpretation in situ

The archaeological resource at the brickmaking site is restricted to the outlines of the former clamp kilns on the ground, with some remnant bricks and soil colour variations indicating the locations of the fires and temperature variations. Numerous bricks lie in scatters, in an area where bricks were stored and on palettes used for sorting various brick types recovered from the site. In one location, wheel ruts indicate where a wagon or barrow was used to transport material to or from a kiln. The likely source of clay for the brick making is in the banks of the nearby creek but the landform has been altered by earthworks, floods and erosion. Trees would have been cut down to provide fuel for the kilns and the current vegetation on site is relatively recent regrowth.



Figure 12 Panorama of the part of the brick making site showing the terrain and vegetation cover. High voltage power lines are visible at right. The blue tarpaulins are used to protect the archaeological excavation sites from rain. (Photo: Chris Betteridge, 18 November 2014)

Conservation of one or more of the kiln sites in situ with appropriate interpretive devices would be desirable but the fragile nature of the archaeological remains and their susceptibility to surface erosion militates against this option. The sites would need to be stabilised and covered with some form of structure, enabling visitors to observe the kiln remains but not walk on them. A simple protective cover could be in the form of a tent, shade structure or marquee but a structure that marks the significance of the site may need to be more substantial in form and materials. Prevention of vandalism would be a major management issue.



Figure 13 Archaeologists recording an excavated area of the brick making site. (Photo: Chris Betteridge, 7 November 2014)



Figure 14 Excavation to show potential source of clay for the brick making site. The archaeologists engaged a soil scientist to advise on the soil profiles of nearby sites and the likelihood of them being the source of the clay for the brick making. (Photo: Chris Betteridge, 7 November 2014)



Figure 15 One of the clamp kiln sites showing the black smudges indicating the locations of the fires. (Photo: Chris Betteridge, 18 November 2014)



Figure 16 Some of the brick fragments excavated from the brick making site. (Photo: Chris Betteridge, 7 November 2014)



Figure 17 Stanford University archaeologists work under an arched canopy at Catalhoyuk, Turkey. An arched structure such as this could be used to protect one or more kiln sites and allow them to be conserved and interpreted in situ.

(Source:

https://www.google.com.au/search?q=canopies+over+archaeological+sites&biw=1024&bih=672&tbm=isch&tbo=u&source=univ&sa=X&ei=vIRuVJHiFYG3mgXwolDQBg&ved=0CDQQ7Ak#facrc=_&imgdii=_&imgsrc=Tjy5PZA45huAIM%253A%3BB2hFxy-WSyMnGM%3Bhttp%253A%252F%252Fcdn.phys.org%252Fnewman%252Fgfx%252Fnews%252Fhires%252F2012%252Fstanfordarch.jpg%3Bhttp%253A%252F%252Fphys.org%252Fnews%252F2012-01-stanford-archaeologist-role-human-rights.html%3B414%3B275



Figure 18 A Roman archaeological site (thermal baths, forum and domus) in Molinete Park at Cartagena, Spain, protected under a canopy designed by ACM Arquitectura and within a fenced area, allowing visitors to observe the remains without intruding on them. The timber boardwalk is suspended from the canopy. Perforated steel plates sandwich the long-span structure to create a solid white cover during the day and a glowing lantern-like cover at night. This is another example of conservation of an archaeological site under a canopy. (Source:

https://www.google.com.au/search?q=canopies+over+archaeological+sites&biw=1024&bih=672&tbm=isch&tbo=u&source=univ&sa=X&ei=vIRuVJHiFYG3mgXwoIDQBg&ved=0CDQQ7Ak#facrc=&imgdii=&imgcr=2ueTfGls3mj03M%253A%3BZdSmxYKXk3rT M%3Bhttp%253A%252F%252Fwww.bdonline.co.uk%252FPictures%252Fweb%252Fz%252Ff%252Fn%252FCartagena-047DFRwe_590.jpg%3Bhttp%253A%252F%252Fwww.bdonline.co.uk%252Fcanopy-for-roman-site-cartagena-spain-by-amann-c%2525C3%2525A1novas-maruri-architects%252F5033819.article%3B590%3B463



Figure 19 The Big Dig Archaeology Education Centre, The Rocks, Sydney. (Photo: Chris Betteridge, 10 august 2010.



Figure 20 Display at The Hills Council offices, Bella Vista of early sandstock bricks from various historic sites in NSW including Elizabeth Farm House and St Johns Cemetery, Parramatta. (Photo: Chris Betteridge, 12 January 2015)

4.3 Incorporation of interpretation into park design

An alternative to conservation of the archaeological resource in situ would be interpretation by design. The outlines of kilns could be interpreted by hard landscaping in the form of different paving materials, with remnant bricks and brick fragments contained in gabions, subject to conservation advice on their long-term survival, and used as seating or as locations for interpretive signs. The form of a clamp kiln could be constructed as a frame to give visitors an understanding of such structures. Examples of different paving materials to indicate the locations of former structures and the use of gabions to contain brick fragments are shown in the images below.



Figure 21 At the abandoned Mediaeval village of Wharram Percy in North Yorkshire, United Kingdom, pebbles and kerbs have been used to illustrate the layout of an archaeologically excavated building. (Source: *Ideas for interpreting heritage places: Bored of boards*)



Figure 22 Variety of paving materials used to interpret former structures within one of the yards at the Cascades Female factory, Hobart, Tasmania. (Photo: Chris Betteridge, 30 November 2014)



Figure 23 Use of Corten steel plate and gravel to interpret the locations of former structures within one of the yards at the Cascades Female Factory, Hobart. (Photo: Chris Betteridge, 30 November 2014)



Figure 24 Brick fragments encased in gabions to interpret the walls of a former privy at the Cascades Female Factory, Hobart. (Photo: Chris Betteridge, 30 November 2014)



Figure 25 Public art / interpretive installation comprising bricks within stainless steel gabions, Salamanca Place, Hobart, Tasmania. (Photo: Chris Betteridge, 27 November 2014)



Figure 26 Corten steel and photo-metal interpretive sign about John Prince, one of the convict workers on the Archer estate 'Woolmers', Longford, Tasmania. John used to take people across the Macquarie River from 'Woolmers' to the adjoining Archer property 'Brickendon'. Similar signs could be used at Site 3 to tell the story of the brick makers and the brick making process. (Photo: Chris Betteridge, 5 December 2014)



Figure 27 This interpretive panel at Vindolanda, Hadrian's Wall, United Kingdom, has three layers of text. It is dominated by a recreation drawing, with summaries in three languages other than English. This allows a broader audience to understand the significance of the site. The design is simple, elegant and contemporary. Pastiche is avoided. The sign is fitted onto a concrete tray which means that site insulation does not require excavation. Such an archaeologically non-invasive approach is only suitable in areas with no livestock. In places where sheep or cattle are present a more durable solution is necessary. A similar approach could be used at St Marys with a recreation of a typical sandstock moulding bench. (Source: *Bored of boards*, p26)

5.0 Interpretive options for the radar range site

Further research is required to determine the history and functions of this site. The structural integrity of the radar hoop antenna has been assessed and its retention in its current location is not possible. However, this unusual structure is a striking element in the cultural landscape and its reconstruction or recreation at a nearby site is considered desirable. It could lend itself to being used as a 'gateway' marker for a residential area or a local park, with appropriate interpretation of its original use and that of the radar range generally. If feasible the fibreglass shell of the radome should be repaired or recreated and attached in its original form.

The Wianamatta Regional Park Conservation Management Plan 2011 identified that the Radar calibration facility and ships have an interpretation potential. Interpretation could include:

- Locating radar calibration facility moveable heritage items (e.g. model ships) and displaying them within the Wianamatta Regional Park to enhance appreciation and understanding of site history and heritage.
- Installation of public art (e.g. replicas of model ships) may be an appropriate medium.
- Installation of a children's climbing structure.



Figure 28 The steel and timber antenna hoop at the former Naval Radar Calibration Range. The figures at right indicate the large scale of this structure. An associated tower is visible in the background at left. (Photo: Chris Betteridge, 18 November 2014)



Figure 29 One of two structures holding the supporting cables for the hoop antenna. (Photo: Chris Betteridge, 18 November 2014)



Figure 30 The fibreglass 'Seatel' radome which it is assumed was previously attached to the hoop antenna or one of the other structures on site. (Photo; Chris Betteridge, 18 November 2014)



Figure 31 Central Precinct in relation to Ropes Creek and Jordans Crossing, with a potential site for relocation and interpretation of some elements from the former Naval Radar Calibration Range marked in red. (Source: JMD Design)

Salvageable elements from the radar range may be able to be reused and interpreted as street furniture or sculptural elements in a local park.

Re-used or adapted elements should be relocated to sites as close as possible to their original location to retain their environmental context and make their interpretation more easily achievable.

The forms of the hoop antenna and other structures within the radar range may be incorporated into a local park / playground, possible as a shade area.

Some examples of public art and playground equipment that could be adapted are shown below.



Figure 32 Sculpture of tank made from recycled office furniture and other materials, Sculpture by the Sea, Marks Park, Bondi. Public art works of ship forms could be used to interpret the former use of the radar range. (Photo: Chris Betteridge, 11 November 2010)

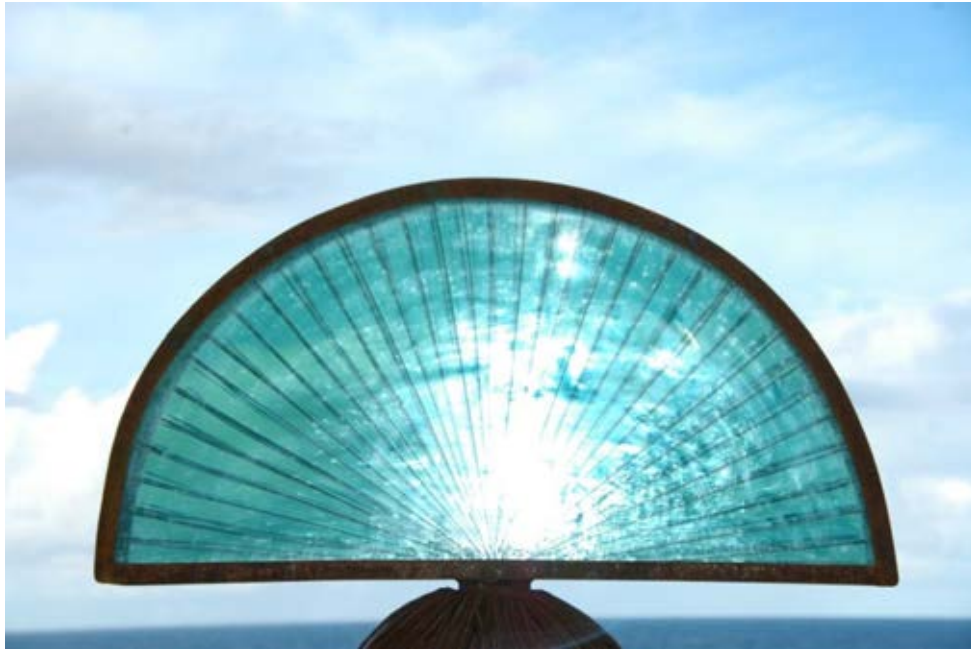


Figure 33 Artwork in the form of a glass and metal arch on a stand, Sculpture by the Sea 2007. The form of the radar hoop antenna could be interpreted in a public art work or sculptural element. (Photo: Chris Betteridge, 8 November 2007)

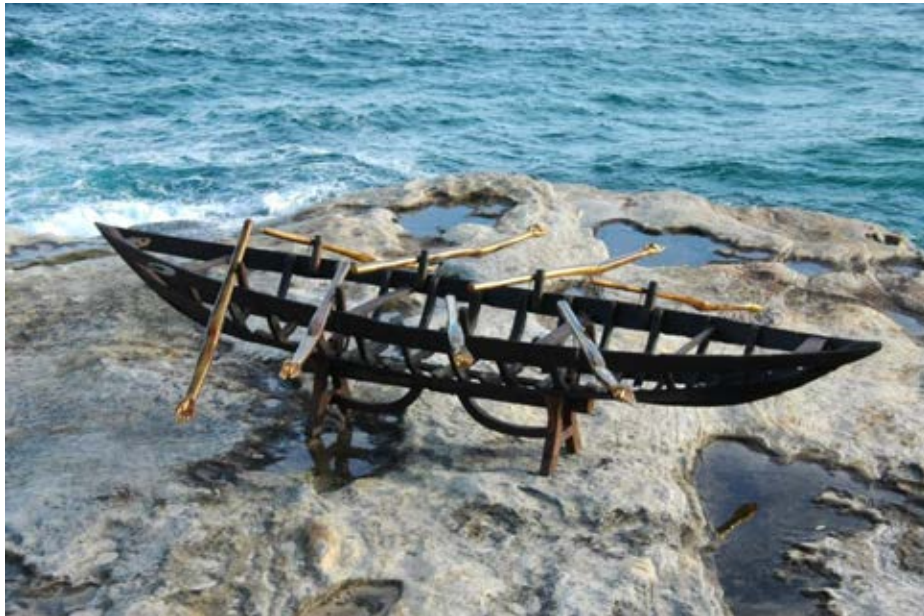


Figure 34 Boat form, Sculpture by the Sea 2007. Replicas of the naval ship forms used at the radar range could be used as sculptural elements in a local park and to interpret the former use of the site. (Photo: Chris Betteridge 8 November 2007)



Figure 35 Whimsical sculpture of helicopter whale, Sculpture by the Sea 2008. A sculpture of a naval ship could be used as part of playground equipment to help interpret the history and use of the radar range. (Photo: Chris Betteridge, 30 October 2008)



Figure 36 'Fat Albert', a piece of playground equipment built in 1995 in the park opposite RAAF Base Richmond created as a community project between Tourism Hawkesbury, Hawkesbury Shire Council, local schools and businesses and the *Hawkesbury Gazette* and RAAF Richmond in recognition of the close relationship between the personnel of RAAF Base Richmond and the broader Hawkesbury community. A naval ship form could be created as playground equipment as a joint venture by Lend Lease and the new community in Central Precinct. (Photo: Chris Betteridge, 12 January 2015)



Figure 37 Playground equipment in the form of a sailing ship, waterfront park, Oamaru, South Island, New Zealand. Although most such similar items in playgrounds are based on pirate ships, a similar item in the form of a modern naval vessel such as a destroyer or patrol boat could be installed in a playground in the Central Precinct. (Photo: Chris Betteridge, 7 May 2014)



Figure 38 This support for swings in the waterfront park at Oamaru, South Island, New Zealand features a whimsical penny farthing bicycle and rockets which tie in with the fact that Oamaru is the home of the Steampunk movement in New Zealand. Swings in the playground at Central Precinct could feature a stylised hoop antenna as part of their supporting structure. (Photo: Chris Betteridge, 7 May 2014)



Figure 39 This item of playground equipment at Malmo, Sweden features a radome-like central housing from which the slides emanate. (Photo: Chris Betteridge 14 May 2009)



Figure 40 This playground equipment at a recent Stockland development could be adapted to a ship form. (Source: https://www.google.com.au/search?q=playground+equipment+%2B+ship&biw=768&bih=928&source=lnms&tbn=isch&sa=X&ei=7h22VLrgCIPn8AXT4oKoCw&ved=0CAYQ_AUoAQ#tbn=isch&q=stockland+playground+&imgdii=&imgsrc=IXJcsbT4vRt1IM%253A%3BJRlr6zwWPU1sM%3Bhttp%253A%252F%252Fwww.outdoordesign.com.au%252Fimages%252Fuploads%252F2013042313666758794764.jpg%3Bhttp%253A%252F%252Fwww.outdoordesign.com.au%252Flandscape-supplies-hard%252Fplayground-equipment-suppliers%252FNew-adventure-playground-challenges-kids-with-innovative-play%252F158.htm%3B470%3B313)



Figure 41 Public art installation by Ecoscape identifying Stockland's Corimbia Estate land development, East Landsdale in the northern suburbs of Perth, Western Australia. The radar towers at the former radar range could be used as inspiration for a similar work in the Central Precinct. (Source: https://www.google.com.au/search?q=playground+equipment+%2B+ship&biw=768&bih=928&source=lnms&tbn=isch&sa=X&ei=7h22VLrgCIPn8AXT4oKoCw&ved=0CAYQ_AUoAQ#tbn=isch&q=stockland+playground+&imgdii=&imgsrc=1rCxL-jZiR4HWM%253A%3BApe7mvdF6naIPM%3Bhttp%253A%252F%252Fecoscape.com.au%252Fwp-development%252Fwp-content%252Fuploads%252F2013%252F10%252F0495_corimbia_estate_s1_screen.jpg%3Bhttp%253A%252F%252Fecoscape.com.au%252Fportfolio%252Fcorimbia-estate-land-development-east-landsdale-wa%252F%3B1100%3B550)

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Wianamatta Regional Park

Volume 3: Park Masterplan



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ADI	Australian Defence Industries
BCC	Blacktown City Council
CMP	Conservation Management Plan
PoM	Wianamatta Regional Park Plan of Management
DLL	Delfin Lend Lease
DECCW	Department of Environment, Climate Change and Water
NPWS	National Parks and Wildlife Service
PCC	Penrith City Council
WRP	Wianamatta Regional Park
WWII	World War Two

Glossary of terms

Adaptive re-use - Modification of a building or its existing curtilage to suit an existing or proposed use. Can only occur if the modification is undertake in a sustainable manner; the modification and use are not inconsistent with the conservation of the natural and cultural values of the land; and the modification is compatible with the retention of the cultural significance of the building or structure.

Amenity Block - A public building that is usually constructed in a visitor area for toilet facilities, showers and maybe laundry facilities.

Appropriate recreation - Recreation that is in accordance with the essential nature and spirit of the management principles of the relevant park, does not substantially interfere with implementation of management objectives, is culturally appropriate and does not have an unacceptable degree of environmental or social/cultural impact.

Appropriate uses - Those activities that are consistent with legislation and DECC policies.

Approval - Includes a consent, licence, permission or some form of authorization.

BBQ shelter - a structure that provides shade and shelter over a BBQ for park visitors for cooking and preparation of food. Normally a roof supported by posts but may have one or more walls for additional protection.

Cafe - A building or part of a building with indoor and/or outdoor seating used for the sale of light meals and refreshments. May be dine in but may also provide a take-away service.

Car park - An area set aside for the safe parking of cars, may have a sealed or unsealed surface, may have formed parking bays or not (usually for more than one or two vehicles). Does not include road pull-off areas.

Conference/Education Centre/Field Studies Centre - a centre that provides training, conference, education or meeting facilities. Would typically include a large room with seating capacity of 20 people or more. May also include catering and dining facilities and in some instances, accommodation may be attached. May be used for staff, holiday or other accommodation.

Bush regeneration - The practice of restoring bushland by focusing on reinstating and reinforcing the system’s ongoing natural regeneration processes (Australian Association of Bush Regenerators). Bush regeneration work aims to rehabilitate the bush from a weed infested or otherwise degraded plant community to a healthy community composed of locally occurring native plants.

Critical habitat - Habitat declared under Part 3 of TSC act that is critical to the survival of species or populations listed under the TSC Act 1995.

Critically endangered ecological community - An ecological community listed under Part 2 of Schedule 1a of the TSC Act 1995, that is at an extremely high risk of extinction in NSW in the near future.

Critically endangered species - A species listed under Part 1 of Schedule 1a of the TSC Act 1995, that is at an extremely high risk of extinction in NSW in the near future.

Day use area - An outdoor space used by visitors providing for day use, as distinct to overnight use. The most common activity in day use areas is picnicking although some day use areas provide for other visitor uses.

Desired outcomes - Goal statements or measurable objectives which are documented in a Plan of Management implementation table

Disabled Access - Access constructed in accordance with AS1428 “Design for Access and Mobility” for use by people with restricted mobility.

Ecologically sustainable development (ESD) - ESD require the effective integration of economic and environmental considerations in decision making processes can be achieved through implementing the following principles: Precautionary principle; Inter generational equity; Conservation of biological diversity and ecological integrity; and, Environmental factors should be included in the valuation of assets and services (*Protection of the Environment Administration Act 1991 s.6(2)*).

Ecotourism - Nature-based tourism that involves education and interpretation of the natural environment and is managed to have minimal environmental impact on the sites visited. The definition recognises that the natural environment includes cultural components and that there should be an appropriate return to the local community and the long-term conservation of the resource (*Commonwealth Department of Tourism 1994*).

Endangered ecological community - An ecological community listed under Part 3 of Schedule 1 of the TSC Act 1995, that is facing a very high risk of extinction in NSW in the near future.

Endangered population - A population listed under Part 2 of Schedule 1 of the TSC Act 1995, that is facing a very high risk of extinction in NSW in the near future.

Endangered species - A species listed under Part 1 of Schedule 1 of the TSC Act 1995 that is facing a very high risk of extinction in NSW in the near future.

Fence (Boundary) - A fence that is situated on the boundary of the park where it adjoins a neighbour. (AMS)

Fence (Internal) - A fence that is situated within a park or reserve and is not a boundary fence. Solely owned and maintained by NPWS. (AMS)

Historic Building - A building that has heritage value and may be either over 25 years old, or listed on the relevant council list (local significance), state heritage register (state significance) Cth EPBC Act 1999 (national significance) or international (world heritage property). May have currently or previously had a range of uses (see homestead, hut, cabin, cottage/house)

Historical/Cultural garden or plantings - Any plantings, either native or introduced that have been historically planted at that location. This definition does not include plants which have spread significantly beyond the original plantings or seedlings of original plants, but may include replacement plantings. Examples of historical planting include (but is not limited to), stands of trees and flowers planted along roads or access routes, ornamental gardens and plants at historic sites, cultural plantings at cemeteries, orchards and hedges. May have heritage significance, but may also be a potential weed source.

Homestead - Typically the primary dwelling in a pastoral situation that provides accommodation, generally for one family. The Homestead can include external buildings such as kitchens, meat house, servants quarters, workers living quarters, bathhouse, laundry, offices, stores buildings, livestock housing, gardens, orchards and sheds etc.

Interpretation - Programs, activities and facilities aimed at giving visitors greater awareness, understanding and appreciation of the features and significance of the park.

Lookout - A high place or structure used for observation for viewing scenic values or for fire detection.

Management response - Are the actions or strategies which are documented in a Plan of Management implementation table.

Management principles - A set of principles set out in the NPWS Act 1974 for each category of land reserved under the NPWS Act 1974.

Management trail - A vehicle trail that is maintained to facilitate management activities and is not available for general public vehicular use, except for licensed access to inholdings, apiary sites or similar.

Modified natural area - An area of land where the native vegetation cover has been substantially modified or removed by human activity (other than activity relating to bush fire management or wild fire) and that is identified in a plan of management as not being appropriate for or capable of restoration.

Nature-based recreation - A recreational activity in which the experience of the natural environment forms a major motivation.

Park - All “protected area” tenures managed by the NPWS.

Picnic Area - A maintained visitor area set aside for outdoor food preparation, consumption and general recreation for groups and individuals. Tables, shelters, barbeques and toilet facilities may be provided. No camping allowed.

Picnic Shelter - A structure that provides shade and shelter for park visitors for seating and food consumption. Normally a roof supported by posts but may have one or more walls for additional protection. May or may not have picnic tables, barbeques and/or other facilities.

Prohibited - An activity can not be undertaken under legislation and/or PoMs.

Public Access road - An access road opened for vehicle use by the general public. May also be available for walking, cycling etc.

Regenerate - A process where ecological communities that have been subject to some form of disturbance such as clearing, logging or weed invasion are restored to a good condition or natural state. This process can occur through naturally processes or management intervention.

Rehabilitate - To restore an ecological community to a good condition or former state using management intervention.

Revegetation - Produce a new growth of vegetation on (disturbed or barren ground)

Restoration - Returning the existing fabric of an historic place to a known earlier state by removing accretions or by reassembling existing components without the introduction of new material (Burra Charter) (Use rehabilitation when referring to restoration of natural areas).

Restricted Public Access road - An access road generally closed to use by the public, however access via locked gates may be permitted by permit.

Threatened species, population and ecological community - Species, populations and ecological communities listed under Schedules 1 or 2 of the TSC act.

Vehicle - (a) a boat or other object that, while floating on water or submerged, whether wholly or partly, under water, is wholly or partly used for the conveyance of persons or things,

(b) an apparatus that, while propelled, or directed or controlled, in the air by human or mechanical power or by the wind, is wholly or partly used for the conveyance of persons or things,

(c) a motor vehicle,

(d) an apparatus propelled, or directed or controlled, upon land, snow or ice by human or animal power or by the wind, and

(e) a trailer or caravan, whether or not it is in the course of being towed. (NPWS Act)

Viewing platform - A structure for viewing scenic values of an area while maintaining a high level of visitor safety.

Visitor Centre - A place that provides information on the area’s attractions and is often a retail outlet for maps, brochures, souvenirs and items relevant to the local area. Provides displays that interpret the natural and cultural features of the local environment.

Vulnerable ecological community - An ecological community listed under Part 2 of Schedule 2 of the TSC act, that is facing a high risk of extinction in NSW in the medium term.

Vulnerable Species - A species listed under part 1 of schedule 2 of the TSC act, that is facing a high risk of extinction in NSW in the medium term.

Walking Track Classes - An accessibility and difficulty grading as defined by AS2156 Walking Tracks.

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Masterplanning Mapping Legends

A compilation of mapping legends used throughout this report have been consolidated onto this page as follows as a quick reference.

Note: All development areas included on plans are subject to change and represent indicative design for roads/ open space etc at the time of the Landscape Masterplan report being written. This will be subject to ongoing design development.

Regional Park Masterplan (section 5.0)



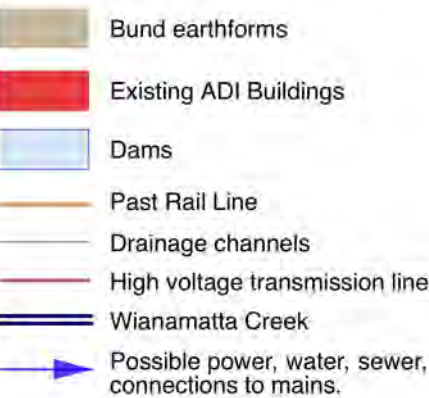
Key Factors Map (Fig 3.1.1)



Action Plan (Fig 7.0)



Services and Infrastructure (Fig 2.6.1)



Access and Relationship to adjoining Communities (Fig 2.5.9)



1.0 INTRODUCTION

1 INTRODUCTION

1.1 Background

The Wianamatta Regional Park (WRP) covers approximately 900 hectares of the former Australian Defence Industries (ADI) site at St Marys in Western Sydney. The site sits approximately 45 kilometres (kms) west of the Sydney CBD and is located 5 Kms north-east of Penrith and 12 kms west of Blacktown (refer Figure 1.1).

The overall ADI site has an area of 1545ha, and stretches roughly 7 kms east to west and 2 kms north to south. The residential suburbs of Willmot, Shalvey, Lethbridge Park, St Marys, Werrington County, Werrington Downs, Cambridge Gardens and Cranebrook bound the site to the south, west and east while the areas of Llandilo and Shanes Park lie to the north of the site and are rural in nature (refer Figure 1.2). The site sits within two local government areas, the eastern portion is within Blacktown City Council area while the west is governed by Penrith City Council. The Park is also within the traditional Darug Aboriginal country and the Deerubbin Local Aboriginal Land Council area.

The land developer (Delfin Lend Lease) portion of the site is expressed as five development precincts, Eastern (Ropes Crossing), Ropes Creek, Dunheved, Central and Western (refer figure 1.0). The Dunheved Precinct supports employment development only, while the Central precinct will support both employment and residential land uses. All other precincts have a residential focus.

A human-made dam located in the south-west corner of the site, commonly known as the “Secret Garden”, has also been zoned as Regional Park. This area has a number of unresolved management issues, including the safety of the dam structure, stormwater management, and the boundary interface with development areas. It is not part of the current Development Agreement which transfers the Park to DECCW and it is therefore not specifically included in this plan. Other lands may also be considered for addition to the Regional Park in the future. (dPoM p2)

Other surrounding land uses include the St Marys Sewerage Treatment Plant and Dunheved Golf Course to the south, while market gardens and transmission station (Shanes Park Air Services site) sit to the north and north-east. The WRP lies within the Sydney Basin Bioregion along with the Castlereagh, Windsor Downs and Agnes Banks Nature Reserve managed by NSW National Parks and Wildlife Services. The former Australian Defence Industries (ADI) site at St Marys was endorsed by the NSW Government for inclusion in the Urban Development Program (UDP) in 1993. The site was seen to present an opportunity to provide housing for Sydney's growing population within an environmentally sustainable framework.

The WRP site contains several (pre ADI) heritage sites, bushland vegetation and numerous remnants of the sites use for munitions manufacturing for the ADI. These remnants include access infrastructure - roads and tracks, building foot prints and topographical berms/ mounds. The site has played an important part in the local history of Western Sydney including early associated development and the ADI ammunitions site. A condition of the acquisition of the site was that high value areas were retained to be developed as a Regional Park.

The masterplanning process for the Wianamatta Regional Park has considered sustainability as an over-arching principle and focus for the site's future use and development. This has taken into account that all facets of the site and their inter-relationships need to be examined with a long term view to a sustainable future. This includes heritage components, built elements and their adaptive re-use, facilities and infrastructure or services. Beyond this physical fabric, sustainability also relates to the education of parkland users, the way in which the site is accessed and the promotion of both a local and global community through management and use of the Park.

The masterplan provides the long term directions for the site's development while also considering that a staged approach and action plan will be necessary to meet NPWS's budget constraints.

The key objectives of management for the Park as defined in the Wianamatta Regional Park Plan of Management are:

1. Protection and enhancement of the natural heritage of the Park, particularly the endangered ecological communities and the threatened flora and fauna species through the management of fire, disturbed areas, drainage, introduced species, access and visitor use.
2. Recognition and protection of traditional and contemporary Aboriginal cultural heritage, landscape and spiritual values through providing opportunities for the involvement of the traditional owners and the local Aboriginal community in the protection, interpretation and management of their heritage and values.
3. Protection of historic heritage through identifying, recording, conserving and interpreting historic items and places.

4. Protection of the catchment values of South and Ropes Creeks through managing any disturbances, particularly those associated with fire, access and drainage.
5. Provision of recreational facilities that are appropriate in a regional context and are designed, located and managed to protect the natural and cultural heritage and visual values of the Park.
6. Provision of interpretive and educational opportunities through signage, park brochures and activities to assist visitor understanding and enjoyment of the Park.
7. Improving knowledge of natural and cultural heritage, corresponding threats and the evaluation of management programs through research and monitoring. Working with local government, other agencies and authorities, the community and commercial interests to maximise community interest and involvement in the conservation of the Park, and the implementation of sympathetic conservation measures in the neighbouring environment.

1 INTRODUCTION

1.2 Site configuration

The Regional Park incorporates the major areas of vegetation habitat and conservation importance across the St Marys site as defined in the St Marys SREP 2001. As a consequence the park is divided by urban development precincts and existing road corridors. Whilst this does exacerbate the park's edge to area ratio (there is 37km of edge to adjoining lands / land managers) and potential for related management issues, it also creates opportunities for a high level of accessibility to adjoining residential areas.

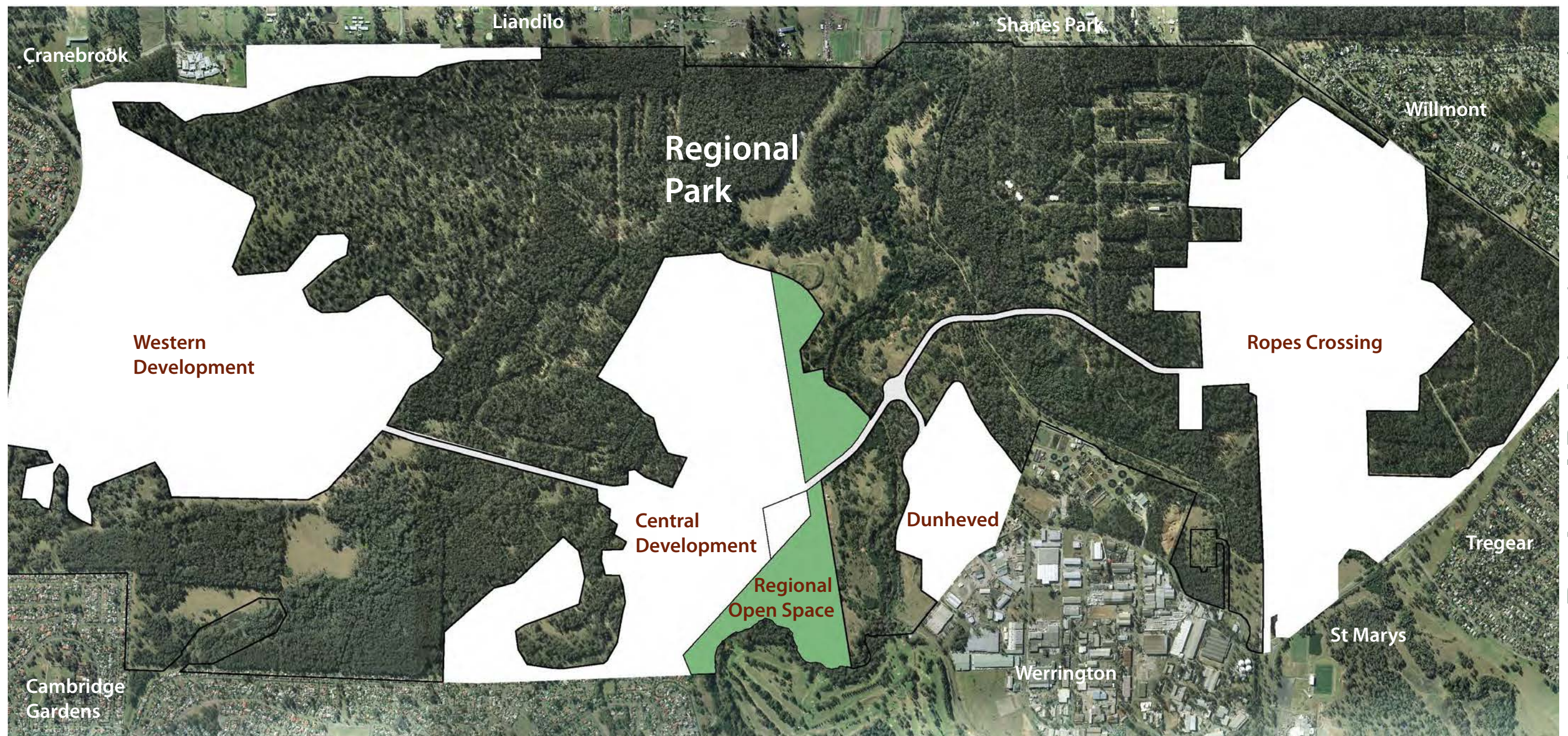


Figure 1.1 ADI Site Map: includes; Wianamatta Regional Park, Delfin Lend Lease Development Precincts & neighbouring suburbs

1 INTRODUCTION

1.3 Project vision

Aims and Objectives

The NSW National Parks and Wildlife Service of the Department of Environment Climate Change and Water (DECCW) commissioned Environmental Partnership (Landscape Architects) in June 2009 to prepare a masterplan for the Wianamatta Regional Park located on the former ADI site at St Marys. The project team incorporated a number of specialist inputs:

Godden Mackay Logan	<i>Heritage Planning, Aboriginal Community Liaison & Interpretation</i>
Carolyn Stone	<i>Consultation Planning and Facilitation</i>

Core aims for development of the masterplan as identified in NPWS brief included:

- Identification and protection of significant heritage items
- Development of visitor facilities
- Provision of traffic circulation
- Provision of access routes into and within the park linking to regional connections
- Car parking and management of different landscape areas and boundary interfaces

Key project objectives are:

- To provide strategic direction based on the plan of management for future management of the park including long term conservation and landscape management outcomes;
- To identify broad scale conservation, use, linkages, services, infrastructure and access zones across the park;
- To identify key access points, connections and circulation routes; and
- To identify appropriate levels of access and visitor facilities across the park.

In order to meet these objectives the precinct plans have taken into account the following:

1. The requirements of the Wianamatta Regional Park Plan of Management;
2. The findings of the Conservation Management Plan;
3. Considers the natural and cultural values of the places as well as community aspirations and needs; and
4. Takes a long term view to developing visitor improvements in the park.

Vision

The full realisation of a Regional Park and related uses and management of the scale of Wianamatta Regional Park will be a long term undertaking. Required actions must be prioritised to enable available resources to be best focussed on those actions that will enable recreational use to be commenced by the public, and important conservation and habitat management actions to be initiated.

As such it is necessary to think of implementation of the park in both the short term and long term. Visions to reach each of these phases of park implementation are outlined following:

Short term vision

Provide for initiation of high priority management regimes for habitat and cultural heritage conservation, and actions for commencement of public use, enjoyment and appreciation of the park.

Long term vision

Consolidate habitat and cultural heritage conservation to complement recreational use and education, and involve the broad range of stakeholders in its planning and management.

Build upon core recreation opportunities of walking, cycling, and picnicking in a bushland setting. Provide dynamic interpretation of conservation values, special events areas and programmed education.



2.0 REVIEW

2 REVIEW

2.1 Natural Systems

Flora

The Park protects a number of Endangered Ecological Communities including Shale Plains Woodland, Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Alluvial Woodland. Along with several wetland communities and Castlereagh Scribbly Gum Forest which are poorly represented in western Sydney. Generally the vegetation communities found across the site (refer figure 2.1.1) have been highly impacted over many years from significant disturbance. As a result weed infestation has affected major areas across the park. The PoM identifies that fire is potentially an important factor in reestablishing vegetation communities such as the Cumberland Plain Woodland, as well as providing an effective weed management tool. The integration of such management strategies with recreational goals for the park is a significant challenge to be addressed.

dPoM Desired Outcomes

- The full range of native plant and animal species and their habitats found in the park is conserved.
- A diversity of vegetation structures and other habitat values are conserved, and restored where they have been subject to past disturbance.
- The endangered ecological communities and populations within the Park are protected.
- Rare, threatened & regionally significant native species and their habitats within the Park are protected.
- Park neighbours support conservation of remaining areas of privately owned native vegetation near the Park.
- Habitat linkages for biodiversity movement within a regional context are established and maintained.

Fauna

Careful management of macrofauna to sustainable levels will enable more holistic habitat values and capacity to be pursued which reflect the sites natural values and caters for a broad range of potential fauna species on the site. Management of uses should ensure that highest quality of potential habitat areas have a conservation focus.

PoM Desired Outcomes

- A sustainable population of macrofauna will be retained in the Park.
- Any decision on long-term fencing for the management of macrofauna, once they have reached a sustainable population size, will seek the best possible environmental result.
- Protection of habitat of native species will include actions to minimise illegal activities.
- Threatening processes from surrounding urban areas are minimised.

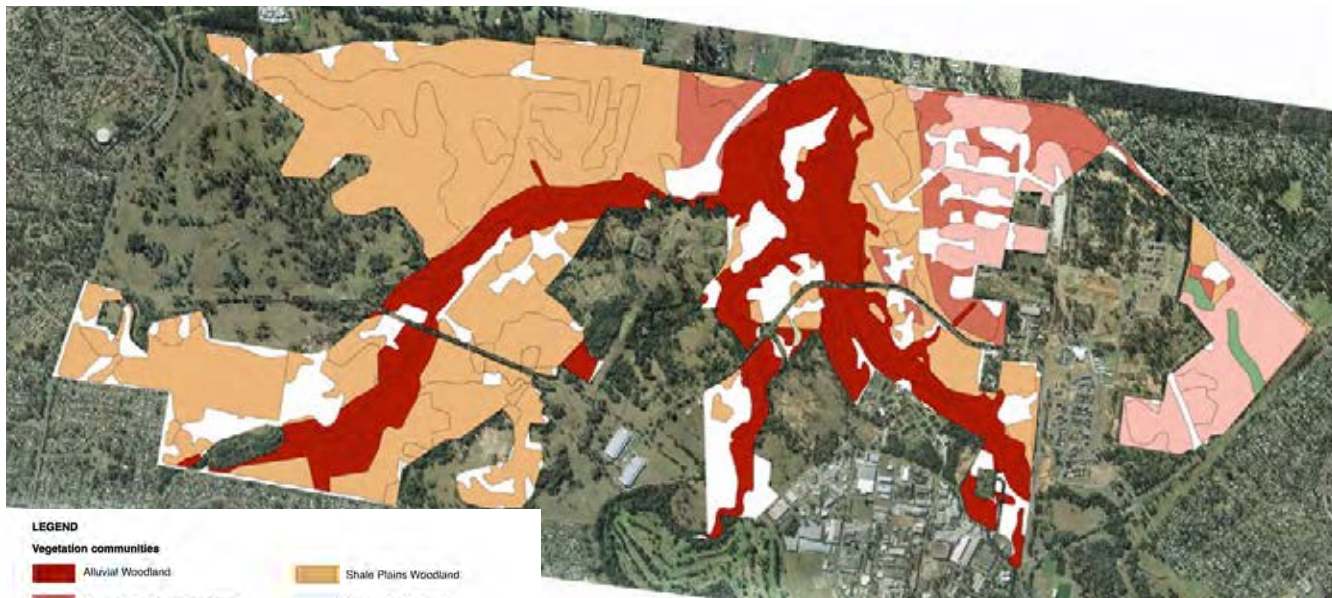


Figure 2.1.1 Vegetation Communities within the Regional Park

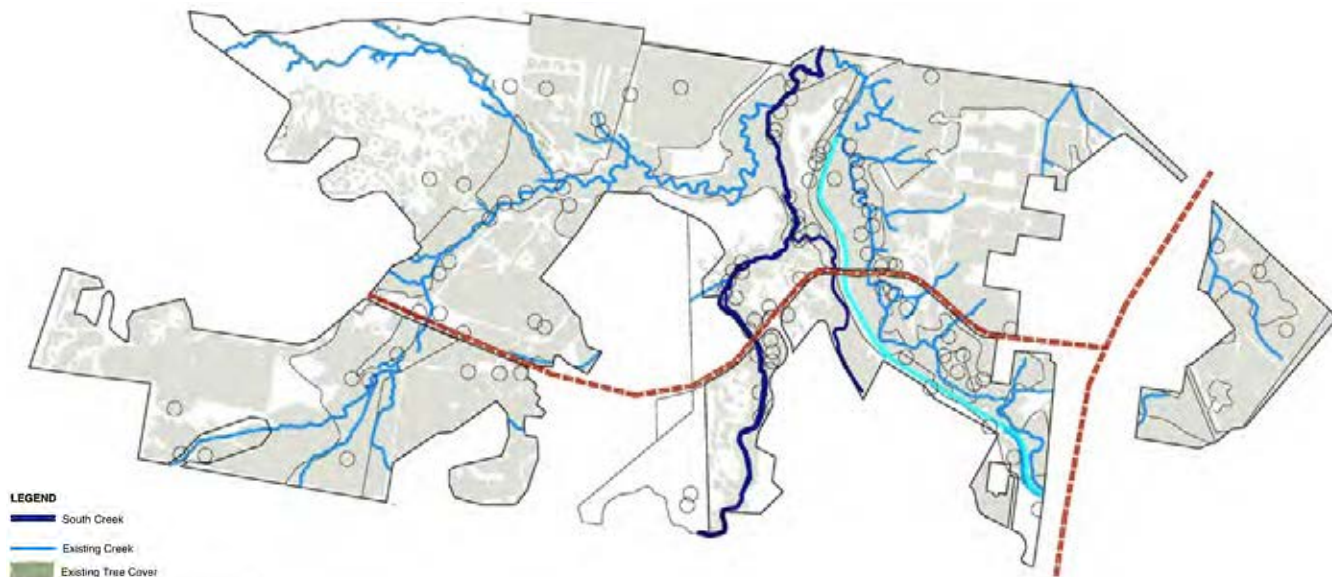
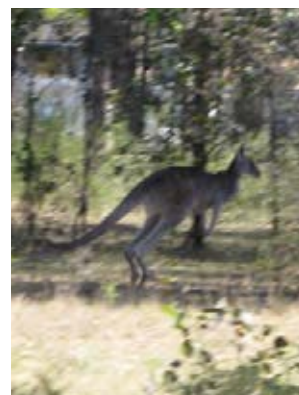


Figure 2.1.2 Fauna habitat within the Regional Park



Site Images: Existing flora and fauna found in the Regional Park Fauna habitat within the Regional Park (Source: EP NSW)

2 REVIEW

2.2 Soils, topography and drainage

The landform of the Regional Park comprises several main units:

1. The central floodplain around the Ropes and South / Wianamatta Creek systems
2. The undulating plains adjoining
3. Higher steeper pockets in the east adjoining Forrester Road and northwest and southwest

These units shape much of the physical character of the site and as a result have influenced past land use and ongoing opportunities and pressures for the Regional Park.

Extensive excavation undertaken during past land uses have resulted in much of the Regional Park being affected by poor drainage and soil erosion.

The Department of Infrastructure, Planning and Natural Resources (2002) modelling of the salinity potential for Western Sydney indicated that the area covered by the St Marys property has a moderate salinity potential especially along the creek lines (dPoM page 39). Residual contamination risks within Site 6, Site 23 (see Fig 2.2.3) and areas under existing infrastructure may require further investigation, remediation and validation during any construction process.

The four soil landscape groups identified in the Regional Park provide an important educational and research resource.

A total water management system has been designed by Delfin Lend Lease based on the St Marys REP to effectively manage the water quality entering and leaving the Regional Park and surrounding development precincts. This will include one to two additional basins adjacent the Regional Park adjacent the Western and Central Precincts and potential long term management of the remnant dam south of the Western Precinct.

dPoM Desired Outcomes

- Human induced soil erosion in the Regional Park is minimised.
- Soil Management practises within the Regional Park do not have any negative impacts on neighbouring landholders.
- Areas affected by soil erosion, salinity and contamination in the Regional Park are identified and remediated.
- Use of water sensitive strategies in the design of recreational and interpretative facilities.



Site Images: A variety of topographical conditions (Source: EP NSW)



Figure 2.2.1 Site topography

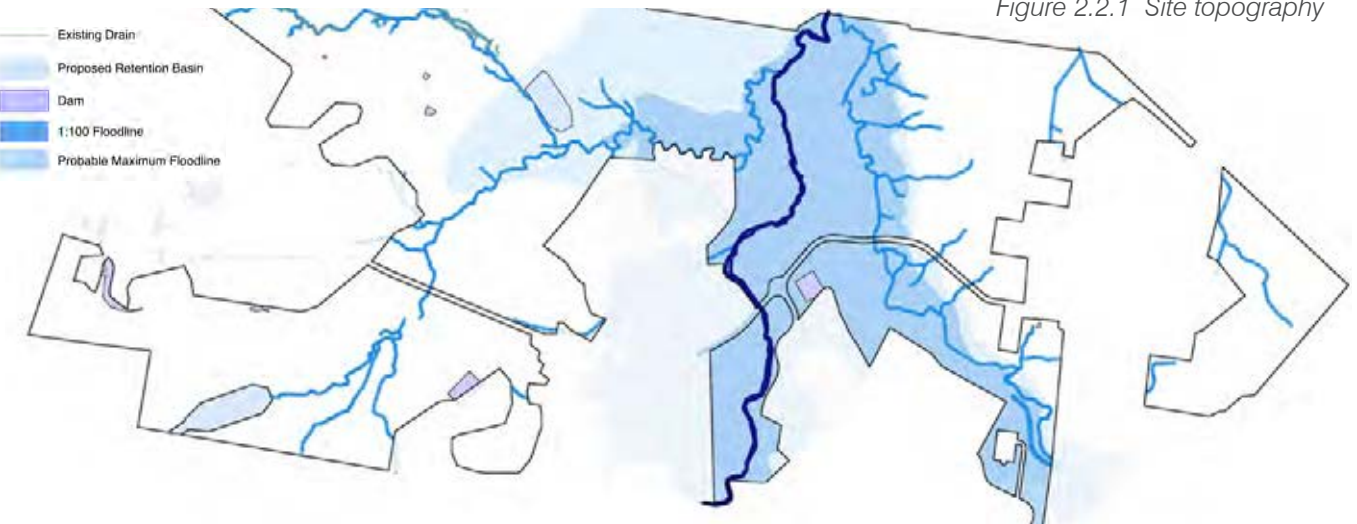


Figure 2.2.2 Creeks local catchment areas and water basins

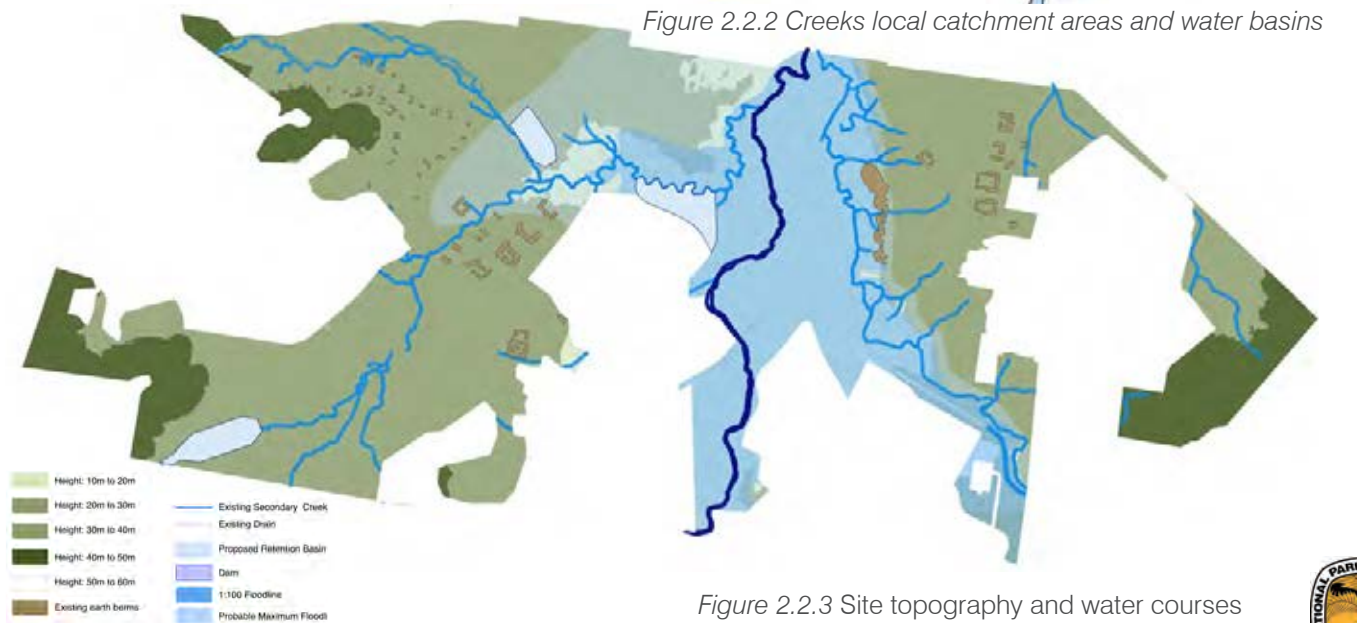


Figure 2.2.3 Site topography and water courses

2 REVIEW

2.3 Environmental management & parkland sustainability

Fire Management

Although fire is a potentially important process in the Australian landscape, inappropriate fire regimes may have an impact on the biodiversity of the Regional Park. Fire could also damage the cultural heritage of the Regional Park and built and natural Regional Park assets.

The fire history of the St Marys property has been recorded since 2000. Most of the unplanned fires were suspected arson attacks originating along roads and tracks. Prior to this, some areas of the site were managed with planned fire events almost yearly to prevent any threat to stored munitions from wildfire (ERM 2002). By contrast the majority of the site has not been burnt.

Asset Protection Zone

A buffer zone, known as the Asset Protection Zone (APZ) exists along all borders of the Regional Park located within adjoining residential development land. This buffer has the purpose of minimising bushfire fuels (eg vegetation) between the Regional Park and homes. The buffer zone in some areas may include part of the residential and commercial development lots bordering the Regional Park.

Sustainability

The planning and implementation of the Regional Park must fundamentally embody a sustainable approach. This will involve a whole of project / whole of life integrated approach across all facets. This includes:

- Optimising capture and re-use of rainwater / stormwater
- Optimising powering of facilities from power generated on site or redirected to grid
- Minimising energy use in park facilities and management
- Optimising opportunities for access by non motorised transport and public transport
- Maximising sustainability of design and construction
 - Materials
 - Fabrication
 - Construction
 - Maintenance
 - Disposal at end-of-life

dPoM Desired Outcomes

- Reserve fire management planning for the Regional Park must ensure the protection of life and property on or adjacent to the Park.
- Fire regimes are appropriate for long-term maintenance of the Regional Park's plant and animal communities.
- The occurrence of unplanned bushfires and the spread of bushfires on, from, or into the Regional Park are minimised.
- Aboriginal sites, historic places and culturally significant features are protected from damage by bushfires.
- Fire is managed to enhance spatial variability and to ensure species always have habitat available within the Regional Park.
- Fire is managed to maintain a range of structural types within the vegetation (eg some high *Bursaria spinosa* density/cover patches, some low *Bursaria spinosa* cover/density)
- Fire management is used to decrease, rather than increase the occurrence of introduced plant species in the Regional Park



Site Images: Typical "full strata" Cumberland Plain vegetation (Source: EP NSW)

2 REVIEW

2.4 Heritage management & interpretation

Values

The CMP prepared concurrently with this document identifies heritage values of the site - a summary of which follows:

Natural

- The Regional Park protects a number of Endangered Ecological Communities and poorly represented communities
- The Regional Park protects several threatened plant species and an endangered population of the species *Marsdenia viridiflora* subsp. *viridiflora*.
- The Regional Park protects at least six threatened animal species and is a significant link for plant and animal movements along both South and Ropes Creek corridors and to and from other regional areas.
- The Regional Park protects an area where four soil landscape groups can be seen in close proximity and where an east-west gradation in soil and geology occurs demonstrating the close relationships between soils and vegetation that have evolved over millions of years in the Cumberland Plain

Cultural

- The floodplain of the 2 major creeks in the Regional Park (Ropes and South / Wianamatta Creek) would have been an important meeting place and source of food for Aboriginal communities.
- The Regional Park protects spiritual values attributed to the heritage of the Park by the Aboriginal community and evidence of Aboriginal occupation and use across the site in the form of stone artefacts and open artefact scatters.
- The Regional Park contains a large area of western Sydney landscape which has been relatively undisturbed, thereby providing a significant opportunity for future research into Aboriginal site distribution and land-use.
- Parts of the Park have a history of stock grazing and timber clearing from 1803 to the 1940s and beyond. These areas provide examples of the impacts of these historic practices on the landscape and the processes of ecological recovery.
- Landscape features such as old fence lines and tracks indicate original grazing property boundaries, and more recently grass species research for grazing of sheep by CSIRO.
- There are a number of historical remains that demonstrate munitions production and storage in the Regional Park.
- Within the ADI site boundary is a number of locally significant heritage sites including: 'Dunheved Homestead Site' (potentially state significant), 'tree plantings near the homestead', 'Elizabeth farm site', 'Luxford's House', 'Ropes Creek Bridge', 'South / Wianamatta Creek Bridge', 'the road between the two bridges', Jackson's Dairy', 'House Site' and 'House site-chimney'.

Significance

The CMP identifies the cultural heritage significance of the site under 8 key phases. The masterplan strategies provide guidance to interpretation of each phase through development and management of the Regional Park

1. Natural landscape
2. Aboriginal lands - Darug Country
3. Colonial landscape (1800 - 1860)
4. Growth and development (1860s to 1940s)
5. Munitions - explosives and filling (1941 - 1946)
Munitions - munitions and storage - project 590 (1950s to 1990s)
6. Revitalisation and conservation - post industrial (1993-2001)
Revitalisation and conservation - Regional Park (2001 onwards)

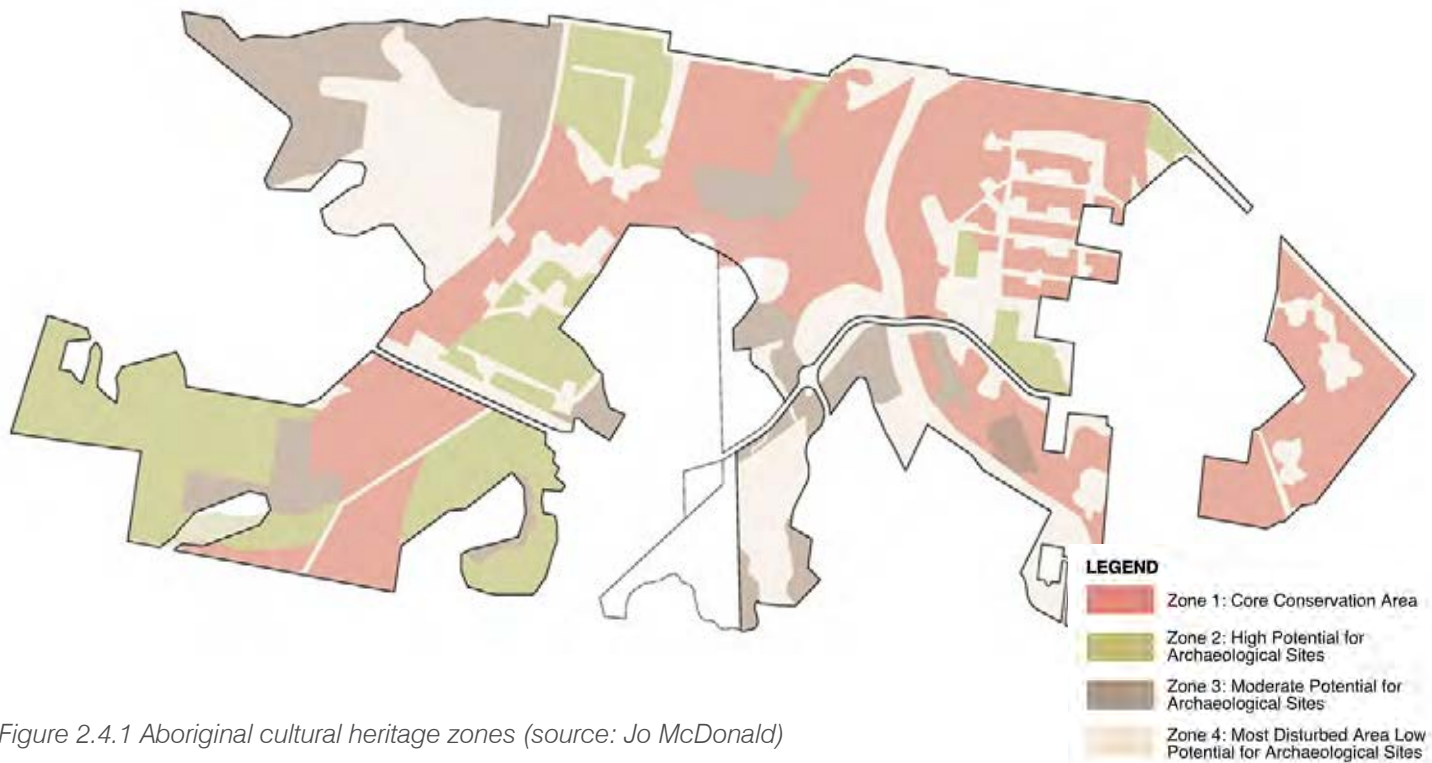


Figure 2.4.1 Aboriginal cultural heritage zones (source: Jo McDonald)

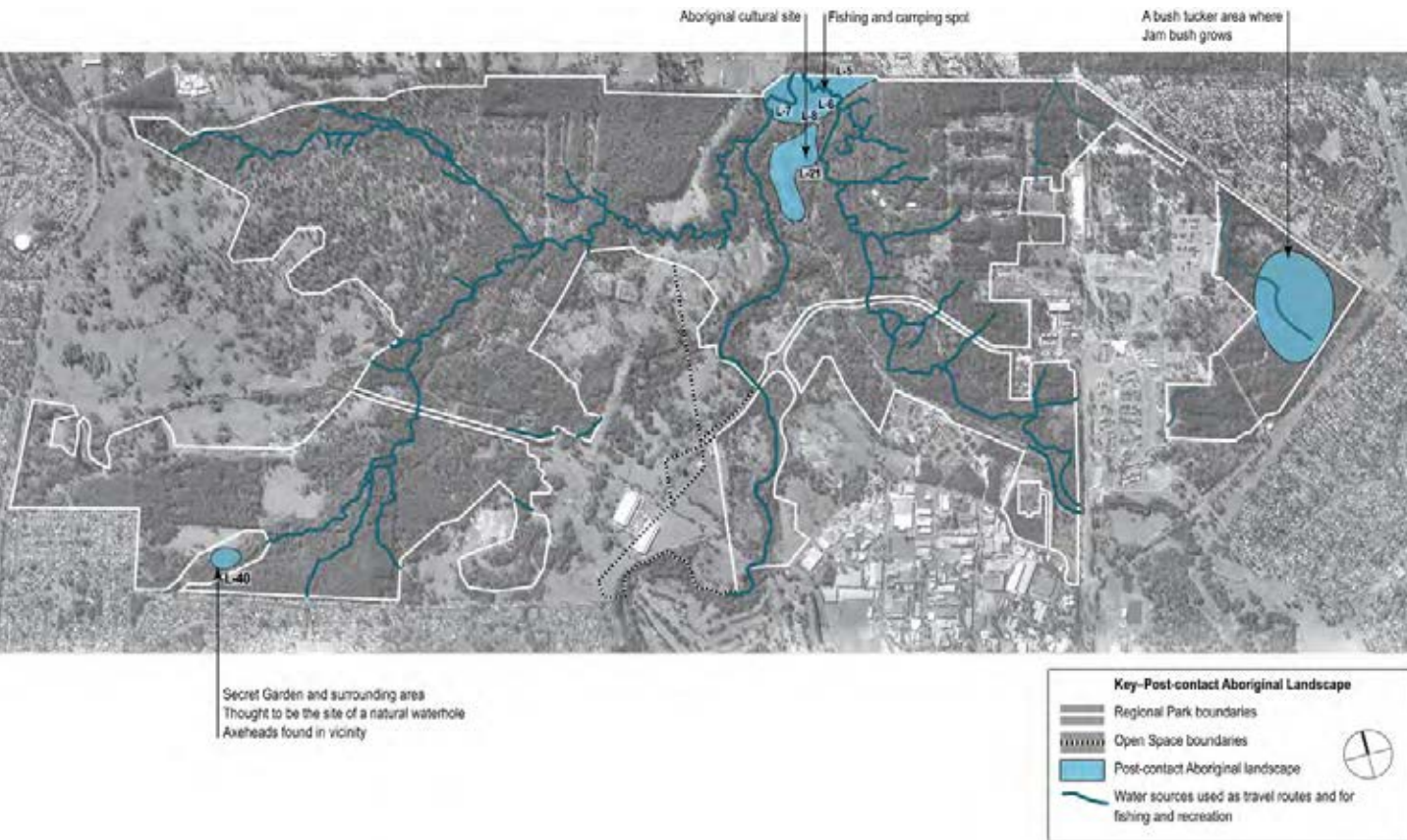


Figure 2.4.2 Pre European settlement archaeology (source GML 2010)

2 REVIEW

2.4 Heritage management & interpretation



Photo looking across Dunheved showing the house and its associated buildings (Source: Mitchell Library, State Library of NSW)



Conrad Martins's painting of Dunheved 1837, showing the house to the right and its associated buildings to the left (Source: Mitchell Library, State Library of NSW)

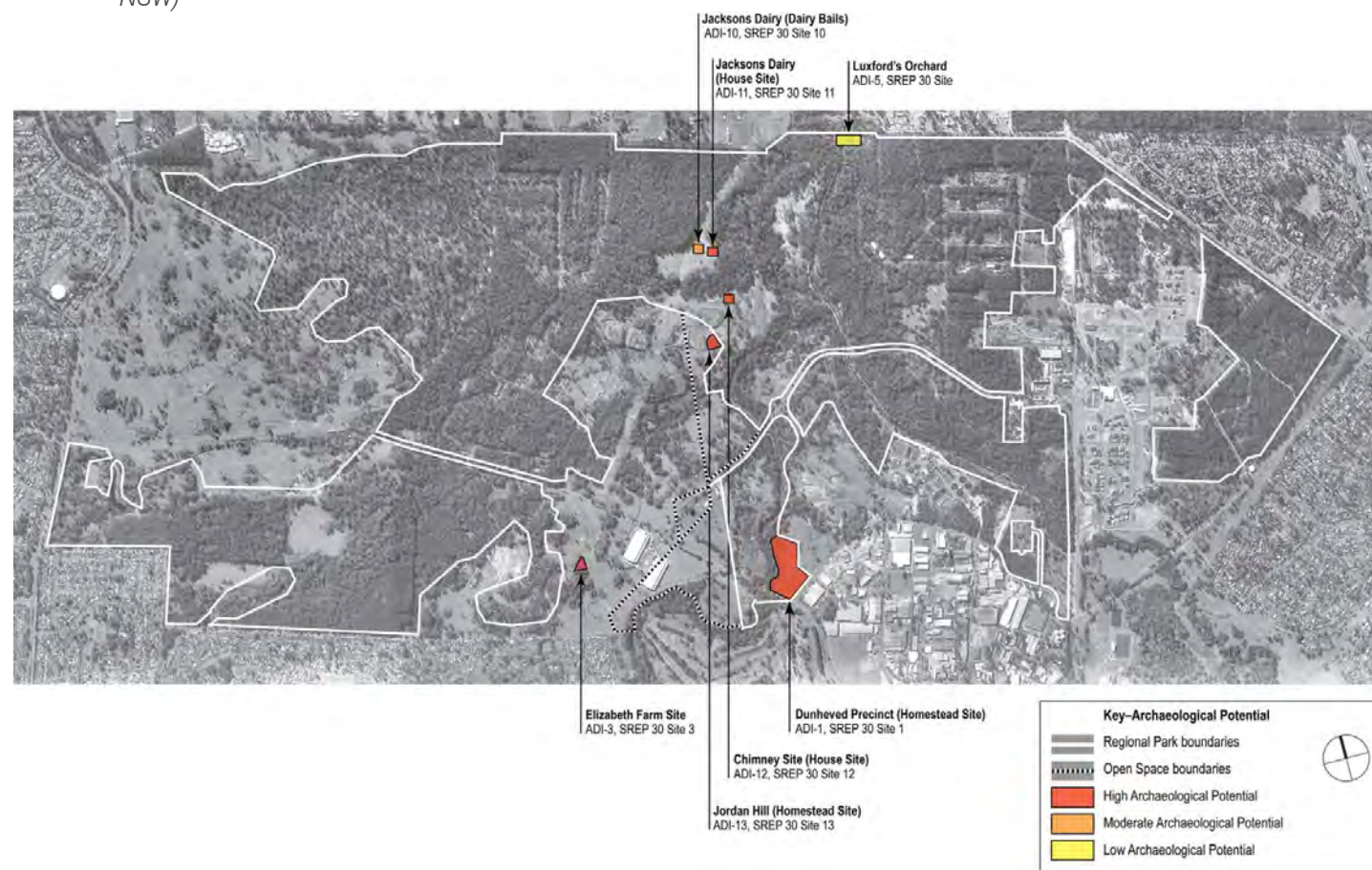


Figure 2.4.3 Location of Early European archaeology sites (source GML 2010)

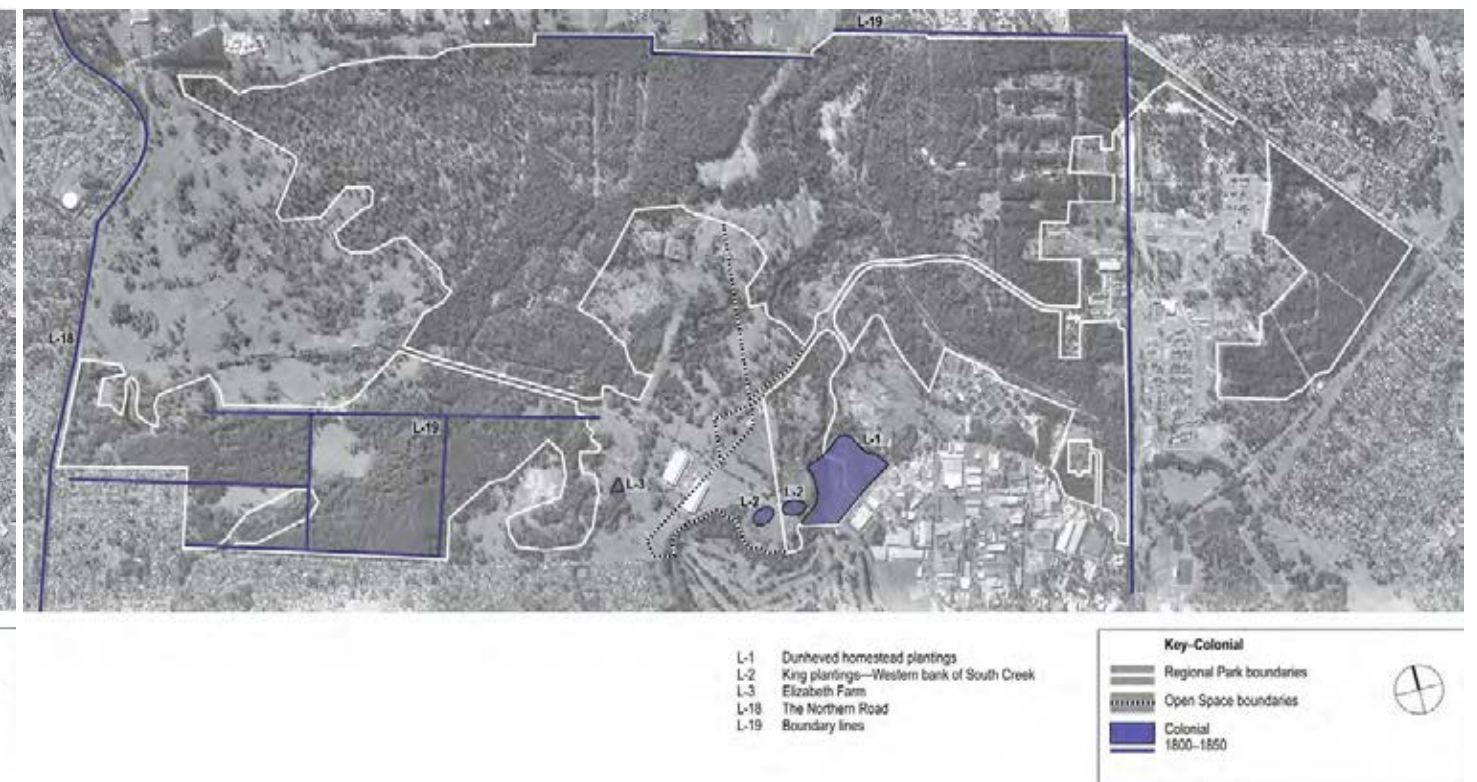


Figure 2.4.4 Location of Colonial landscape 1800-1860 (source GML 2010)

2 REVIEW

2.4 Heritage management & interpretation

Significance of individual elements

Significance of existing elements of the landscape was identified in the CMP and must be considered in the masterplan.

Existing Site Boundary

- Some portions of the present site boundary reflect historical patterns of subdivision, mainly from Colonial Phase 3 and Growth and Development Phase 4. They are a direct reflection of field boundaries which date from land grants and rural holdings. Some of these are also reinforced by differences in natural and managed landscape.

Other Boundaries within the Regional Park

- Other delineations in the landscape also reflect historical patterns of subdivision and land management. They remain in evidence through road and fence alignments and differences in the natural and managed landscape including age, density and type of vegetation and, in some cases, cleared areas.

General Topography and Landforms, Including Remnant Vegetation

- The present topography and landforms comprise an important cultural landscape that has been modified over 200 years. It recalls both the specific setting of the original colonial land grants (such as Dunheved, and also some of the former rural character of the wider setting, since lost through incremental development of the wider district.
- Dunheved is a significant remnant of a colonial farm landscape, reflecting the nineteenth century rural aesthetic with potential to shed light on early settlement patterns and early methods of agriculture.
- The existing vegetation within the park is almost exclusively re-growth, mostly dating to post-1943. The trees recall the pre-European vegetation cover but their significance as a cultural heritage feature (as opposed to a natural heritage feature) is limited (some isolated pre 1940's stands remain).
- Some aspects of the vegetation on site have been actively managed since and possibly prior to the mid-nineteenth century. These include a number cleared areas which remain clear of regrowth and a number of stands of mature eucalypts including those associated with creeklines and fencelines.

Dunheved Homestead

- The archaeological remains of Dunheved Homestead Site constitutes an in-situ record of an early colonial estate with close associations with Governor King and his family, and important evidence of the westward expansion of the colony in the early years of settlement and of early attempts at agriculture in previously unsettled areas.
- The remains of the homestead makes a highly significant contribution to the remnant cultural landscape, contributing to the legibility of the original and early settlement landscape and being an uncommon and representative example of a farm from the early colonial period.
- The homestead location and remnant cultural landscape (trees, remnant hedge and garden plantings and cleared areas) contribute to our understanding of the colonial rural aesthetic. The archaeological relics associated with the homestead have the potential to contribute significantly to our understanding of the conditions and lifestyle of colonial society.
- The visual connection with cultural plantings to the west of Dunheved (outside the Regional Park but within an area allocated as open space) is also important.
- Whilst the Elizabeth Farm site is not located within the boundary of Wianamatta Regional Park, it has been assessed as being an ancillary site supporting a major colonial estate and as such, should be considered as part of the suite of 'King Family' sites (Dunheved landscape).

2.4 Heritage management & interpretation



James and Charlotte Luxford - they ran a dairy farm (Source: Mitchell Library, State Library of NSW)



Fred Luxford with Bullock dray (Source: Mitchell Library, State Library of NSW)

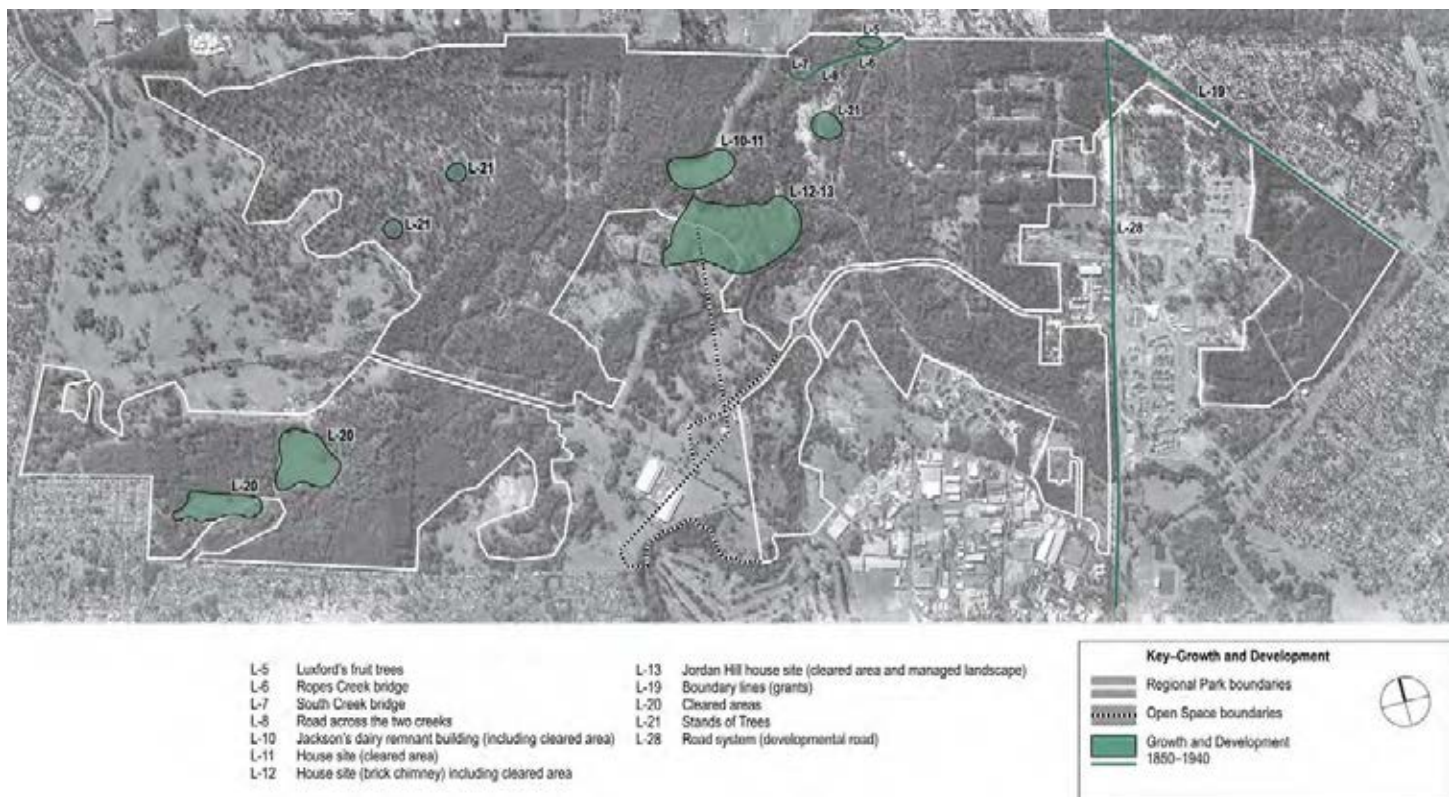


Figure 2.4.5 Location of Growth and Development Phase (1851 to 1941) heritage (source GML 2010)

2 REVIEW

2.4 Heritage management & interpretation



Thelma May Casey packing ammunition at St Marys filling factory in 1943 (source Australian War memorial)



Women workers made up 42% of munitions workers between 1942-1945 (source Australian War memorial)



Workers filling shells at St Marys filling factory in 1962 (source Australian War memorial)



Explosion of a truck carrying materials in 1962 (source Australian War memorial)

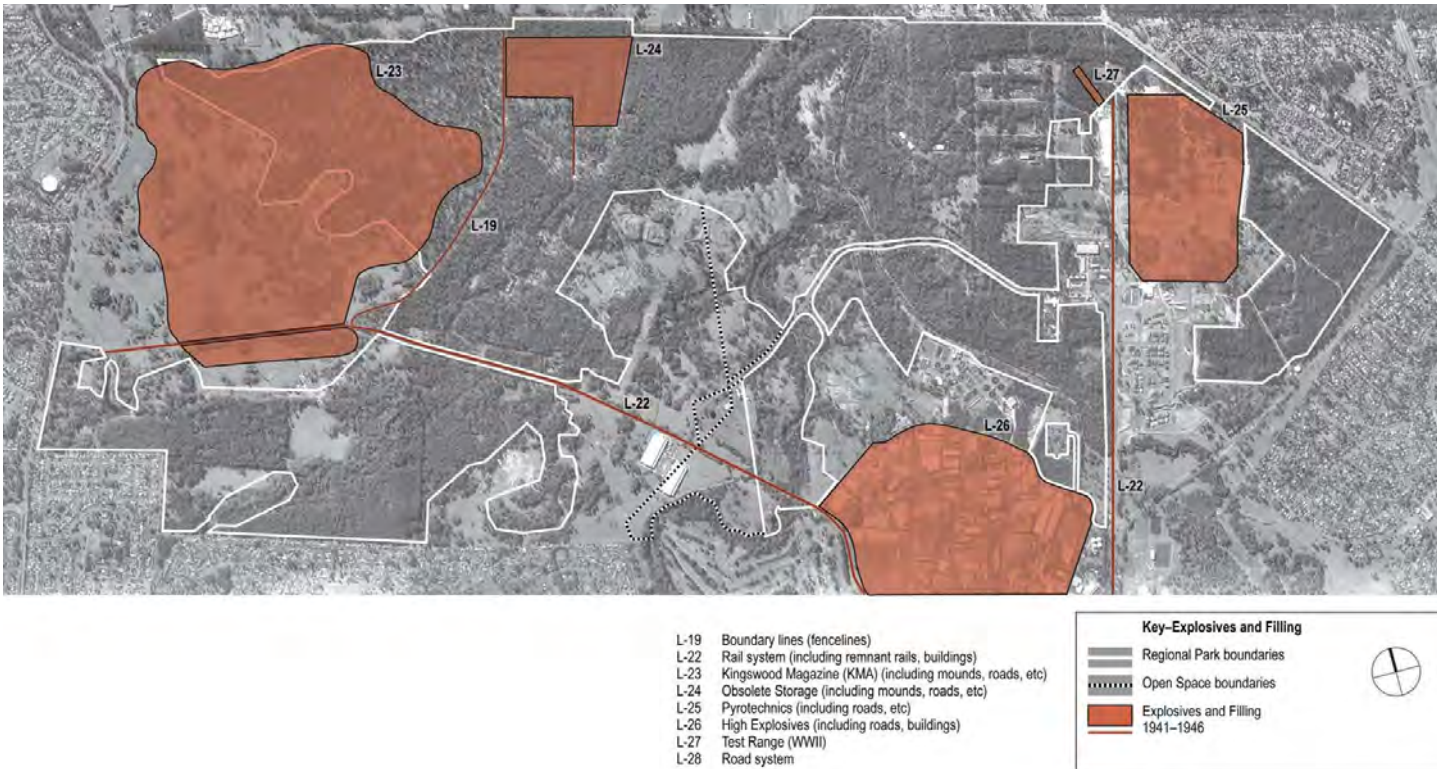


Figure 2.4.6 Location of Explosives & Filling Phase (1914 to 1946) heritage (source GML 2010)

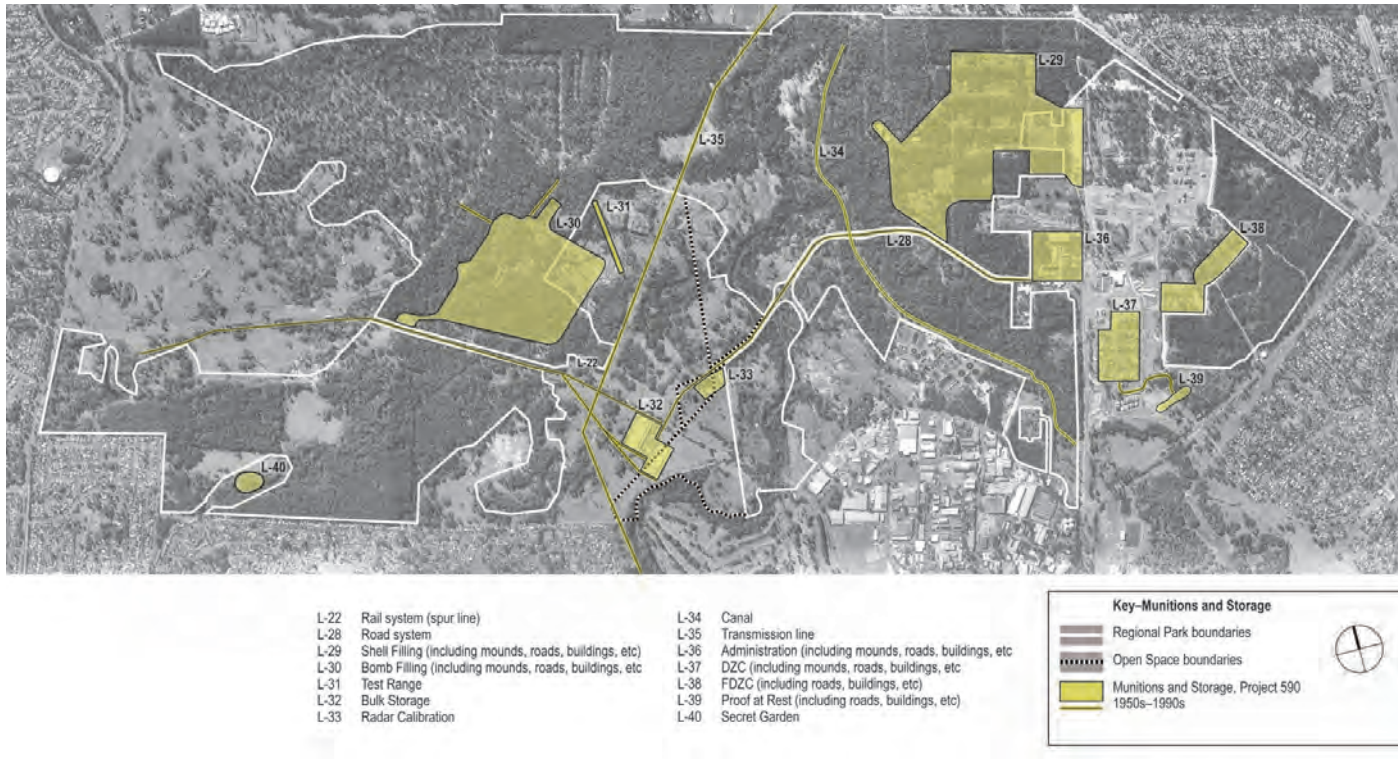


Figure 2.4.7 Location of Munitions & Storage Phase (1950 to 1990s) heritage (source GML 2010)

2 REVIEW

2.4 Heritage management & interpretation



Site Image: Exceptional significance area (Source: EP NSW)



Site Image: High significance area (Source: EP NSW)



Site Image: Moderate significance area (Source: EP NSW)



Site Image: Some significance area (Source: EP NSW)



Community action was part of conservation history and should be interpreted (Source: www.adisite.org)

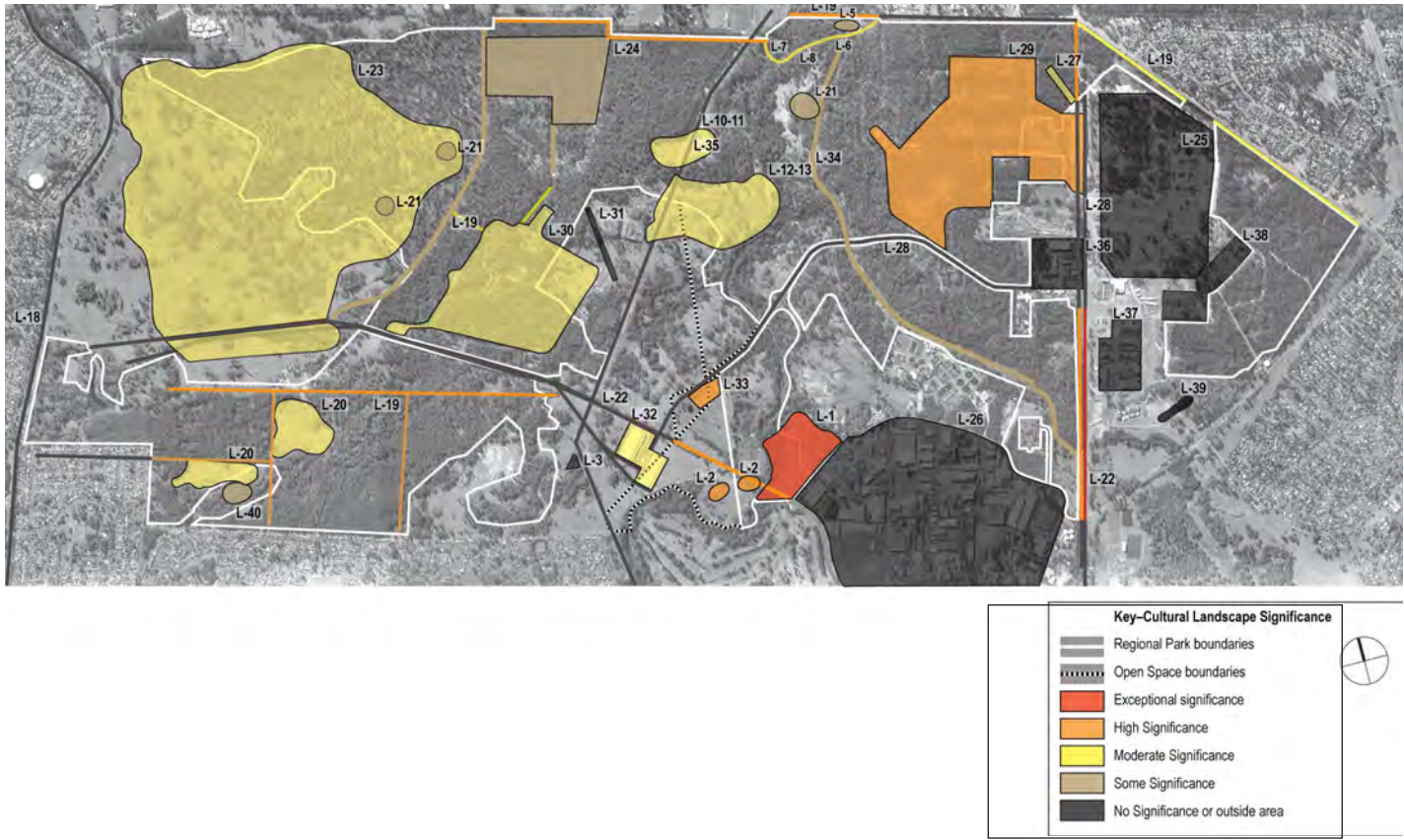


Figure 2.4.8 Grading of significance of historical archaeological sites in the Regional Park (Source: Google earth 2009 with GML overlay 2010)

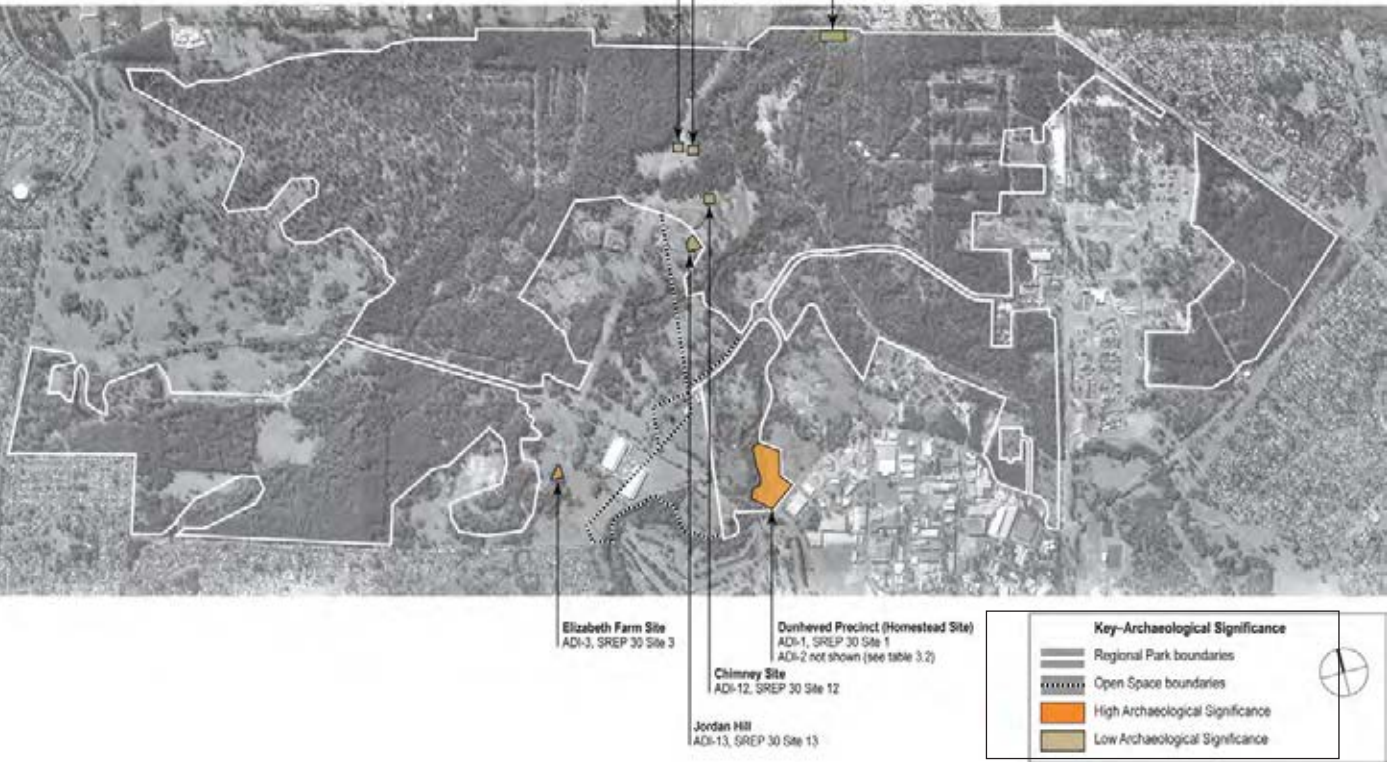


Figure 2.4.9 Grading of significance of the cultural landscape elements within and partially within the Regional Park (Source: Google earth 2009 with GML overlay 2010)



2 REVIEW

Significance of individual elements

Jackson's Dairy

- Jackson's Dairy site comprises both the above-ground ruin of the dairy bails and the sub-surface structural remains, as well as the adjacent archaeological house site.
- Archaeological relics deriving from the site may shed light on certain elements of the local area's history small-scale farming initiatives.
- The archaeological site is also within a cleared area which provides a setting evocative of the farming use of the site. These sites also represent an important (Growth and Development) phase in the history of the local area.

Luxford's Orchard (Remnant)

- Evidence of orchards and possible outbuildings associated with Luxford's farm represent continued local agricultural development from the late nineteenth to early twentieth century.

Road and Bridges from Growth and Development Phase

- The late nineteenth century road linking Llandilo to the Northern Road and the two associated bridges crossing Ropes and South / Wianamatta Creeks provides evidence of the infrastructure associated with farming during Growth and Development Phase 4 and is evocative of this period.

Chimney Site

- The chimney ruin and sub-surface structural features form the remains of a 20th century house. This house site is representative of rural regional development.
- This site is within a larger cleared landscape edged to the east by an arc of retained, mature eucalypts. This shared cleared area links it visually to Jordan Hill (see below).
- The western edge of the cleared area includes a track which also linked these properties with the outside world and also served Jackson's dairy. The group of sites in this central precinct of the Wianamatta Regional Park is evocative of the interdependence of rural holdings in the area in Phase 4.

Jordan Hill Site (NOT within Regional Park Boundary)

- Jordan Hill homestead was one of the better-known nineteenth century dwellings (the Growth and Development phase), which was demolished sometime after 1940. Archaeological features, deposits and relics may have potential to make a contribution to an understanding of the evolution and activities of an early rural homestead complex within a local rural tenancy context.
- A number of groves of deciduous trees are escapee remnants of the homestead. A number of mature eucalypts indicate managed plantings within the cleared farm setting (see Chimney Site, above). The site is listed on the Register of the National Estate.

Rail and Road Networks from Munitions Phase

- Rail and road networks provide the clearest physical indication of the disbursement of the ADI St Marys factory operations across the site and the scale of these operations.
- These transport systems include major road and rail corridors, tight networks of roads within functional areas and feeder roads between functional areas and transport corridors. Along with the remaining buildings and earthworks associated with demolished buildings, these networks provide a basis for an understanding of the processes and scale involved in munitions manufacture.

Views and Vistas

- Views and vistas are limited due to the natural topography of the site and due to the regrowth of vegetation. A number of significant historical views exist at the site (refer Figure 2.4.8 for locations):
 - View from and to Dunheved house site (L-1) and the King plantings (L-2);
 - Views between Jordan Hill (L-13) and House Site (L-12);
 - View from Jordan Hill (L-13) and House Site (L-12) to the access track to the west;

Heritage Themes

The CMP identifies a series of potential interpretation themes (storey lines) to guide the masterplan process and be integrated into ongoing design and management of improvements to the park.

A Resilient Landscape Restores

- The topography and natural vegetation of this site is the result of dramatic transformation through natural processes and human occupation and modification.
- The Cumberland Plain is the Sydney Basin's most significant geological feature and this park typifies its gentle undulating character.
- The Park represents three main geological formations, four soil types which support though modified, remnants of four Cumberland Plain ecological communities.

Wianamatta - our Mother Country

- Wianamatta Regional Park is the traditional country of the Darug. Their country was their life force, sustaining them physically and spiritually. It was carefully managed according to a complex system of beliefs and cultural protocols. Ceremonial sites, hunting grounds, wood, water, stone and native foods that were harvested and hunted within the park.
- Wianamatta Regional Park includes extensive archaeological evidence of Aboriginal occupation which is of significance to the local Aboriginal community. The site represents a tangible link to the past and evidence of the occupation of the land by Indigenous people prior to settlement by Europeans.
- The site is associated with the exploitation and use of water, food, stone and timber resources. British settlement dramatically altered the traditions and customs of the Aboriginal group that occupied this land over thousands of years. Their traditional country was also irrecoverably altered.

Living and Working this Land

- The landscape has been used to support human occupation for thousands of years. Aboriginal people exploited the natural environment and developed economies sharing and exchanging natural resources according to well established protocols.
- Several places in this park reflect different periods of this area's development. This park includes evidence of some of the earliest land grants in the colony in the form of property boundaries, fencelines, archaeological evidence and cultural plantings. Dunheved Farm is a rare and significant heritage site associated with Governor King and his family.
- The Park includes places that are associated with subsequent growth and development of the area. This includes a number of smaller cleared areas, remnant orchard plantings and house sites.
- Past land owners and their employees worked this land. Timber was cut, farms, dairies and orchards were established and often worked by several generations of the same family. The King Family farmed here over a period spanning 140 years.

Making Munitions

- The site has been associated with Australian defence from 1941 to the 1990s.
- People have worked at this site since 1940 in defence of our nation. During its peak between 1941 and 1946the St Mary's Munitions Filling Factory employed 3,600 men in construction. In 1943 the factory employed 2175 workers, a significant proportion of whom were women.
- The changes that have occurred over time by Defence on site are reflected in the small number of remnant built and cultural landscape environment as well as memories and social attachments.

Revitalisation and Conservation

- Following the closure of the site, a grassroots campaign to conserve it began. The Kangaroos and emus that had been introduced to the site thrived here following the decommissioning of the ADI factory and were much loved by locals. The Regional Park is managed and conserved by the DECCW NPWS on behalf of the people of NSW.

2.4 Heritage management & interpretation

2 REVIEW

Adaptive re-use

There are 4 remnant buildings on site from the Munitions Phase and an extensive network of remnant roads. The road and access network generally provides a significant opportunity for use in the regional park both for recreational and management access.

The Former Mine Filling building S29 (The Hulk) is centrally located in the park and offers potential to house major facilities to serve park users. Previous concept design has indicated the opportunity to create new structures within the shell of this building as a potential means of creating habitable space.

The transit stores (3 buildings) are conserved within a setting of intact roads and mounding and with buildings in generally fair condition. These offer potential for re-use to service recreational or management activities with some potential for adaptation. Retention of setting is desirable.

Summary heritage opportunities

1. Aboriginal

- Involve stakeholders in ongoing planning and management of park
- Involve stakeholders in development of interpretation
- Select sites maybe interpreted through public artworks designed by local Aboriginal people
- Key sites for the promotion and interpretation of Aboriginal cultural heritage include:
 - The 'secret garden', located in the south west of the site;
 - Bush tucker sites
 - Creek lines
 - Post-contact campsite and fishing spot; and
 - Area of Silcrete cobbles
- Use of Aboriginal names of precincts and tracks

2. Historic

Dunheved

- Interpretation of archaeological resource and cultural landscape features
- Interpretation through design and management of the landscape
- Railway corridor link potential

Jordan Hill

- Views to remnant fabric ('chimney site')
- Retention of cleared area and continued management of native tree stands located within WRP

Jackson's Dairy

- Extant Dairy bails – interpretation and signage opportunity around Growth and Development phase
- Retention of cleared area to support interpretation of agricultural use
- Retention of rural tracks

Western Regional Park Area

- Retain elements of rural landscape around hilltops to conserve views
- Retain some cleared areas to interpret grazing use of the land
- Retain significant fence and boundary lines to interpret early land grants

Central Regional Park Area

- Relationship of Dunheved to Elizabeth farm site—linkage and interpretation
- Reuse of roads and bridges

3 Munitions

Western Regional Park Area

- Interpret elements of Kingswood Magazine Area (KMA) including link to rail/road corridor
- Possible use of area as picnic facility

Transit Stores S42, S43 and S44

- One of only two locations in the park where landform, road and buildings remain
- Interpret the operations of the ADI site in general
- Retain and reuse for park-related purpose
- Public access to at least one store with an appropriate use

The Hulk and adjacent smaller building

- One of only two locations in the park where landform, road and buildings remain
- Gateway to park and associated uses
- Venue for introduction, interpretation, meetings, welcome to country

Road/rail network

- Reuse of road network (eg in Shell Filling area) to interpret site layout and operation
- Reuse of rail lines
- Connections with ADI uses outside park could be made through interpretive material

4. Recent Habitat Conservation by Community (ADI Resident Action Group)

- Integration into visitor centre
- Integration into interpretive panels
- "Time lapse" interpretation - before and after images

dPoM Desired Outcomes

- Aboriginal sites and places are protected from damage by human activities.
- Aboriginal people are involved in management of Aboriginal cultural and natural values in the park.
- Historic features are appropriately documented, conserved, managed and interpreted.
- Community and NPWS knowledge and understanding of Aboriginal and historic values within the Park is increased.
- Intact landscape units are preserved as a means of protecting Aboriginal heritage.



2 REVIEW

2.5 Access and relationship to adjoining communities

Generally the Regional Park has good potential for connections to the south through the South and Ropes Creek corridors linking through to the Western Sydney Parklands. These links have been defined in previous strategies as outlined in Figures 2.5.1 and 2.5.2 on this page. At this time links to the north are less well defined and as such future connections should be considered in ongoing management and liaison with Councils. This includes those to existing open space/ bushland areas such as Castelreagh Nature Reserve and possible NPWS managed lands in Shane's Park and Cranebrook. Other key opportunities to the north are along South / Wianamatta Creek and road corridors (Second Ave / Northern Road). Vehicular entry to the urban development will ultimately provide signaled intersections to Northern Road which will enhance commuter and recreational cycle links to the west.

Cycle and pedestrian links to existing and future cycleway and open space networks in adjoining developments and suburbs should be utilised to maximise community accessibility and use of the Regional Park.

dPoM Desired Outcomes

- There is community recognition of the park in the provision of recreational opportunities within the context of regional and local space
- There is community recognition of support for sympathetic conservation management on lands surrounding the Regional Park
- Visitors are can easily find their way to park facilities and recreational trails

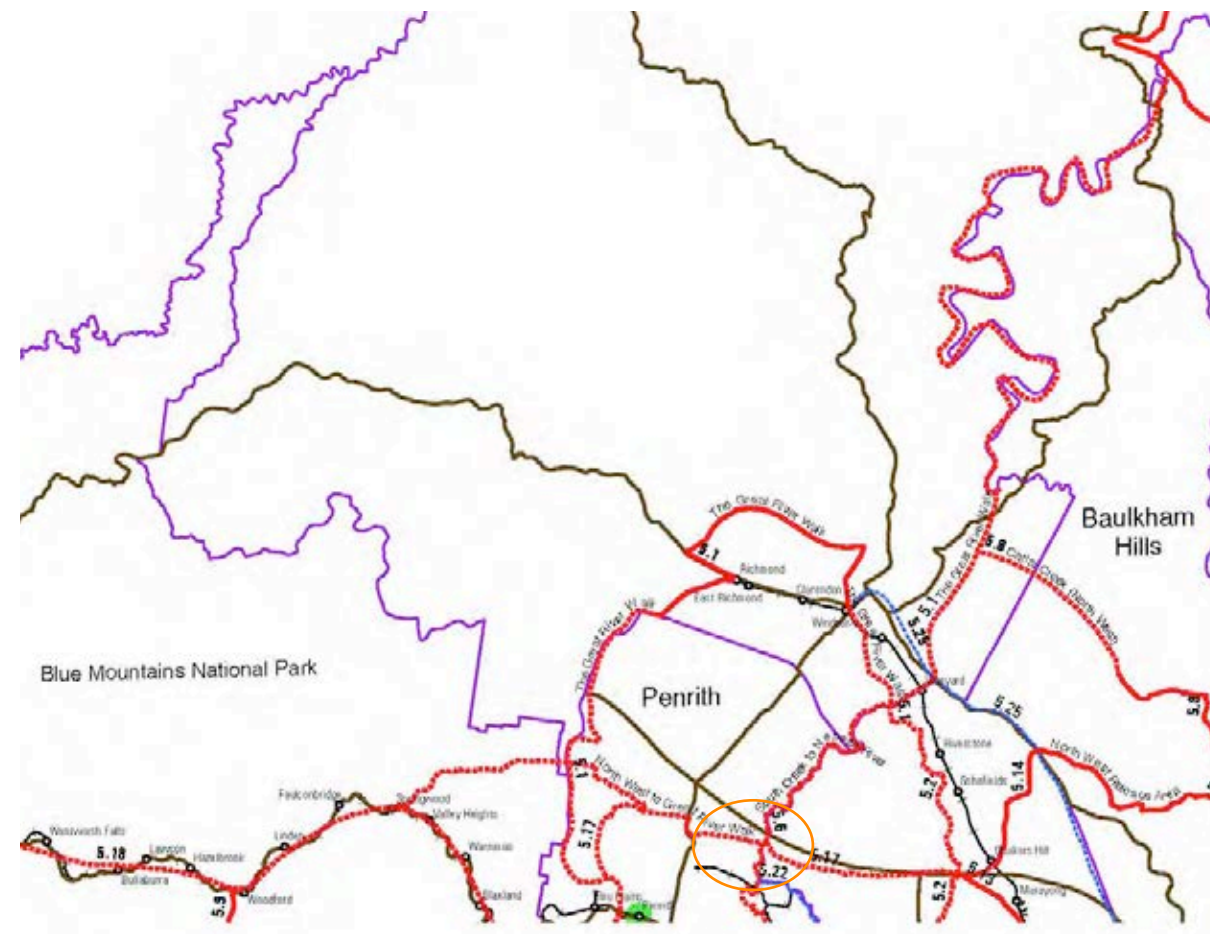


Figure 2.5.1 Sydney Metropolitan Regional Trails Network (Source DoP) ○

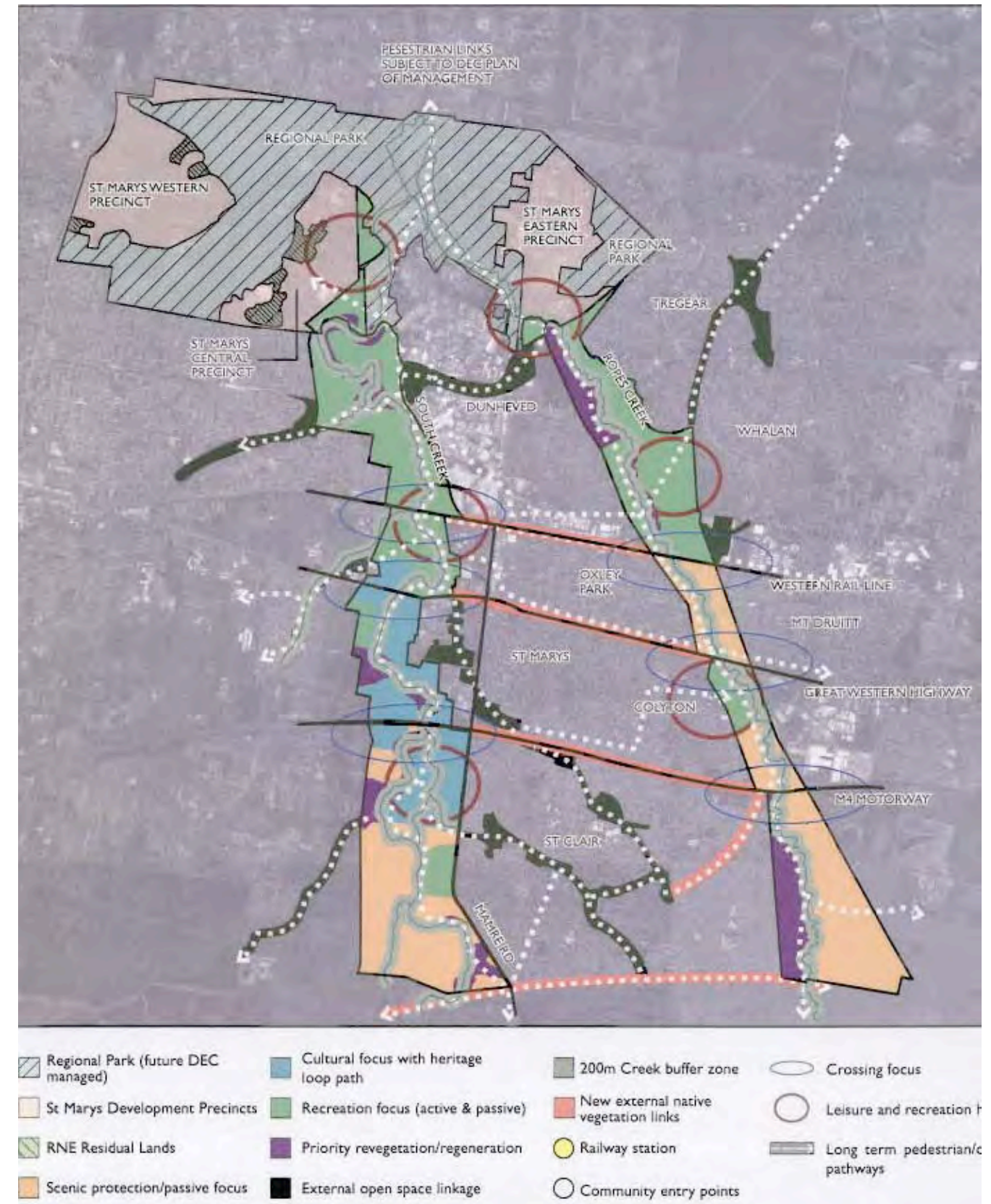


Figure 2.5.2 Ropes and South / Wianamatta Creeks Masterplan (Source DoP)

2 REVIEW

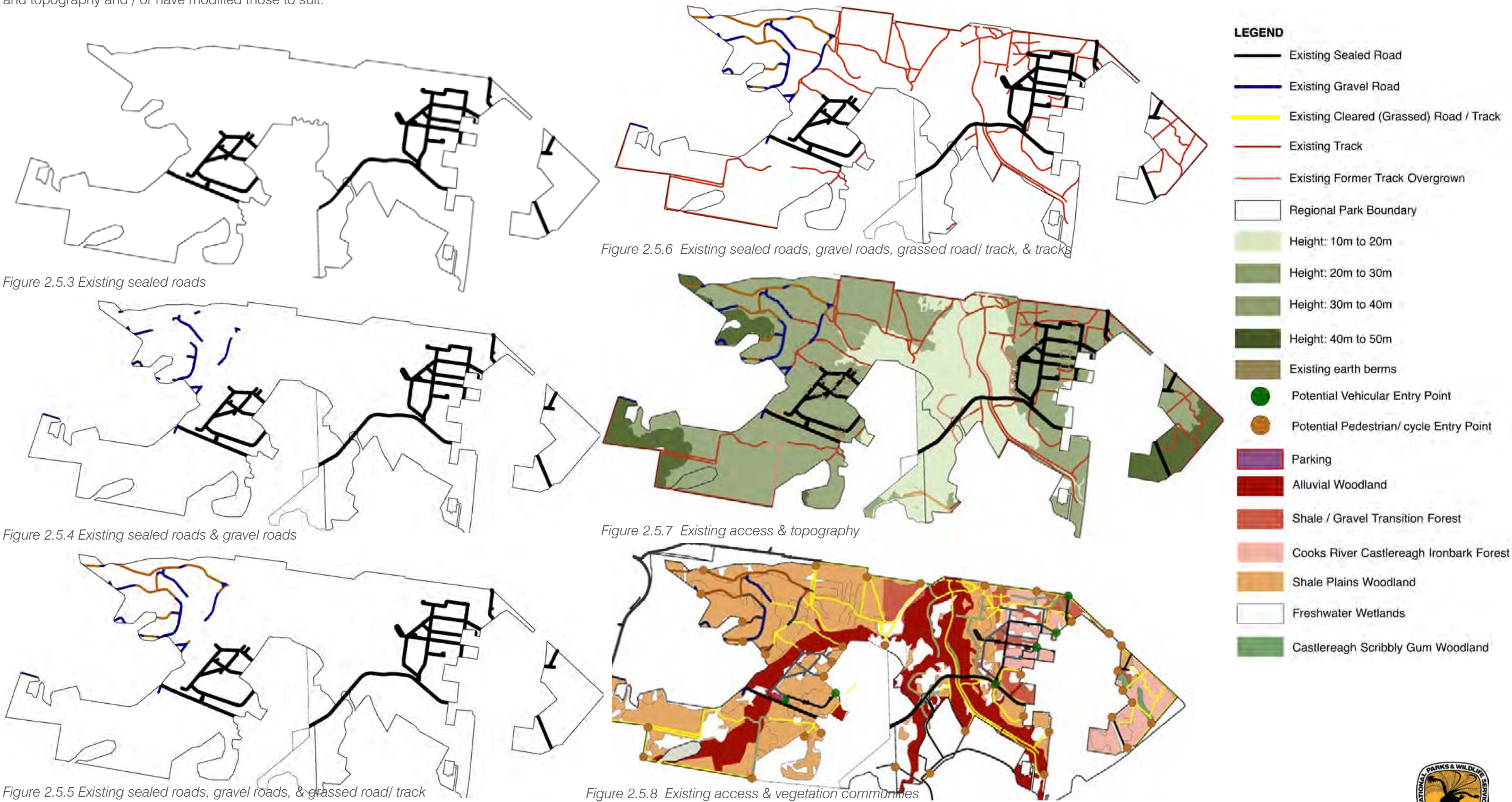
2.5 Access and relationship to adjoining communities

Existing access hierarchy

The plans this page indicate the extent of existing access on the site. The large plan on the opposite page indicates all existing access including former tracks which are now generally overgrown but have potential for use.

The existing access system has potential to largely cater for access needs for the Regional Park. Generally this access follows direct functional routes between areas of past use and takes into account constraints of drainage and topography and / or have modified those to suit.

The existing access is predominantly a legacy of the Munitions Phase of the site's use although tracks along the northern boundary and in the south west section of the site (see Figure 2.4.4) have some reference to boundaries of land grants from the Colonial Phase of site use.



2 REVIEW

2.5 Access and relationship to adjoining communities

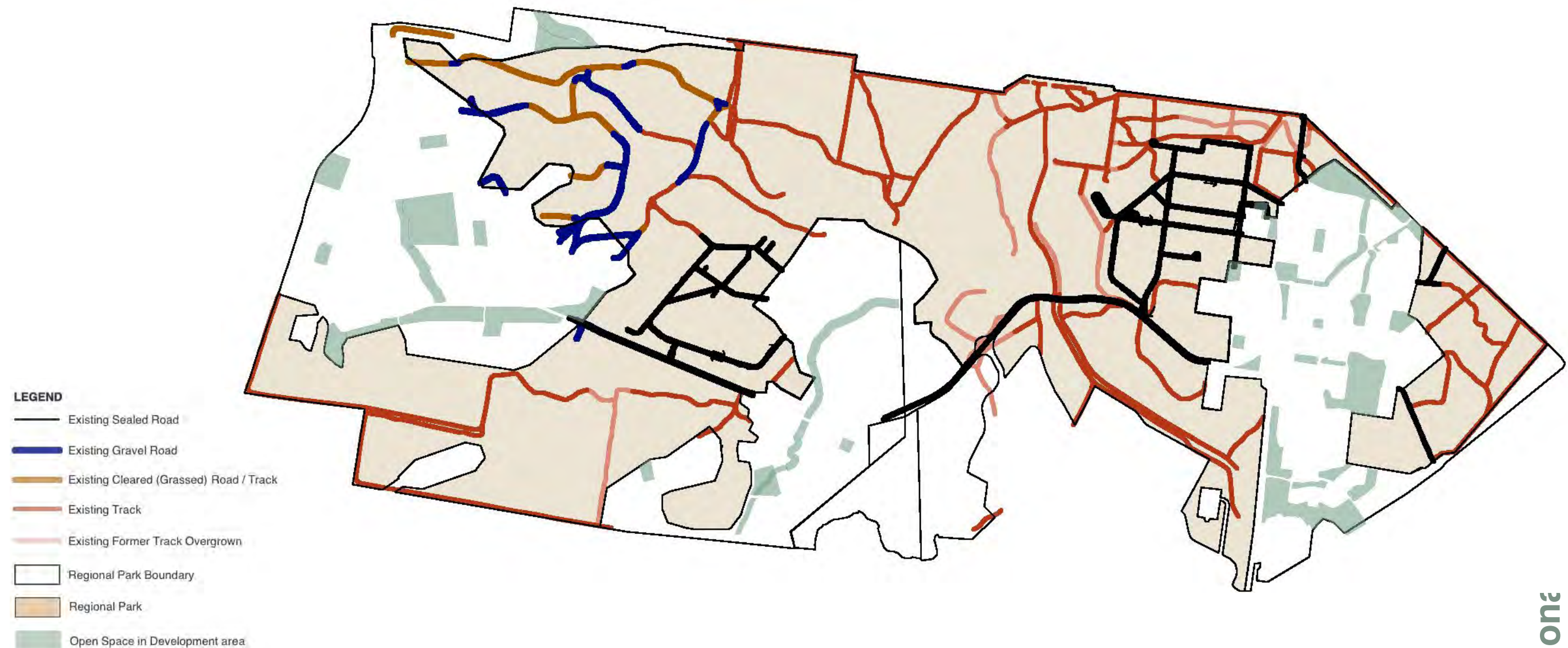


Figure 2 5.9 Compilation of existing roads and tracks on the site



Site Image: Existing sealed road (Source: EP NSW)



Site Image: Existing gravel road (Source: EP NSW)



Site Image: Existing cleared grassed road / track (Source: EP NSW)



Site Image: Existing track (Source: EP NSW)



Site Image: Existing track overgrown (Source: EP NSW)

2 REVIEW

2.6 Services and infrastructure

The site has a legacy of many layers of services and infrastructure that have evolved through different uses. The Munitions phases from 1940 till 1993 account for the majority of these.

The diagram this page illustrates the main elements identifiable on the site, and make comment as to whether these have some use / value to Regional Park development and management.

High Voltage Transmission Line

- Will remain in place in the long term
- May be relocated in alignment through the adjoining development (Central Precinct) but this will not affect alignment through park

General Power reticulation

- Combination of overhead power and some underground links through Munitions project 590 area (eg Transit Stores and Bomb Filling buildings)
- Limited potential for re-use due to age and damage during demolition
- Potential to link to new mains through adjoining development as indicated

Telecommunications

- Limited existing cabling - no potential for re-use due to age, damage during demolition, and lack of compatibility with current systems
- Potential to link to new mains through adjoining development as indicated

Water supply

- Minimal remnant reticulation - no potential for re-use due to age, damage during demolition
- Potential for roofwater harvesting to be fitted to existing buildings to be adapted / new buildings
- Potential to link to new mains through adjoining development as indicated

Sewer

- Minimal remnant reticulation - no potential for re-use due to age, damage during demolition, and lack of compatibility with current systems
- Potential to link to new mains through adjoining development as indicated

Stormwater

- Network of open channels linked by piped connections and pits in some locations
- Building demolition has created larger areas without effective drainage - existing swale function has also been impacted by demolition and remedial works
- Generally will need to allow for new drainage system focussed on surface drainage to creek systems with appropriate water quality and volume management to developed user precincts.

Earthforms

- The modification of landform to provide earth enclosures to operational and storage areas of the ADI Munitions works is a key piece of remaining infrastructure that provides links to this past use. Mounds were created through a combination of excavation to set working platforms into the ground and use of fill material to create mounded earthforms
- These earthforms are an important element for interpretation of Munitions uses and offer potential for visual and spatial definition to usage precincts of the Regional Park

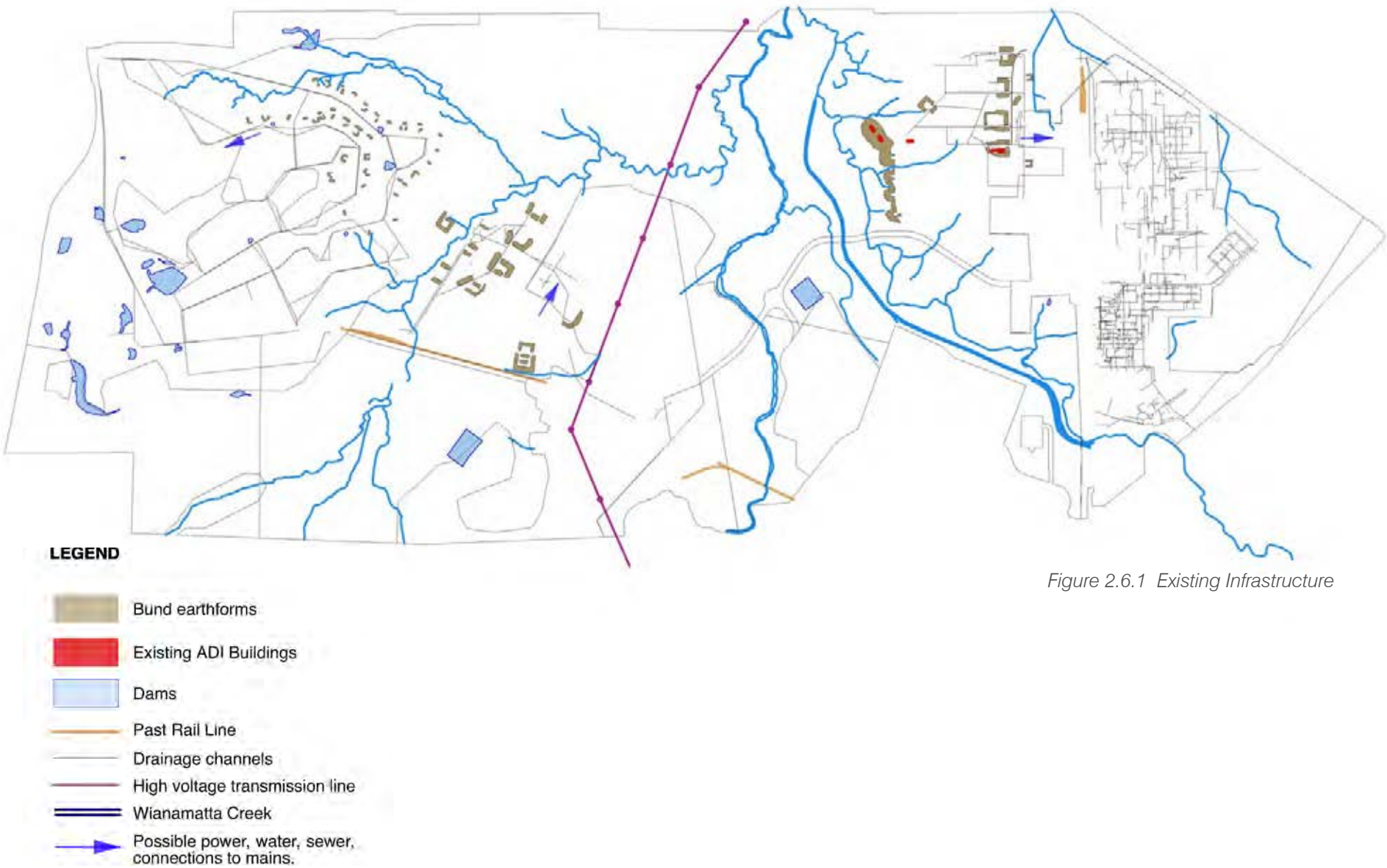


Figure 2.6.1 Existing Infrastructure



Site Image: Transmission lines (Source: EP NSW)



Site Image: Existing channel (Source: EP NSW)



Site Image: Earthforms (Source: EP NSW)

2 REVIEW

2.7 Sustainable Tourism and Recreation

The PoM provides a reasonably prescriptive position in terms of recreational uses in the Regional Park. The plan notes that:

"recreation opportunities will be concentrated at the passive end of the spectrum which will include picnicking, bushwalking, running and cycling. This is appropriate in the regional context, because of the demonstrated demand for passive recreation, and the relatively limited opportunities for such recreation in a bushland setting in the local and regional environment. In addition the current and proposed enhancements of active recreational facilities in regional and local open space will ensure that more active recreational pursuits are adequately catered for elsewhere in the area" (dPoM NPWS 2007).

The limitation of recreational scope is primarily based on the reality that of the 900ha of Regional Park approximately 828ha is listed on the Register of the National Estate for the presence of rare and regionally significant plant and animal species, the presence of significant remnants of native vegetation of the Cumberland Plain, and significant examples of Aboriginal and European heritage. This includes archaeological sites associated with the King family (including Dunheved Homestead site, Elizabeth Farm site, and the Pines planted on the western site of South / Wianamatta Creek).

In this context the plan identifies that:

"the park provides an excellent opportunity for the community to experience and learn about the Australian bush, and the Cumberland Plain and its endangered biodiversity in particular".

The PoM in section 6.2 provides a broad zonation of potential usage of the park in relation to the significance of habitat and the related carrying capacity of the land. Also the plan specifically identifies the following uses as suitable for the park:

- | | |
|----------------------|--|
| • Bushwalking | • Education - including controlled overnight stays |
| • Picnicking | • Fitness and health |
| • Cycling | • Research and Monitoring |
| • Commercial Tourism | |

Further to this core listing the masterplanning process has through further appraisal of the site and various consultative forums identified that ongoing management of the park should enable opportunities for engagement with partners including the private sector and the community to provide new visitor experiences. Such experiences should be environmentally, socially, culturally, and economically sustainable and might include:

- Events- such as concerts festivals, adventure challenges, eco-events
- Partnerships to achieve conservation objectives, enhance visitor experiences, and increase understanding of Regional Parks values - for example, Aboriginal people, other land managers, tourism industry, research institutions, and the private and not for profit sectors
- Private fitness training- use by personal trainers for fitness activities including health, yoga, meditation etc.

Further the PoM identifies the following uses as deemed to be inappropriate within Wianamatta Regional Park:

- Camping
- Dog walking
- Horse riding
- Skateboarding, rollerblading, and similar facilities

Figure 2.7.1 this page provides an appraisal of potential locations of uses as identified in the PoM based on the parameters identified in Figure 2.7.2 on the following page. Figure 2.7.2 provides an evaluation of the suitable uses/activities as identified in the PoM against several key criteria aimed at evaluating the range of facilities that will be needed, the interrelationship of uses, capacity to stage implementation etc. The criteria include:

1. Identification of the facilities, and infrastructure required
2. Identification of the preferred landscape and visual setting / characteristics
3. Relationships with other uses and other park elements
4. Provision of use in the local area - potential user catchment
5. Potential negative/positive impacts on the site and the local area.
6. Potential for staging of implementation
7. Management support required

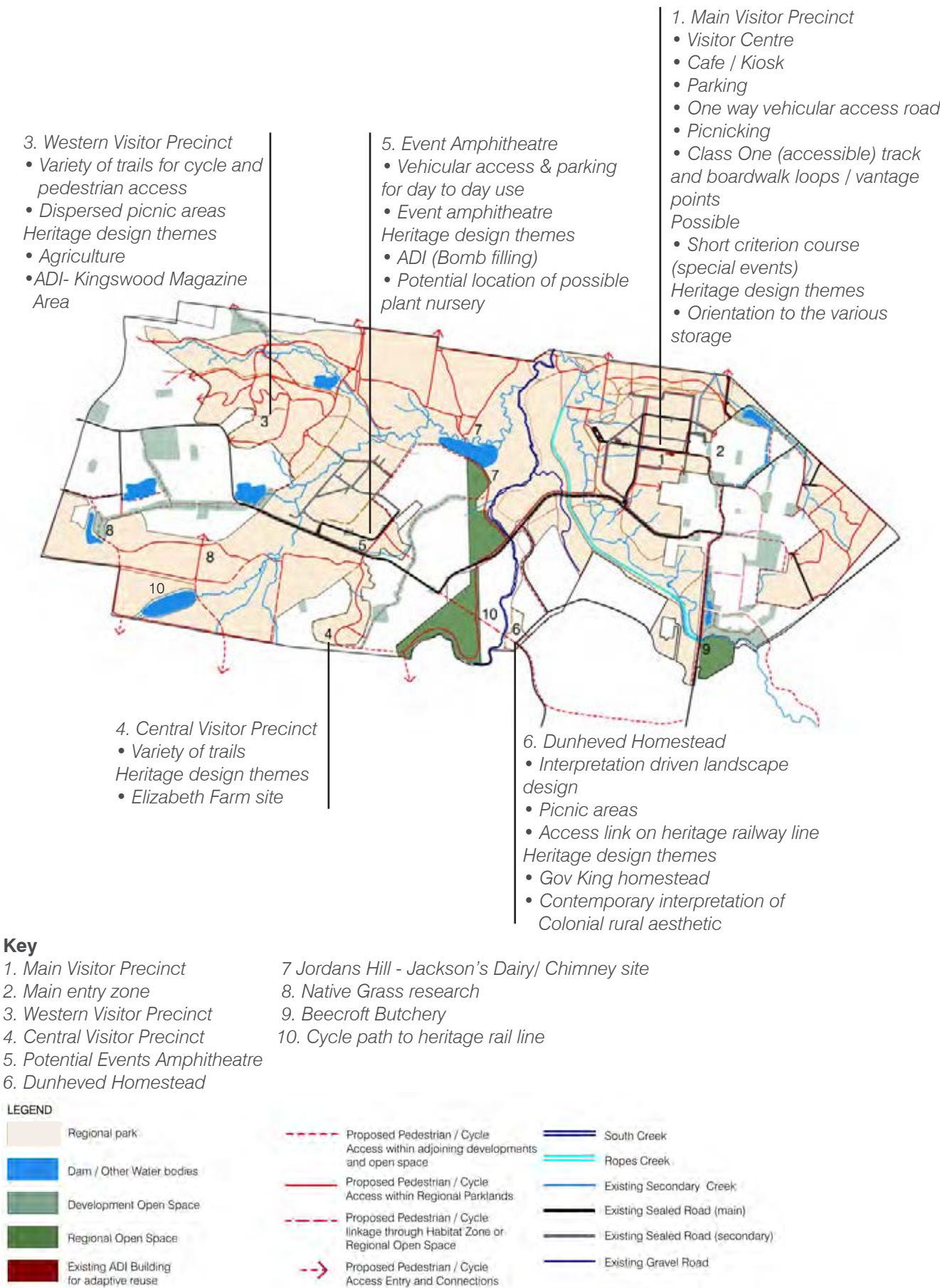


Figure 2.7.1 Appraisal of potential locations of uses based on PoM scope of uses

2 REVIEW

2.7 Sustainable Tourism and Recreation

Evaluation of Recreational and Community Uses

Facilities, and infrastructure	Preferred landscape and visual setting	Relationships with other uses and park elements	Provision of use in the local area - potential user catchment	Potential negative/positive impacts	Potential for staging	Management support required
BUSHWALKING						
<p>Network of trails that may provide:</p> <ul style="list-style-type: none">- point to point access within or across park- connections to nodes or other points of interest-recreational loops of varied length and difficulty <p>Variety of surfaces reflecting AS2156 Walking Tracks hierarchy:</p> <p>Class 1 All Access Track</p> <p>Class 2 Graded Track</p> <p>Class 3 Walking Track</p> <p>Class 4 Hiking Track</p> <p>Class 5 Marked Route</p> <p>Class 6 Unmarked Route</p> <p>(Note: lack of gradient to site will limit provision of full range - mainly Class 1-3)</p>	Variety of settings that represent the landscape types on site and provide visual interest for users	<p>Provides access to the various user precincts within the park</p> <p>Extends user access from parking facilities</p> <p>Potential to link the various local communities both existing and future</p>	<p>Some existing provision - Whalan / Tregear Reserves</p> <p>Potential for both local and regional use to extent of potential trails and expansive bushland context</p>	<p>Rubbish dropping</p> <p>Erosion on heavily used tracks</p> <p>Management of drainage</p> <p>Potential for trail bike access at park boundaries</p> <p>Potential for conflicts on shared tracks</p> <p>Can add to local access network to provide holistic / coordinated resource</p>	<p>Good potential for staging - target effective loops taking advantage of established amenity in shorter term</p>	<p>Boundary / trail bike access (Councils / Police / Community)</p> <p>Planning and implementation of access beyond Regional Park</p> <p>As above</p> <p>Possible involvement of organised user groups</p>
MOUNTAIN BIKING						
<p>Network of trails that may provide:</p> <ul style="list-style-type: none">- recreational / cycling loops of varied length and difficulty- connections to nodes or other points of interest	Variety of settings that represent the landscape types on site and provide visual and topographical (grade) interest for users	As above	Limited off road cycling opportunities on large scale in district	As above	As above	As above
ROAD BIKING						
<p>Criterion Tracks can range from 2-5km on asphalt road surface. Using existing roads within the main ADI zone adjoining the Ropes Crossing community a track of around 2km could be configured</p>	<p>Settings can vary from urban to natural - however a bushland setting with ADI infrastructure remnant character would be a very individual experience eg. the zone containing remnant ADI roads adjacent Ropes Crossing</p>	<p>Would require temporary closure of access roads - preferable to do in non peak use</p>	<p>Existing formal courses at Bankstown and Sutherland</p>	<p>Would require temporary closure of access roads - impact on general recreational use</p> <p>Would compliment off road cycle use of site</p> <p>Potential for informal use of roads integrated with adjoining urban development roads for road cycling with lesser impact</p>	<p>Could be implemented with minimal infrastructure</p>	<p>Necessary involvement of organised user groups</p>
PICNICKING						
<p>Provision of facilities at a number of levels from high (BBQ shelters and picnic shelters) to low (simple table / bench)</p>	<p>Provision of picnic facilities in a variety of settings that are of good amenity and assist users in understanding site</p> <p>Major facilities could be located at several locations which are separately accessible and provide different experiences eg. the zone containing remnant ADI buildings adjacent Ropes Crossing and western area accessed from the western urban development precinct</p>	<p>Should relate to combination of vehicular and pedestrian access catering for varied types of users from elderly and families to those happy to ride / walk to a destination</p>	<p>Limited local opportunities for picnicking in expansive bush setting with added character of cultural heritage</p> <p>Nurranginy at Blacktown provides comparable gathering opportunities</p>	<p>Rubbish movement</p> <p>Desire for close vehicular access parking</p>	<p>Good potential for staging / phased implementation as user demand grows</p>	<p>General maintenance by NPWS</p>



2 REVIEW

2.7 Sustainable Tourism and Recreation

Evaluation of Recreational and Community Uses

Facilities, and infrastructure	Preferred landscape and visual setting	Relationships with other uses and park elements	Provision of use in the local area - potential user catchment	Potential negative/positive impacts	Potential for staging	Management support required
EDUCATION						
Outdoor gathering spaces in proximity to sheltered / indoor spaces that can provide for outdoor teaching Internal displays / visitor centre covering the range of site interpretational themes External interpretive points identifying specific point / factors of interest that are part of a broader educational / experiential walk	Primary facilities in Visitor Centre for Regional Park Shelter / protection from summer sun to external education spaces Location specific interpretation to be located to optimise understanding	Educational interpretation integrates with loop track systems with potential for progressive experiences Some outdoor learning spaces should relate to main internal displays / visitor centre	Can provide facility of individual identity and value related to combination of natural and cultural values that are able to be expressed	Fixed elements can become static in their benefit and interest once viewed - challenge for research and design Fixed educational interpretation for organised groups (schools etc) is equally effective for casual park users	High potential for staged implementation of interpretation Ideal to have a degree of interps in place for initial park opening	Involve Aboriginal groups in their interpretive processes and ongoing educational activities on site
TOURISM						
Interpretive / educational experiences as for education Potential for overnight stays (eg camping within existing sheds or externally) for organised groups Enable opportunities for engagement with partners including the private sector and the community to provide new visitor experiences Identify opportunities for visitor experiences that are environmental, social, culturally and economically sustainable and that demonstrate leadership in environmental sustainability	Experience of a “different” landscape and character - through bushland setting and remnant industrial infrastructure Transit stores(S42, S43 & S44) and mine filling building (S29) Earth mounds in shell filling area	Educational interpretation integrates with loop track systems with potential for progressive experiences	Limited opportunities of similar character in district	Tourism / commercial activities should not overwhelm or compromise general public use	Good potential for staged implementation and use of temporary facilities in short term	Potential licenses to external operators Potential to involve Aboriginal groups
NATIVE PLANT NURSERY						
Internal work sheds and operational areas External spaces for preparation , propagation and holding	Must have reasonable solar access Possible location adjoining Central urban development precinct which will have an employment landuse focus - possible complimentary Regional Park (NPWS) private sector partnership	Could compliment visitor centre / cafe Could compliment external commercial nursery	Greening Australia run nursery currently at Nurrangingy (with licence by Blacktown Council)	Access for larger vehicles and related habitat and recreational impacts needs to be considered Can play role in park implementation Will draw visitors in additional to adding to experience of general visitation	Good potential for staged implementation and use of temporary facilities in short term	Potential license to external operator

2 REVIEW

2.7 Sustainable Tourism and Recreation

Evaluation of Recreational and Community Uses

Facilities, and infrastructure	Preferred landscape and visual setting	Relationships with other uses and park elements	Provision of use in the local area - potential user catchment	Potential negative/positive impacts	Potential for staging	Management support required
EVENTS						
Large open outdoor gathering spaces in proximity to toilets and vehicular access / parking for larger crowd events – such as concerts, festivals, adventure challenges, eco-events	Open grassed areas secluded from development sitting within bushland for larger gatherings Variety of different sized spaces and settings for smaller events	Avoid major impact on day to day use Major (eg annual) events - some impact acceptable	Limited availability of other large spaces in bushland setting (eg Nurranginy - Blacktown)	Noise - proximity to residences and other park uses / impact on fauna need to be considered Rubbish / cleanup Degradation of grassed/ other surfaces	High potential for staging and for temporary facilities setup (eg stages, toilets) - provide event power	Support for event management will be required - events likely to be run by organised groups to provide required coordination / management
FITNESS TRAINING						
Fitness training – opportunity to explore the potential for personal trainers to provide fitness activities – including health – yoga, meditation etc	Smaller sized grass clearings Trail network Grassed areas with shade	Morning and evening peaks of use	Use of Council parks in urban areas is common	Overuse of areas - degradation of surfaces Noise	High potential	Must be managed by operators
PARTNERSHIPS						
Partnerships for eg. – Aboriginal people, other land managers, the tourism industry, research institutions, the private and non-profit sectors to achieve conservation objectives, enhance visitor experiences and increase understanding of the regional parks values.	Bushland settings Regenerating bushland Heritage precincts	Maintain flexibility to not unduly impact / restrict general public use	Local Govt increasingly pursuing partnerships	Perceived loss of public ownership / access to park areas (monopolisation of space by partners)	High potential	May be jointly undertaken or with major role by partnership party

dPoM Desired Outcomes

- A variety of informal visitor opportunities are available that encourage appreciation of the natural and cultural environment and enjoyment of the park.
- Facilities are designed and managed to provide a satisfying and informative visitor experience and minimise impacts.
- Visitor use is compatible with the management direction of the Park and is ecologically, economically and socially sustainable.
- Appropriate recreation and visitor opportunities are provided within the Park, that take into account the proximity and nature of regional and local open space.
- Future planning of recreation activities takes the regional context into account.
- A sustainable macrofauna population is retained in the Park and linked to visitor experience.
- Where appropriate, the impact of the macrofauna fencing on visitor experience is minimised.
- Opportunities exist for sustainable and appropriate commercial recreation activities.
- Construction of new facilities complies with the conditions of any relevant Site Audit Statements and the Contamination Management Plan.

Other desired outcomes identified;

- Enable opportunities for engagement with partners including the private sector and the community to provide new visitor experiences
- Identify opportunities for visitor experiences that are environmental, socially, culturally and economically sustainable and that demonstrate leadership in environmental sustainability.



2 REVIEW

2.8 Visitor facilities and site management

Facilities

The recreational use of the Regional Park and ongoing NPWS management of the park require that certain facilities be provided. These facilities should enhance the recreational experience of the park while observing the full range of principles developed in the PoM related to conservation and sustainability.

Based on the PoM range of acceptable uses to be pursued in the park the following facilities can be expected to be appropriate to consider:

Buildings / structures

1. Central (and focal) visitors centre located near the entry (or main entry) to the park
2. NPWS office (potentially located adjoining or as part of visitors centre)
3. Focal interpretive display (ideally in the visitors centre)
4. Cafe / kiosk and toilet facilities serving main visitor area
5. Picnic and BBQ shelters located adjoining main usage areas at a range of locations
6. Internal event space for site based or community events
7. Meeting rooms for stakeholder and NPWS use
8. Smaller scale toilet facilities serving dispersed recreation areas
9. NPWS maintenance depot
10. Native plant nursery

Parking

11. Main parking area serving central facilities
12. Dispersed parking facilities to user precincts accessible by vehicle

Spaces

13. Open grassed external event spaces of a range of sizes / scales

Signage

14. Main entry signage
15. Precinct identification signage
16. Vehicular wayfinding signage
17. Pedestrian / cycle wayfinding signage through site
18. Interpretive signage through site

Paths / Tracks

19. Shared pedestrian cycle track
20. Pedestrian walking tracks of varied levels (that is width and surface)
21. Cycle tracks of varied levels (that is width and surface)
22. Maintenance access tracks (supplementary to dual use of other access tracks)

Site Management

The nature of the Regional Park site including its dispersed expansive area and segmentation provides a number of challenges for management. Key issues to be addressed in development of masterplan include:

1. Edge condition and management

- The park has approximately 37km of boundary to adjoining uses and land managers.
- Planning and management could aim to control the amount of boundary that has to be intensively managed (eg high security fencelines) and associated capital and maintenance costs
- Planning and management could aim to provide where possible a buffer between highest priority habitat areas and adjoining land managers

2. Public access management

- Although the park is dispersed in nature and is likely to have several separate usage precincts - planning should minimise number of vehicular entries to keep ongoing management / control of entries (eg potential gate closure) to a sustainable level
- Controlled vehicular access enables managed (eg paid) events to be catered for
- Pedestrian and cycle access could potentially be provided from a number of locations given the extensive park boundary - this needs to be reconciled against management of trail bike access

3. Maintenance access

- The extensive network of existing access will be used for public, maintenance access and fire management
- Certain recreational links (2.5m width and over) offer potential to be used for maintenance access by light NPWS vehicles. Dedicated maintenance routes should supplement public access routes in particular in those areas where public access is to be limited

dPoM Desired Outcomes

- Commercial and other non-park uses have minimal environmental impact and contribute to the aims of Park management.
- Commercial and other non-park uses contribute to understanding and enjoyment of the values of the Park
- Commercial and other non-park uses are potentially revenue-generating opportunities and provide opportunities for employment and training, where appropriate.
- Management facilities adequately serve the needs of NPWS objectives, strategies and operations and have minimal environmental impact.
- New management facilities will consider and apply the principles of ecological, economic and social sustainability.
- The conditions of relevant Site Audit Statements and the Contamination Management Plan are complied with prior to the construction of any facilities and/or infrastructure in contaminated areas of the Park.

2 REVIEW

2.9 Planning framework

Regional Parks requirements

The PoM identifies that Regional Parks are reserved under the NPWS Act to protect and conserve areas in a natural or modified landscape that are suitable for public recreation and enjoyment. Under the Act, Regional Parks are managed to:

- i. Provide opportunities, in an outdoor setting, for recreation and enjoyment in natural or modified landscapes;
- ii. Identify, interpret, manage and conserve the Park so as to maintain and enhance significant landscape values;
- iii. Conserve natural and cultural values;
- iv. Promote public appreciation and understanding of the Park's natural and cultural values;
- v. Provide for sustainable visitor use and enjoyment that is compatible with the conservation of the Regional Park's natural and cultural values; and
- vi. Provide for the sustainable use (including adaptive reuse) of any buildings or structures or modified natural areas having regard to conservation of the Regional Park's natural and cultural values.

The management of Wianamatta Regional Park will be in accord with the National Parks and Wildlife Act 1974. Consistent with this, management of the Park under the POM will also comply with:

1. Sydney Regional Environmental Plan 30 – St Marys;
2. St Marys Environmental Planning Strategy 2000;
3. Clause 11 of the St Marys Development Agreement (2002); and
4. The Macrofauna Management Plan (2004) for the St Marys Property.

St Marys Development Agreement

It is an obligation of the St Marys Development Agreement that the Plan of Management give due consideration to the inclusion of the following principles:

1. The principle of environmental sustainability, which will involve:
 - the preservation, protection and rehabilitation of remnant bushland;
 - the preservation, protection and improvement (where practicable) of the biodiversity values of the Regional Park, recognising the importance of the Regional Park to the local area, including the Land; and
 - the retention of fauna and flora, recognising that sections of the Regional Park may be used for macrofauna conservation in accordance with a macrofauna management plan to be prepared and implemented by the Developer.
2. The principle of economic sustainability, which will involve:
 - the development of the Regional Park to minimise capital and maintenance costs;
 - the making of capital improvements to maximise employment and training opportunities;
 - maximising the opportunities to access external funding and grants for the Regional Park; and
 - the identification of appropriate revenue generating opportunities relating to the Regional Park and the use of that revenue to offset the capital and maintenance costs of the Regional Park.
3. The principle of social/community sustainability, which will involve:
 - maximising educational opportunities for school and community groups;
 - highlighting aboriginal heritage at appropriate locations within the Regional Park;

- involving community groups in the rehabilitation and maintenance of the Regional Park; and
- maximising the opportunities for community interaction and passive recreation within the Regional Park.

The St Marys Development Agreement also requires that the Plan of Management will:

1. Identify a set of clear management objectives which reflect the principles of plans of management in accordance with the National Park and Wildlife Act 1974, and the social and economic context of the Regional Park;
2. Identify a set of clear management objectives in relation to the Regional Park reflected from the principles and obligation of the St Marys Development Agreement, SREP 30 and EPS 2000;
3. Identify a set of priority works which are essential to the achievement of the objectives of the Plan of Management
4. Assesses the relative priority of identified works in relation to short- and long-term objectives of the Plan of Management, and
5. Is accompanied by a realistic and pragmatic budget and time frames to undertake those works.

Wianamatta Regional Park Plan of Management

The PoM identifies the following key actions in section 6.0 Visitor Opportunities and Education. These include or will be informed by this Masterplan and supporting CMP.

- 6.2.1 Prepare a Master Plan for Park facilities and infrastructure with a focus on recreation opportunities in natural settings, ensuring that this Plan is consistent with the Conservation Management Plan, the Visitation Strategy, the Fire Management Strategy, the Bush Regeneration Plan and the listed values on any RNE listed land, and is environmentally, economically and socially sustainable;
- 6.2.2 Prepare a Visitation Strategy that is consistent with the Conservation Management Plan, the Fire Management Strategy, the Bush Regeneration Plan and the listed values on any RNE listed land, and is environmentally, economically and socially sustainable;
- 6.2.3 Prepare an Access Plan that considers priority access areas, minimisation of visitor impacts on the Park environment, NPWS management facilities and operations as well as threats to visitor's safety from macrofauna, management of possible residual contamination and development of adjoining residential areas;
- 6.2.4 Plan visitor access within the constraints of environmental sustainability, public safety and macrofauna management;
- 6.2.5 Provide controlled visitor access to the eastern sector of the Park to minimise the impacts on threatened plant species;

3.0 SYNTHESIS AND EVALUATION

3 SYNTHESIS AND EVALUATION

3.1 Consultation

Consultation with a number of stakeholder groups has been undertaken during the development of the masterplan. This has informed confirmation of constraints and opportunities to be addressed in addition to enabling forums for discussion and refinement of masterplanning strategies. Key points from consultations are outlined following:

Community

Community flyer / questionnaires and a series of workshops and consultation provided the focus of liaison with the community during the masterplan process. These aimed to promote community understanding and appreciation of park values and management strategies, allow community input to the process, and promote the role of sympathetic conservation in surrounding areas (in ensuring the Park's long term sustainability).

1. Community flyer

A questionnaire was distributed to local residents and posted on the Ropes crossing web site. Key responses by the general community included;

1. Natural values highest priority - conservation of endangered communities
2. Minimal infrastructure in order to maintain "Naturalness" is desirable
3. Some limited Vehicular access and parking is needed
4. Education and research to protect endangered communities
5. Key active recreational usages - bush walking and cycling
6. Picnic tables and toilets to be provided
7. Weekends between 9-3pm expected high usage

2. Community Workshops

Two evening community workshops were held including;

1. 16th September 2009

The Study team introduced project, then outlined initial mapping of existing site and preliminary principles derived from this exercise. Followed by a general discussion of preliminary principles ;

Key Items raised were:

- Concern for ongoing protection of endangered habitat and flora and fauna communities
- Key locations of bio-diversity to be "no go" zones or have limited access only
- Connectivity between the precincts should allow for regeneration areas – preserved areas to be maintained. ie closed off and then restricted to access
- Entry points to core recreational corridors are important
- Access for maintenance / fire access to be considered
- Active recreation to focus on pedestrian / cycle use
- Potential ranking for access – 1. Restricted/ 2. Pedestrian Cycle/ 3. Cars/ Vehicular
- Confirmation of selected Cumberland Plain vegetation boundaries
 - ground proofing critical boundaries to sub communities on site in areas to be affected by recreational use

2. 9th December 2009

The Study team provided a brief outline of the preliminary Conservation Management Plan and Preliminary Masterplan. A discussion of stakeholder comments followed:

Key Items raised:

- It was noted that South Creek had been officially changed in name to South / Wianamatta Creek
- Effective adaptive re-use of remaining buildings is important
- Impact of visitor vehicular access to the park on local residential streets to be considered

- Draft plan identifies several potential zones of management from conservation focus to recreation focus - varied levels of boundary control to each zone need to be carefully resolved
- How to manage trail bikes (motorised) to edges of recreational areas that may not have full fencing needs to be carefully resolved
- Recreational focus area - to also incorporate important habitat goals in terms of tree retention, revegetation etc
- Central point near site entry (eg Visitor Centre) that provides site orientation and access to heritage stories is important
- Explore potential to encourage Councils and RTA to further develop "off site" links that complement Regional Park in improving local access and recreation opportunities (eg. from Shanes Park to St Marys)

The image displays two documents related to the Wianamatta Regional Park Landscape Masterplan. On the left is a questionnaire titled "How would you like to use the Regional Parkland?". It contains several sections with checkboxes and text boxes for user input, including questions about frequency of use, preferred parkland features, sustainability, and contact details. On the right is a flyer titled "The former ADI Site Regional Parkland masterplan". The flyer features a map of the site, a list of stakeholders, and a timeline of the masterplan process. Both documents are dated 4/11/2009.

Community flyer / questionnaire (Source EP NSW)

3 SYNTHESIS AND EVALUATION

3.1 Consultation

Aboriginal Stakeholders

Invitations were issued to all potential stakeholders applicable to NPWS policy and relevant legislation by Godden Mackay Logan and NPWS. A number of Darug Community Group representatives attended both consultations. Deerubbin Local Aboriginal Land Council representatives were unable to attend these forums. NPWS has issued further invitations and will pursue further liaison as the programme allows.

3. Aboriginal Group Workshop 10th September 2009

A workshop session explored what the site means to the Aboriginal Community (in this case - the Darug representatives)

Wianamatta Cultural Landscape: Meanings and Associations

- Tangible Evidence – footprints on landscape
- Creek lines
- Direct Continued Connection: “In the Blood”
- Meeting/Consolidation point – Pre & Post Contact – Core Area – Rich Resource Area
- Lived—Continuity—Survival in Changing Landscape
- Trade Routes
 - Clear passage
 - Ceremonies
 - Interaction with other groups
 - Intermarriage
- Displacement and Exclusion (Blacktown)
- Severing Connections- Survival and Resistance
- Living in Harmony with Environment/Nature
- Pristine Areas – Conservation by Default
- Country “It is Mother”- Like a church – sacred
- Reading the Landscape
 - Living in it
 - Responding
 - Feeling it “Born with it”
 - Understanding land form
 - Seasonality
- A Journey – Living Culture
- Dynamism
- Finding a Feed
- Fishing Spots and Catching Rabbits

Potential Key Themes for Aboriginal Interpretation:

- Respect, Recognition and Acknowledgement of Darug Country
“Old Peoples Country”
- Strategies
 - Education of the Broader Community
 - Tourism [Co-management of initiatives]
 - Employment and training opportunities

Potential Design and Management Strategies for Aboriginal Interpretation:

- Ancestral-Family–Genealogy -”Known” and Continued Connection–Importance of local Darug history
- Interpretation
- Welcome to Darug Country Entry and Exit signage
- Darug community/cultural centre
 - Education
 - Arts and Crafts
- Use of Darug language and names
 - Naming precincts and places
- Use of Darug artists
- Silcrete cobbles as public art feature – also education
- Explore siting/location of feature (s)
 - Tool manufacturing, quarry site
 - Walking trails
 - Darug culture theme
 - Mini song lines
 - Contemporary values
 - Explore location of interpretation points
- Darug people are the rightful interpreters of their heritage
- Relative Quality of Landscape
- Ecology = fauna and ecological health & cultural meanings
- Native/local flora, re vegetation, rehabilitation
- Water course rehabilitation
- Traditional Lands co-management
- Inclusive process - Care and Control permit – Darug participation
- Surveying is a priority



3 SYNTHESIS AND EVALUATION

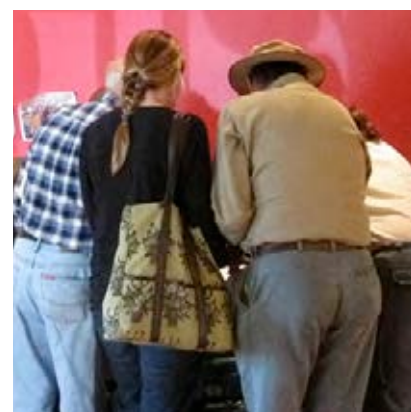
3.1 Consultation

4. Aboriginal Group Workshop and Site Walk 28th October 2009

In follow up to the workshop forum a second meeting was held with Darug Community representatives that involved a site to several key locations in the Regional Park. The aim was to further verify the values and potential for interpretation of these locations as part of masterplan development.

The sites visited were

- Farm dam (also known as Secret Garden) in the south west of site. This is a human made dam but lies in an area of low elevation of poor drainage which is likely to have been an ephemeral swamp before creation of the dam. This location is likely to have been a place of gathering and of harvesting of creek fauna when water flowed during the pre European era
- Confluence of Ropes and Wianamatta (South) Creeks in central north of site:
 - high potential for higher ground to have been past permanent campsite / gathering place
 - extensive remains of tool chippings found on site and along high voltage power easement
 - during ADI era Darug representative accessed creekline near this area for play / foraging
- Silcrete quarry area, near Interim community centre of Forrester Road
 - know to be location of Silcrete "River" and past quarry site for toolmaking
 - extensive remains of tool chippings found on site



Aboriginal stakeholder sessions (Source : EP NSW)



Authority stakeholder sessions (Source : EP NSW)

Authorities Stakeholders

5. Authority Workshop 1st October 2009

The Study team introduced the project and then outlined initial mapping of existing site and preliminary principles derived from this exercise. A discussion of preliminary principles followed and a number of issues were raised.

Key Items raised:

- Ensure connectivity to regional access routes/ conservation - also to potential sites including Shanes' Park and Cranebrook corridors/ open space
- Consideration to other Regional recreation ie. dog walking / sporting/ recreation nodes
- Ensure heritage overlays/ interpretation and consider past use / activities beyond remnant archaeology sites
- Entry points to core recreational corridors are important
- Access for maintenance / fire access vital especially boundary condition and fencing issues
- Hierarchy of fencing strategies and ongoing maintenance
- Consider recreational opportunities to water bodies
- Consider visual connectivity of road links beyond boundary
- Natural conservation should not always take precedence over heritage conservation

6. Authority Workshop 25th November 2009

The Study team provided a brief outline of the preliminary Conservation Management Plan and Preliminary Masterplan.

Outcomes of discussions included:

- Consider potential for vehicular access to main visitor precinct off east west access road rather than through Ropes Crossing (*note subject to discussions with DLL - possible for access through Ropes Crossing to avoid impact on Local Roads*)
- Parking to recreational areas in Regional Park should be provided within the park - ideally not within Asset Protection zones adjoining
- Drainage basins lying at boundary of Regional Park and adjoining development as defined in REP for St Marys site require a range of issues to be addressed - potential conflicts between hydraulic, heritage conservation, recreational access and maintenance access to be addressed.

Supplementary Consultation

The Study team also undertook further consultation on site with the authors of Heritage Assessments on the Dunheved European Cultural heritage site to confirm potential for design interpretation along with specialist NPWS staff to review habitat linkage opportunities.



Supplementary consultation with specialist experts (Source : EP NSW)

3 SYNTHESIS AND EVALUATION

3.2 Opportunities and constraints

The effective balance of a sustainable level of usage with the natural and cultural values of the park is the fundamental challenge of the Masterplan. As has been outlined in the preceding review, the creek system and related floodplain support the most significant habitat on the site. Working from the premise that these areas have a higher conservation value and significance, these should form the core of conservation management in the Regional Park.

Key Factors Map

The Key Factors Map (Figure 3.1.1) indicates compilation of key influences on masterplanning decision making:

- Alluvial Woodland as most significant (endangered) vegetation and in the worst condition being located along creek corridors and within floodplain
- Creeks and water courses – high fauna habitat value
- Existing roads and tracks – fundamentally re-use existing infrastructure for access needs
- Adjoining open space to development and Regional Open Space – extended access network including potential for connections through Asset Protection Zones to development



Site images: Alluvial Woodland
(Source : EP NSW)



Site images: Creeks & watercourses
(Source : EP NSW)



Site images: Existing roads and tracks
(Source : EP NSW)



Site images: Open space to adjoining development
(Source : EP NSW)

3 SYNTHESIS AND EVALUATION

3.2 Opportunities and constraints

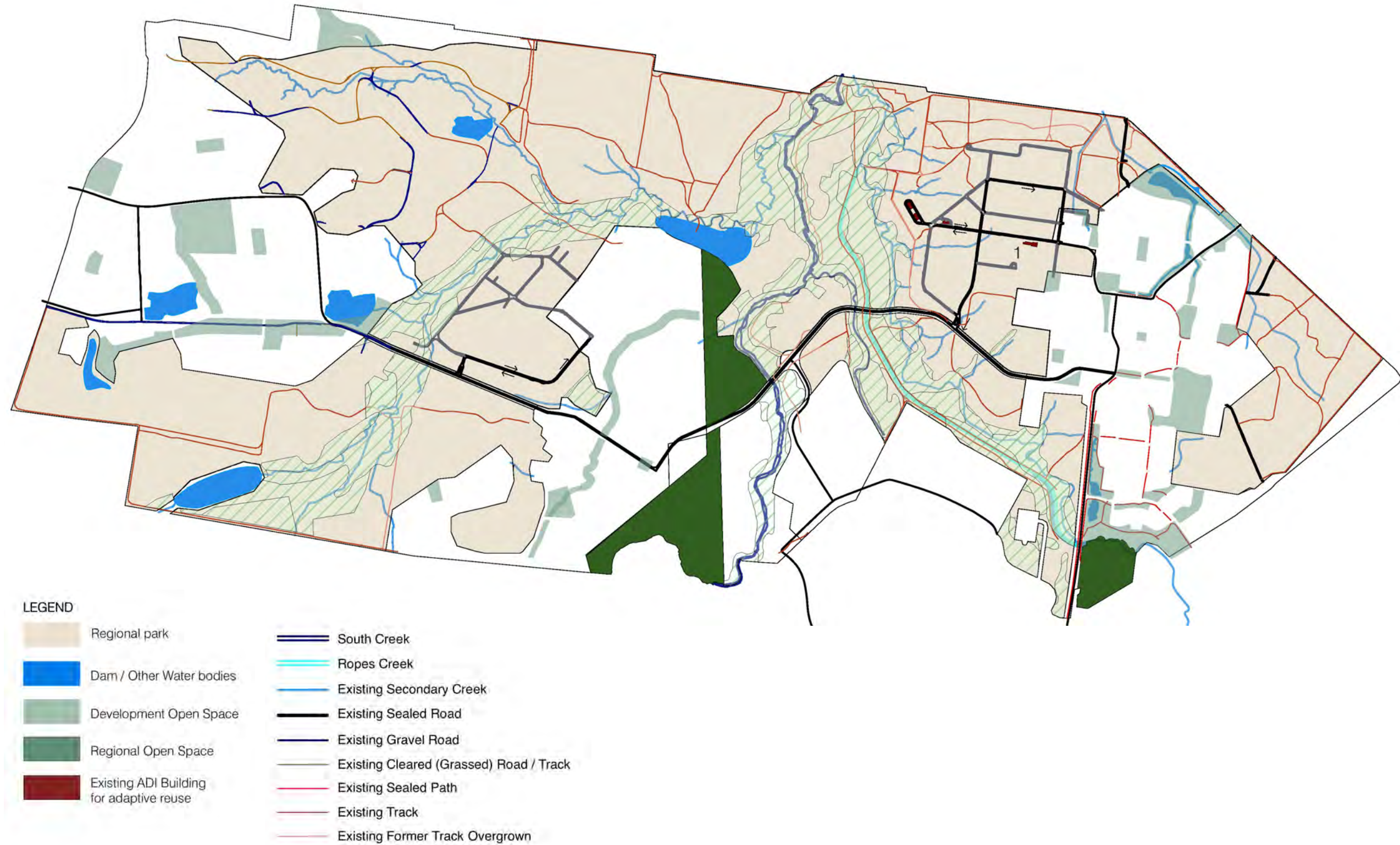


Figure 3.1.1 Key Factors Map: Alluvial Woodland, creeks and water courses, existing roads and tracks and adjoining open space

3 SYNTHESIS AND EVALUATION

3.3 Park Vision

Aims and Objectives

The NSW National Parks and Wildlife Service of the Department of Environment, Climate Change and Water (DECCW) commissioned Environmental Partnership (Landscape Architects) in June 2009 to prepare a masterplan for the Wianamatta Regional Park located on the former ADI site at St Marys. The project team incorporated a number of specialist inputs:

Godden Mackay Logan

Carolyn Stone

Heritage Planning, Aboriginal Community Liaison & Interpretation

Consultation Planning and Facilitation

Core aims for development of the masterplan as identified in NPWS brief included:

- Identification and protection of significant heritage items
- Development of visitor facilities
- Provision of traffic circulation
- Provision of access routes into and within the park linking to regional wide connections
- Car parking and management of different landscape areas and boundary interfaces

Key project objectives are:

- To provide strategic direction based on the plan of management for future management of the park including long term conservation and landscape management outcomes;
- To identify broad scale conservation, use, linkages, services, infrastructure and access zones across the park;
- To identify key access points, connections and circulation routes; and
- To identify appropriate levels of access and visitor facilities across the park.

In order to meet these objectives the precinct plans have taken into account the following:

1. The requirements of the Wianamatta Regional Park Plan of Management;
2. The findings of the Conservation Management Plan;
3. Considers the natural and cultural values of the places as well as community aspirations and needs; and
4. Takes a long term view to developing visitor improvements in the park.



Site image: Hierarchy of potential access (Source: EP NSW)



Vision

The full realisation of a Regional Park and related uses and management of the scale of Wianamatta Regional Park will be a long term undertaking. Required actions must be prioritised to enable available resources to be best focussed on those actions that will enable recreational use to be commenced by the public, and important conservation and habitat management actions to be initiated.

As such it is necessary to think of implementation of the park in both the short term and long term. Visions to reach each of these phases of park implementation are outlined following:

Short term vision

Provide for initiation of high priority management regimes for habitat and cultural heritage conservation, and actions for commencement of public use, enjoyment and appreciation of the park.

Long term vision

Consolidate habitat and cultural heritage conservation to complement recreational use and education, and involve the broad range of stakeholders in its planning and management.

Build upon core recreation opportunities of walking, cycling, and picnicking in a bushland setting. Provide dynamic interpretation of conservation values, special events areas and programmed education.



Example of Interpretation totem - multi themed (source Victoria Parks)



Example of Visitors Centre - site responsive facilities (Source: EP NSW)



4.0 MASTERPLANNING PRINCIPLES

4 MASTERPLANNING PRINCIPLES

4.1 Key masterplanning objectives and principles

The chart following identifies the guiding principles established for the masterplan in response to the PoM desired outcomes (and corollary planning objectives identified during the study).

Desired outcomes (from PoM)	Masterplan Objectives	Masterplanning Principles
Topography and drainage		
<ul style="list-style-type: none">• Features, sites and processes of geological, natural geomorphological and/or pedological significance will be protected.• Research is conducted to confirm the location of the different geology and soil associations across the Park.• Significant landscape features of the Park including the two creeks, and associated floodplains and undulating landscape will be protected.• Exposed geologic cross-sections, where safe, may remain accessible to the public and maintained in their natural state for education purposes.• Reduce, wherever possible, or at least do not increase, the risks imposed by contamination from previous owners• Human induced soil erosion in the Park is minimised.• Soil Management practises within the Park does not have any negative impacts on neighbouring landholders.• Areas affected by soil erosion, salinity and contamination in the Park are identified and remediated.• The Park's catchment values and the water quality and health of streams and waterbodies within the Park are maintained;• The management of the Park does not cause any degradation of the downstream catchment;• Potential catchment management impacts caused by upstream activities are minimised;• Park facilities and infrastructure will utilise environmentally sustainable development principles and practices where possible.	<ul style="list-style-type: none">• Assist park users to interpret the character of the park• Improve water quality• Minimise soil erosion• Mitigate soil salinity	<ul style="list-style-type: none">• Ensure access system provides experience of all landscape types• Provide vantage / viewing / orientation points over generally flat landscape where possible / of benefit• Use of existing tracks/ roads to minimise additional earthworks to Regional Park• Coordinated design (including habitat, heritage, and relationship to recreational access of water quality control ponds by developer at edge of Regional Park• Provide on line water quality control within natural creeks where possible
Flora		
<ul style="list-style-type: none">• The full range of native plant and animal species and their habitats found in the park is conserved.• A diversity of vegetation structures and other habitat values are conserved, and restored where they have been subject to past disturbance.• The endangered ecological communities and populations within the Park are protected.• Rare, threatened & regionally significant native species and their habitats within the Park are protected.• Park neighbours support conservation of remaining areas of privately owned native vegetation near the Park.• Protection of habitat of native species will include actions to minimise illegal activities.• Threatening processes from surrounding urban areas are minimised.• The impact of introduced species on native plants and animals is minimised.• Monitoring of new introduced species in the Park results in eradication before they establish.• Increasing neighbour and community awareness about the impacts of introduced animals and plants on the Park's natural values, and about the desirability of sympathetic management in areas adjoining the Park.• Introduced species of cultural significance are managed to have no impact on environmental values of Park.• There is no establishment of <i>Phytophthora cinnamoni</i> within the Regional Park.	<ul style="list-style-type: none">• Conserve full range of flora habitats in parkland• Enhance / maintain vegetation connectivity within parkland	<ul style="list-style-type: none">• Protect areas with threatened and highly significant native species / sub communities• Focus park activities in existing disturbed and cleared areas• Focus park activities within areas containing most resilient vegetation communities• In areas where recreation is to be promoted, ensure conservation objectives are also pursued in relation to existing vegetation and habitat opportunities

4 MASTERPLANNING PRINCIPLES

4.1 Key masterplanning objectives and principles

Desired outcomes (from PoM)	Masterplan Objectives	Masterplanning Principles
Fauna		
<ul style="list-style-type: none">Habitat linkages for biodiversity movement within a regional context are established and maintained.A sustainable population of macrofauna will be retained in the Park.Any decision on long-term fencing for the management of macrofauna, once they have reached a sustainable population size, will seek the best possible environmental result.	<ul style="list-style-type: none">Maintain and enhance flora habitat values	<ul style="list-style-type: none">Focus park activities in existing disturbed and cleared areasIn areas where recreation is to be promoted, ensure conservation objectives are also pursued in relation to existing vegetation and habitat opportunitiesRecognise fauna movement through park (creek & vegetation corridors)Provide buffer zones to adjoining uses and activities within the parkRetain habitat tree trunks and protect plant species which provide food and shelterReestablish vegetation to highly disturbed zones that impact on fauna movement and habitat
Aboriginal Cultural heritage		
<ul style="list-style-type: none">Aboriginal sites and places are protected from damage by human activities.Aboriginal people are involved in management of Aboriginal cultural and natural values in the park.Community and NPWS knowledge and understanding of Aboriginal history and heritage within the Park is increased.Intact landscape units are preserved as a means of protecting Aboriginal heritage.		<ul style="list-style-type: none">Aboriginal people to participate in further investigation of significance zones 1 to 3 as mapped in PoM where these areas are proposed for park development worksReflect key themes for Aboriginal cultural heritage in park interpretation and visitor experience;<ul style="list-style-type: none">- productive place- living place- meeting place- survival and continuityInvolve Aboriginal communities in the planning, management and conservation of Aboriginal heritage and any associated interpretative elementsSeek local stories about the history and meaning of the site and incorporate in appropriately located interpretationAboriginal people are the interpreters of their cultural heritage
Colonial settlement and Cultural heritage		
<ul style="list-style-type: none">Historic features are appropriately documented, conserved, managed and interpreted.	<ul style="list-style-type: none">Provide for recreational activities compatible with the cultural significance of heritage placeInterpret the park's significant cultural heritage and provide opportunities for public enjoyment and educationPlan uses and activities that do not impact on the cultural significance of the parkIntegrate local stories about the history and meaning of the site	<ul style="list-style-type: none">Tell the stories of the site's agricultural development and useSeek local stories about the history and meaning of the site and incorporate in appropriately located interpretationIdentify important areas such as Dunheved to retain cultural landscape character as part of conservation and understanding of history



4 MASTERPLANNING PRINCIPLES

4.1 Key masterplanning objectives and principles

Desired outcomes (from PoM)	Masterplan Objectives	Masterplanning Principles
Growth and Development Cultural heritage		
<ul style="list-style-type: none">Historic features are appropriately documented, conserved, managed and interpreted.	<p>Provide for recreational activities compatible with the cultural significance of heritage place</p> <ul style="list-style-type: none">Interpret the park’s significant cultural heritage and provide opportunities for public enjoyment and educationPlan uses and activities that do not impact on the cultural significance of the parkIntegrate local stories about the history and meaning of the site	<ul style="list-style-type: none">Use heritage roadways, tracks, and other infrastructure to provide recreational locations / services where possible - to reduce additional disturbance and aid interpretation / understandingProvide interpretation and destination points to berm landformsProvide clear identification / treatment of any new access routesAdaptive re use of existing buildingsSeek local stories about the history and meaning of the siteTell the story of the ADI site across the landscape using a range of interpretative initiatives
Munition Cultural heritage		
<ul style="list-style-type: none">Historic features are appropriately documented, conserved, managed and interpreted.		<ul style="list-style-type: none">Seek local stories about the community involvement in establishment of the Regional ParkTell the story of the communities involvement in the conservation of endangered habitat and communities across the landscape using a range of interpretative initiatives and within adaptive reuse of existing buildings
Recreation Generally		
<ul style="list-style-type: none">There is widespread community understanding and appreciation of the Park’s natural and cultural values.Visitors are aware of the Park’s recreational opportunities and can easily find their way to park facilities.The Park is a useful educational resource for local schools and community organisations.There is community understanding and acceptance of park management practices.There is community recognition of the role of the Park in the provision of recreational opportunities within the context of regional and local open space.There is community recognition and support for sympathetic conservation management on lands surrounding the Regional Park.A variety of informal visitor opportunities are available that encourage appreciation of the natural and cultural environment and enjoyment of the park.Facilities are designed and managed to provide a satisfying and informative visitor experience and minimise impacts.Visitor use is compatible with the management direction of the Park and is ecologically, economically and socially sustainable.Appropriate recreation and visitor opportunities are provided within the Park, that take into account the proximity and nature of regional and local open space.Future planning of recreation activities takes the regional context into account.A sustainable macrofauna population is retained in the Park and linked to visitor experience.Where appropriate, the impact of the macrofauna fencing on visitor experience is minimised.Opportunities exist for sustainable and appropriate commercial recreation activities.Construction of new facilities complies with the conditions of any relevant Site Audit Statements and the Contamination Management Plan.		<ul style="list-style-type: none">Use existing disturbed areas / developed areas for recreational uses where possible (passive recreation, picnicking, gatherings)Provide a range of access to recreational uses - some areas to be accessible by vehicle whilst some by cycle or walkingRe-use ‘Hulk’ remnants as location of main Visitor Centre and arrival / orientation point

4 MASTERPLANNING PRINCIPLES

4.1 Key masterplanning objectives and principles

Desired outcomes (from PoM)	Masterplan Objectives	Masterplanning Principles
Vehicular Access and entry		
	<ul style="list-style-type: none">• Provide a functional, effective, and memorable arrival experience• Limit the extent of vehicular access to minimise impacts on habitat values and recreational use	<ul style="list-style-type: none">• Reuse of existing infrastructure - sealed roads/ entry points• Provide entry points which effectively connect to district linkages• Stop unauthorised vehicular access within the park - no cars/ motor bikes or trail bikes on unsealed roads and tracks• Limit on site parking to key entry points/ recreational nodes/ educational & facilities buildings locations• Consider one way circulation through site as a way of mitigating potential traffic congestion/ cycle pedestrian conflicts
Pedestrian and Cycle Entry		
	<ul style="list-style-type: none">• Maximise accessibility of recreational areas to pedestrian and cycle access from adjoining communities	<ul style="list-style-type: none">• Establish hierarchy of access control based on natural and heritage conservation<ul style="list-style-type: none">- Guided or controlled public access only to highest priority conservation areas- High level of access / entry to highest priority recreational areas• Reuse of existing track network and connections at boundaries where possible• Provide entry points which connect to local areas• Provide entry points which connect to district linkages• Prioritise placement of track and entries to outside flora, fauna, and heritage conservation areas where ever possible• Link and supporting signage to regional trail networks
Pedestrian and Cycle (shared) Access		
	<ul style="list-style-type: none">• Provide an appropriate balance of shared (cycle and walking) and specific use access (cycle only, bushwalking only)	<ul style="list-style-type: none">• Reuse of existing infrastructure - roads/ tracks/ entry points• Supplement where required to:<ul style="list-style-type: none">- complete functional loops- create a variety of spatial and environmental experiences• Provide point to point and loop circulation through site with varied hierarchy of:<ul style="list-style-type: none">- walk/ cycling difficulty,- experiences,- points of interest & vegetation/ flora habitat• Provide opportunities for pedestrian only and cycle only access experiences• Provide sustainable facilities, picnicking areas and resting points to within existing cleared/ disturbed areas and at points of interest• Provide destination for rest / facilities to complement broader district cycle networks (i.e. Ropes creek/ South / Wianamatta Creek corridors)• Interpretative treatments to recognise track usage: pedestrian, cycle, shared
Bushwalking		
	<ul style="list-style-type: none">• Promote a variety of experiences through park topography, vegetation and heritage• Provide dedicated bushwalking paths in some locations	<ul style="list-style-type: none">• Existing roads tracks to be used are generally past vehicular access and will cater for shared use• Recognise opportunities for bushwalking only tracks to western zone of park where topography is more varied and older tracks are more heavily overgrown• Integrate track access with picnic facilities for shared use of facilities (toilets / picnics)• Provide directional signage• Integrate interpretation into track facilities and signage



4 MASTERPLANNING PRINCIPLES

4.1 Key masterplanning objectives and principles

Desired outcomes (from PoM)	Masterplan Objectives	Masterplanning Principles
Cycling		
	<ul style="list-style-type: none"> Provide an appropriate balance of shared (cycle and walking) and specific use access (cycle only, bushwalking only) Promote cycling as key park activity <ul style="list-style-type: none"> track system possible bike hire 	<ul style="list-style-type: none"> Use existing roads and tracks Promote a variety of experiences through park topography, vegetation and heritage Integrate track access with picnic facilities for shared use of facilities (toilets / picnics) Associated Car Parking Cafe / Kiosk and facilities Integrate interpretation into track facilities and signage Provide destination for rest / facilities to complement broader district cycle networks (i.e. Ropes creek/ South / Wianamatta Creek corridors)
Picnicking		
	<ul style="list-style-type: none"> Picnicking in a variety of locations and settings with varied levels of accessibility from vehicular to cycle / walking only 	<ul style="list-style-type: none"> Provide to existing cleared areas Relate to areas / elements that have heritage “story” and build upon for design themes Consider most applicable approach: <ul style="list-style-type: none"> centralised “high volume” facilities to control and focus impacts more dispersed areas affording lower volume of use but potentially wider spread impacts (albeit less intense) Educate park users in sustainable practises through design of park facilities
Tourism		
<ul style="list-style-type: none"> Commercial and other non-park uses have minimal environmental impact and contribute to the aims of Park management. Commercial and other non-park uses contribute to understanding and enjoyment of the values of the Park Commercial and other non-park uses are potentially revenue-generating opportunities and provide opportunities for employment and training, where appropriate. 	<ul style="list-style-type: none"> Self guided educational walks Guided Cycling/ Bush walking activities Educational Tours / stays Sustainability research and development Visitor facility - event spaces/ cafes/ restaurants 	<ul style="list-style-type: none"> Track system to provide opportunities for self guided access through recreational areas of park Potential for adaptive re-use of Transit Stores for overnight stays Maintain existing track access through habitat conservation areas (that is limited general public access) for guided access events and access for management and research Re-use ‘Hulk’ Bomb Filling building remnants as location of main Visitor Centre and arrival orientation point
Education and Research		
<ul style="list-style-type: none"> Research is undertaken that enhances the information base and assists conservation and management of the Park, and of the Cumberland Plain. Research causes minimal environmental damage. Monitoring programs are in place to detect any changes in the status of Park resources and values. Monitoring programs designed to assist in the management of the Park comply with the principles of environmental, economical and social sustainability. Research and monitoring programs and activities comply with relevant legislation. Research participation and co-operation is achieved with tertiary institutions and other major interested organisations. 	<ul style="list-style-type: none"> Sustainability research and development Plant propagation Plan research Ongoing heritage research / investigations 	<ul style="list-style-type: none"> Control of general public access to highest priority conservation areas Maintain existing track access through habitat conservation areas (that is limited general public access) for access for management and research Potential for native plant propagation in a Regional Park area adjoining the “Central Precinct of the urban development - for potential integration with a commercial nursery facility in the Employment Lands Potential for native grass research in cleared areas of historic significance (Growth and development phase) Heritage research / investigation
Heritage research / investigation		
<ul style="list-style-type: none"> Management facilities adequately serve the needs of NPWS objectives, strategies and operations and have minimal environmental impact. New management facilities will consider and apply the principles of ecological, economic and social sustainability. The conditions of relevant Site Audit Statements and the Contamination Management Plan are complied with prior to the construction of any facilities and/or infrastructure in contaminated areas of the Park. 		<ul style="list-style-type: none"> Re-use ‘Hulk’ Bomb Filling building remnants as location of main Visitor Centre and arrival orientation point Re-use single Transit Store building as location of NPWS depot and maintenance activities.

4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies Natural Systems

The fundamental strategy embodied in the masterplan is the expression of the Regional Park in three management zones that will have varied balance of conservation, access and recreation emphasis:

- Zone 1 - Primary Habitat Focus
- Zone 2 - Secondary Habitat Focus
- Zone 3 - Recreation Focus

These will be linked by a system of access that focuses upon reuse of existing roads and track infrastructure. A description of the zones follows;

Zone 1 - Primary Habitat focus:

- Encapsulates the Alluvial Woodland area and all creek corridors
- Incorporates the Aboriginal cultural heritage zone at the confluence of South and Ropes Creeks and the majority of the High Significance areas as determined in previous assessments (refer PoM).
- Would generally be fenced to boundaries – 75% being a boundary to adjoining development / 25% to other RP zones
- Public access to be limited to guided access for special events and one fenced east west corridor (which generally replicates an existing corridor) through the central area of Zone 1

Zone 2 - Secondary Habitat Focus:

- Areas that have potential to be pursued in the future for either Habitat (Zone 1) or Recreation (Zone 3) focus
- Areas that provide for access links but with limited recreation use
- May be fenced to boundaries – subject to relationship to adjoining areas (eg Zone 1) which may be fenced already at their boundary
- Public access will vary – but generally will be open to day to day pedestrian and cycle access but no public vehicular access
- Where no fencing provided – vehicular access management required to boundaries

Zone 3 - Recreation Focus:

- Areas to be pursued for a Recreation Focus – potential for a specific use and interpretational theme to each recreation zone
- Key location of access track system
- Location of recreational facilities
- Public access will generally be open at boundary for to day to day pedestrian and cycle access with public vehicular access to designated access roads to key recreation precincts (ie not necessarily to all recreation precincts)
- Where no fencing provided – vehicular access management required
- Will fundamentally integrate habitat enhancement and conservation with recreational activities and maintain habitat and conservation qualities of area
- Includes key historic heritage precincts



Figure 4.2.1 Zone 1 - Primary Habitat Focus

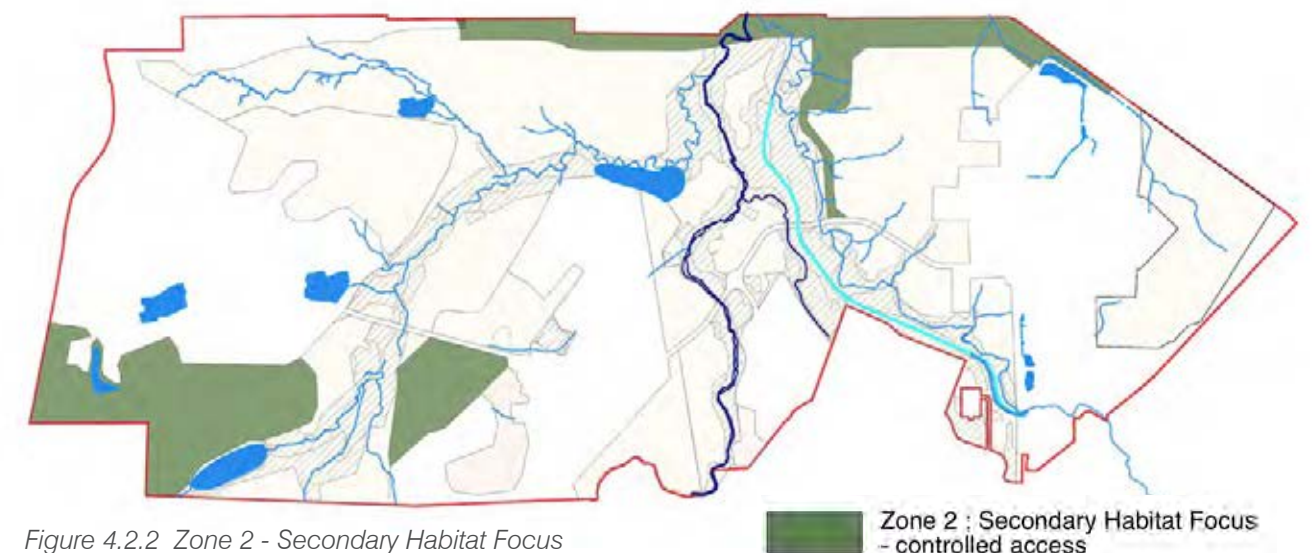


Figure 4.2.2 Zone 2 - Secondary Habitat Focus

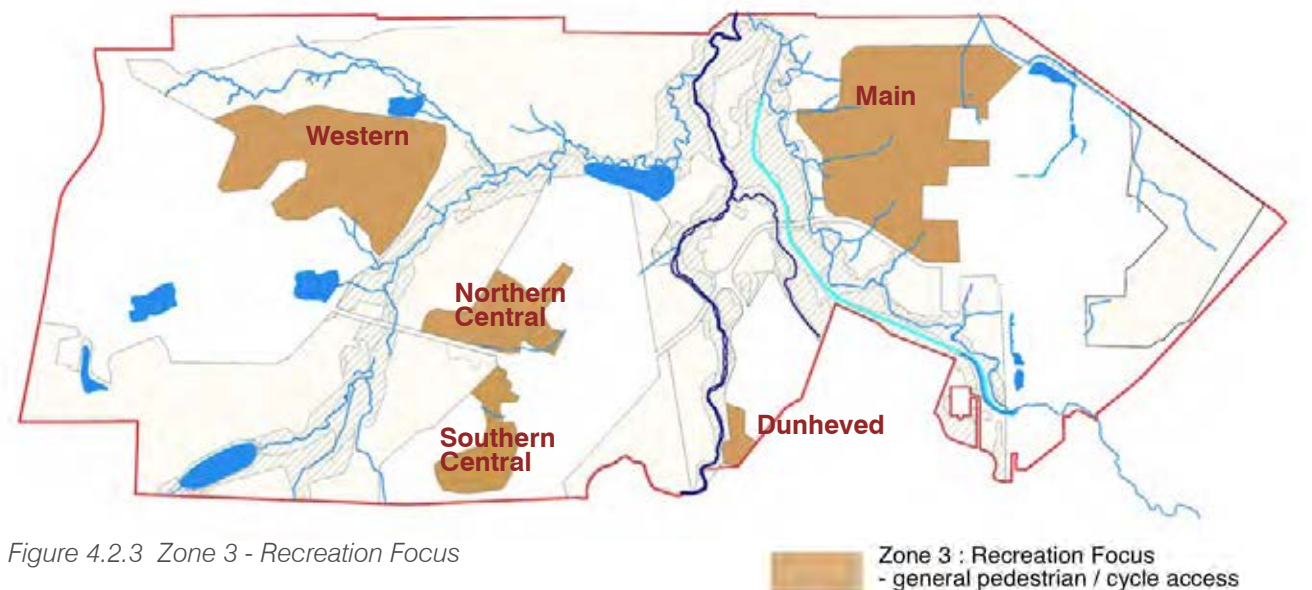


Figure 4.2.3 Zone 3 - Recreation Focus

4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies

Cultural heritage

Heritage themes and their relationship to site

Interpretation of historic themes and heritage will contribute to the understanding and appreciation of the park through initiatives that stimulate and engage visitors. Benefits of heritage interpretation will be :

- Increased appreciation of heritage values
- Community cohesion
- Creating and making a sense of place

The CMP identifies the cultural heritage significance of the site under 6 key phases. The masterplan should guide development and management of the park so as to facilitate the understanding by park users of these key phases. A particular feature of the Regional Park is that physically these phases overlay and interpretation must consider the optimum locations and means to assist understanding. The proposed strategies for interpretation of the key phases are listed broadly following:

1. Natural landscape

- Integrated display at Visitor Centre
- Included in regular “totems” on paths network explaining local factors and changes in natural conditions (from other parts of site) in context of other themes
- Focussed interpretation signage and “time lapse” photographs at key locations to interpret progressive upgrading of natural values
- Guided and self guided walks

2. Aboriginal lands - Darug Country

- Integrated display at Visitor Centre
- Included in regular “totems” on path network explaining local factors in context of other themes
- Focussed interpretation signage at key locations to interpret camp site, Silcrete quarry, and significance of creeks / wetlands
- Darug naming of spaces, paths etc.
- Guided walks
- Darug involvement in education and guided tours etc
- Programme of public art that commemorates and celebrates the sites history and heritage

3. Colonial landscape (1800 - 1860)

- Integrated display at Visitor Centre
- Included in regular “totems” on paths network explaining local factors in context of other themes
- Maintain and provide interpretive signage to key clearings such as in Jordan Hill area, Dunheved, and to western recreational precinct - where not in conflict with CMP provide recreational uses to clearings
- Focussed interpretation signage at key locations to interpret
- Interpretation plantings and features at Dunheved

4. Growth and development (1860s to 1940s)

- Integrated display at Visitor Centre
- Maintain historic cleared areas in zone 1 & 2, seeking compatible use (eg native grass research)
- Maintain tracks for reuse in zones 1 & 2
- Included in regular “totems” on paths network explaining local factors in context of other themes
- Conservation and use of tracks along past land grant boundaries
- Focussed interpretation signage at key locations to interpret Luxford dairy, South / Wianamatta Creek Bridge (restricted and controlled access with in zones 1 & 2)

5.1 Munitions - explosives and filling (1941 - 1946) and munitions and storage - project 590 (1950s to 1990s)

- Integrated display at Visitor Centre
- Included in regular “totems” on paths network explaining local factors in context of other themes
- Focussed interpretation signage at key locations to explain location of Munitions uses
- Thematic focus on munitions history in main visitor precinct being site of major site works
- Use of Munitions names and numbering / codes to spaces and facilities in Main Visitor Precinct
- As above
- Conservation and use of road and rack networks (main visitor and western visitor precincts)

6.1 Revitalisation and conservation - post industrial (1993-2001) and Regional Park (2001 onwards)

- Integrated display at Visitor Centre
- Included in regular “totems” on paths network explaining local factors in context of other themes
- Focussed interpretation signage at key locations to explain conservation campaign
- Integrated display at Visitor Centre
- Included in regular “totems” on paths network explaining local factors in context of other themes
- Focussed interpretation signage and “time lapse” photographs at key locations to interpret progressive upgrading of natural values

4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies

Responses to specific heritage elements

The CMP identifies the cultural heritage significance of a range of key cultural landscape elements on the site (refer table 5.2 in CMP). Key attributes are identified which should be conserved and interpreted in masterplanning and ongoing design development in the park. Masterplanning strategies to achieve this are outlined following. The Masterplan strategies should be read in conjunction with the CMP policies.

Zone 1: King plantings - western side of South / Wianamatta Creek

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Remnant cultural plantings with landmark qualities visible from east side of creekForm of the trees (Norfolk Island Pines) Also <ul style="list-style-type: none">Lie in area of past rail link to western section of ADI	<ul style="list-style-type: none">Located in adjoining Regional Open SpaceConserve and manage remnant trees and view linesPursue recreational access link along alignment of past rail line and in vicinity of trees across creek and through Regional Open Space to Central Precinct of urban developmentProvide interpretive signage on access route and within Dunheved area (looking west to trees)

Zone 1: Jackson's dairy remnant building (including cleared area)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Evidence includes ruin of dairy bails and archaeological remainsLocation adjacent to house siteCleared, grassland settingRelated to small scale farming in the area	<ul style="list-style-type: none">Located in proposed Zone 1 conservation focusConserve cleared areaProvide interpretive signage adjacent track access for guided groups

Zone 1: House site / cleared area of Jackson's dairy

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Location adjacent to dairy siteCleared, grassland settingRemnant garden plantings	<ul style="list-style-type: none">Located in proposed zone 1 conservation focusConserve cleared area and remnant plantingsProvide interpretive signage adjacent track in adjoining Regional Open SpaceCoordinate detention basin design to consider heritage factors

Zone 1: House site / brick chimney)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Evokes interdependence of small scale farm holdingsWide, cleared settingFruit tree scatterVisual link to Jordan HillRelationship to access track	<ul style="list-style-type: none">Located just outside Regional Park in Regional Open SpaceLiaise for conservation and protectionProvide interpretive signage adjacent track in adjoining Regional Open Space

Zone 1: Jordan Hill house site (cleared area and managed landscape) (not in Regional Park)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Early rural homestead complexWide, cleared settingDeciduous tree scatterVisual link to house site with chimneyRelationship to access track	<ul style="list-style-type: none">Located across proposed Zone 1 conservation focus and adjoining Regional Open SpaceProvide interpretive signage adjacent track in adjoining Regional Open Space

Zones 1-2: Canal

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Fauna attractantAmenity value	<ul style="list-style-type: none">Located predominantly in proposed Zone 1 area conservation focus

Zone 2: Luxfords fruit trees

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Evidence of local orcharding fruit trees close to the confluence of the two creeks approximates the location of Luxford orchard	<ul style="list-style-type: none">Located in proposed zone 1 conservation focusConserve and manage remnant plants where compatible with conservation of natural valuesProvide interpretive signage on access route - potentially related to bridge crossing

Zone 2: Ropes Creek Bridge

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Evidence of infrastructure associated with farmingRustic characterMake-do nature of repairsAssociation with past road in this area	<ul style="list-style-type: none">Located in proposed Zone 2 secondary conservation focusProvide pedestrian cycle crossingProvide interpretive signage

Zone 2: South/ Wianamatta Creek Bridge

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Evidence of infrastructure associated with farmingRustic characterAssociation with past road in this area	<ul style="list-style-type: none">Located in proposed Zone 1 & 2 secondary conservation focusProvide pedestrian /cycle crossingProvide interpretive signage

Zone 2: Road across the two creeks

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Unpaved characterNatural gravel surfaceEvocative of growth and developing of area for farming	<ul style="list-style-type: none">Located in proposed Zone 2 secondary conservation focusRetain natural / gravel surfaceConserved as shared access trail - provide interpretive signageRetain use of road



4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies

Zone 3: Dunheved Homestead

Key Physical Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Rows of trees, garden and Hedge plantings;Cleared, grassland settingRemnant terracing;Views to Kings Plantings - wester side of creek Also <ul style="list-style-type: none">Archaeological evidence of colonial homestead and outbuildings with related uses offering potential for interpretation	<ul style="list-style-type: none">Located in a proposed recreational focus Zone 3Conserve and manage remnant trees, garden and hedge plantingsConserve and manage cleared / pastoral setting adjoining riparian corridorInterpret terracing in future design for use of area - providing access near creek - possible new cultural plantingsInterpret footprints of past buildings and their uses in landscape design

Zone 3: Rail system (including remnant rails, buildings, spur line)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">AlignmentFabricRelationship with roads and functional areas (main Precinct and Central Park Precinct)	<ul style="list-style-type: none">Located across various zones and outside Regional ParkPursue recreational access link along alignment of past rail line and through Regional Open Space to Central Precinct of urban developmentRemnant rails in Links Ave interpreted as entry element to DunhevedProvide interpretive signage on access route

Zone 3: Kingswood Magazine (KMA including mounds, roads, etc)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Network of roads of a variety of materials, sinuous alignments along contoursHardstand areasEarthworks and building footprints	<ul style="list-style-type: none">Located partly in proposed zone 3 (western precinct) recreational focusTrack system conserved as recreational accessHardstand areas retained with in pavement marker / identifierMarkers to identify bunker names / numbersInterpretative signage to explain munitions history and industrial processes

Zone 3: Shell Filling (including mounds, roads, buildings, etc)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Road pattern and connection to road systemBuildings and their relationship with other componentsEarthworks and building footprints	<ul style="list-style-type: none">Located in proposed Zone 3 (main visitor precinct)Shell filling pads retained for picnic / gathering usesNames of spaces to relate to past use / identifying numbers / namesProvide interpretive signage to explain past use and processProvide access up onto berms to enable viewing over

Zone 3: Bomb Filling (including mounds, roads, buildings, etc)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Road pattern and connection to L-28Earthworks and building footprints	<ul style="list-style-type: none">Located in proposed zone 3 (Central Visitor Precinct)Main area retained for picnic / gathering uses and additional event space (eg community marketsProvide interpretative signage to explain past use and process

All Zones: Boundaries

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">TracksCleared lines amongst treesDelineation through differences in vegetation types, etc	<ul style="list-style-type: none">Tracks conserved as part of park access system either as day to recreational tracks or access tracks in controlled access areasName track loops in Zones 1 and 2 (that is zones of general public access) interpreting land grants / ownership

All Zones: Cleared areas

Key Physical Attributes	Masterplanning Strategies
<ul style="list-style-type: none">cleared, grassland settingSome edges coinciding with fence or boundary lines	<ul style="list-style-type: none">Located in proposed Zone 2 secondary conservation focusClearing to be maintained - potential for native grass research to continue research role of this areaProvide interpretive signage adjacent track

All Zones: Stands of trees

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">mature original trees in a groupAssociated understorey	<ul style="list-style-type: none">Located in proposed Zone 1 and zone 3 (western precinct) recreational focus - adjacent track accessConserve stand of trees - identify as possibly remaining from pre development era in interpretive signage

All Zones: Obsolete Storage (including mounds, roads, etc)

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">Remnant infrastructure	<ul style="list-style-type: none">Located in proposed Zone 1 area conservation focusAllow to revegetate - provide interpretive signage to explain munitions history and industrial process to adjoining paths / tracks

All Zones: Road system

Key Attributes	Masterplanning Strategies
<ul style="list-style-type: none">AlignmentFabric of bridgesRelationship with functional areas and rail	<ul style="list-style-type: none">Located in all areasRoads retained - several to be used as public vehicular access to main visitor precinct and central visitor precinct

4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies

Access & Circulation

Potential Vehicular Entry / Circulation

Vehicular entry is proposed to be provided on existing sealed road surfaces to two of the proposed recreational precincts. Whilst a preferred circulation direction is nominated below - this is flexible to future adaptation if required.

Main visitor precinct

- Entry is proposed from the Ropes Crossing urban development flowing past the proposed visitor centre
- Exit is proposed out onto the main east west link road

As arriving traffic will be dispersed across a greater time frame and exiting traffic potentially focussed on afternoon the highest impact traffic will be to the east west link road.

Bringing traffic adjoining the Ropes Crossing Town Centre was seen by Delfin lend Lease a positive, and DLL advise that there is potential for this access to continue the Ropes Crossing Boulevard axis and link to the existing roadway into the Regional Park by roadways that limit impact on residential streets. Traffic would potentially also flow past the proposed cultural park at the past ADI rail station.

It is proposed that a one way access loop through the main recreational area would be provided with a two way connection to the west to the Transit Stores to house varied recreational and management activities.

It is proposed that gates to entry and exit would be locked at park closing. If events were to be held in the Visitor Centre at night gates would be kept open.

Central visitor precinct

- Entry / exit is proposed from the main east west link road
- A secondary access is proposed to the north to the central precinct of the urban development

Generally traffic would flow on a two way system.

Potential Vehicular Parking

Parking is provided within the main and central precincts and at the edges of the Western and Dunheved precincts as outlined:

Main Visitor Precinct

- Several permanent parking areas serve the visitors centre
- Parking in ninety degree or parallel arrangement adjoining roads will serve the picnic / gathering areas to ADI operational pads
- An event parking area is available in the grass clearing in the south west

Western Visitor Precinct

- Parking in ninety degree or parallel arrangement within Regional Park lands but adjoining roads flanking the park boundary at the main hilltop clearing

Northern Central Visitor precinct

- Parking in ninety degree or parallel arrangement adjoining internal road
- Parking in ninety degree or parallel arrangement at entry from east west link road

Southern Central Visitor precinct

- No parking is envisaged within the Regional Park area - not seen as a regional destination area - and limited facilities are provided
- Parking would occur to adjoining streets if required

Dunheved Visitor precinct

- Parking Bays within site adjoining Links Rd, having regard to views corridors to site from roadway.

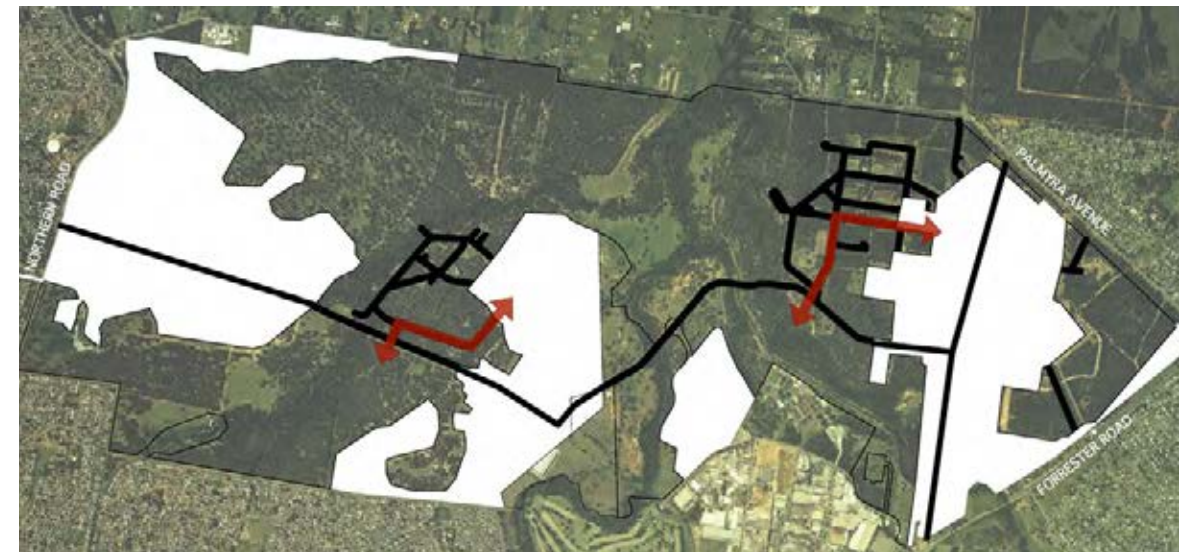


Figure 4.2.4 Potential vehicular entry / exit

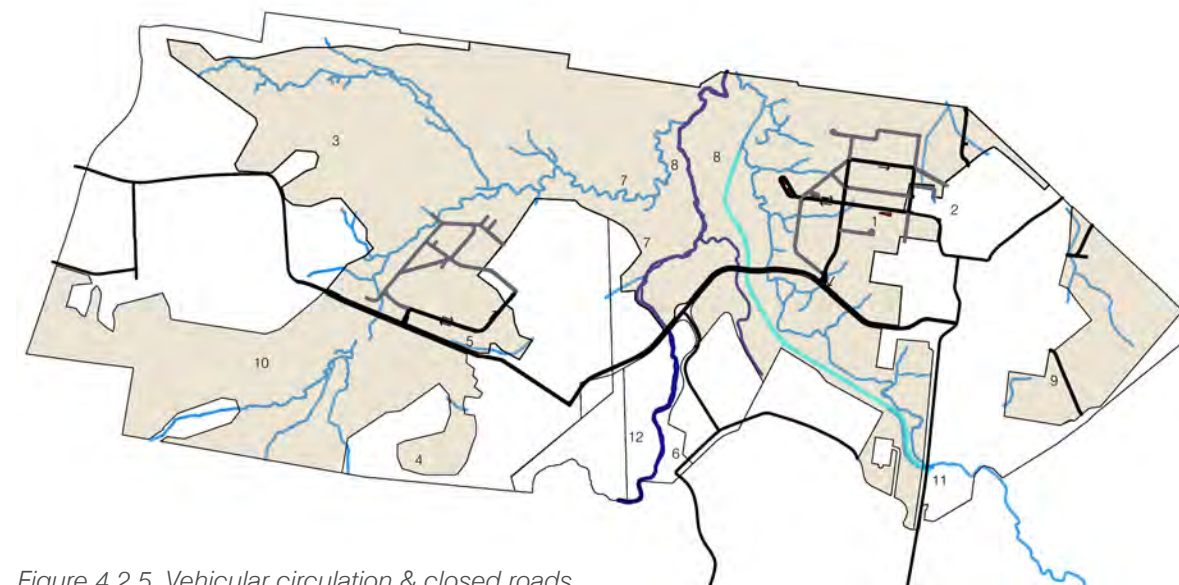


Figure 4.2.5 Vehicular circulation & closed roads

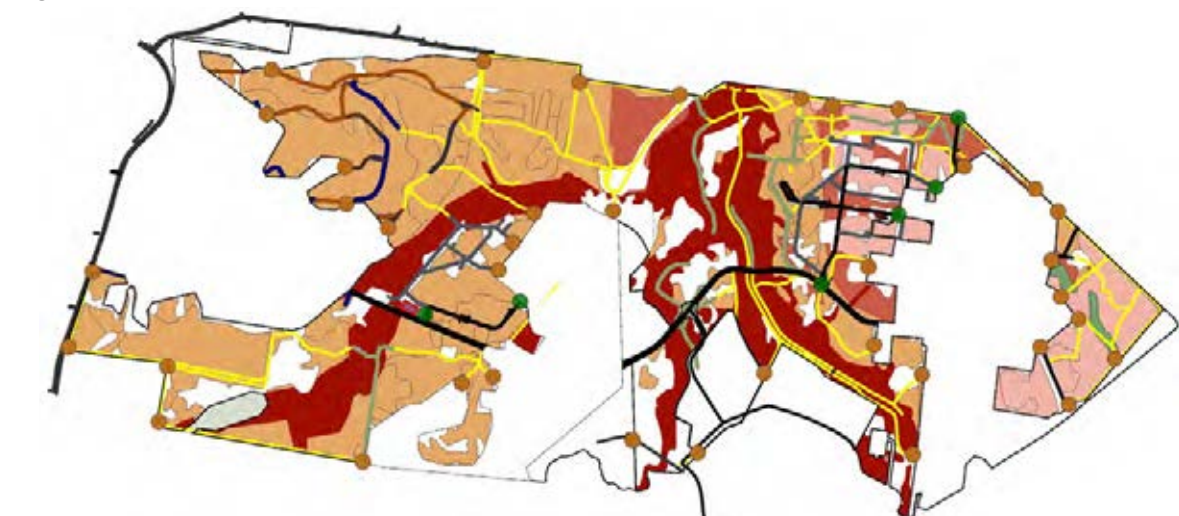


Figure 4.2.6 Access network and vegetation communities



4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies



Site Images: Existing road and track infrastructure will provide the majority of access to the Regional Park (Source : EP NSW)



Key

1. Main Visitor Precinct
2. Main entry zone
3. Western Visitor Precinct
4. Central Visitor Precinct
5. Potential Events Amphitheatre
6. Dunheved Homestead
- 7 Jordans Hill - Jackson's Dairy/ Chimney site
8. Native Grass research
9. Beecroft Butchery
10. Cycle path to heritage rail line

LEGEND

- | | | |
|--|---|----------------------------------|
| Regional park | Proposed Pedestrian / Cycle Access within adjoining developments and open space | South Creek |
| Dam / Other Water body | Proposed Pedestrian / Cycle Access within Regional Parklands | Ropes Creek |
| Development Open Space | Proposed Pedestrian / Cycle linkage through Habitat Zone or Regional Open Space | Existing Secondary Creek |
| Regional Open Space | Proposed Pedestrian / Cycle Access Entry and Connections | Existing Sealed Road (main) |
| Existing ADI Building for adaptive reuse | | Existing Sealed Road (secondary) |
| | | Existing Gravel Road |

Figure 4.2.7 Access network and recreational precincts / points of interest

4 MASTERPLANNING PRINCIPLES

4.2 Masterplanning strategies Recreation and Facilities

Recreational uses

The following uses are addressed in the recreation and use strategy outlined on figure 4.2.8.

- Bushwalking
- Picnicking
- Cycling
- Commercial Tourism
- Education
- Research and Monitoring

Further the plan identifies the following uses as deemed to be inappropriate within Wiannamatta Regional Park:

- Camping
- Dog walking
- Horse riding
- Skateboarding, rollerblading, and similar facilities

Buildings / structures

1. Central (and focal) visitors centre located near the entry (or main entry) to the park
2. NPWS office (potentially located adjoining or as part of visitors centre)
3. Focal Interpretive display (ideally in the visitors centre)
4. Cafe / kiosk and toilet facilities serving main visitor area
5. Picnic and BBQ shelters located adjoining main usage areas at a range of locations
6. Internal event space for site based or community events
7. Meeting rooms for stakeholder and NPWS use
8. Smaller scale toilet facilities serving dispersed recreation areas
9. NPWS maintenance depot
10. Native plant nursery

Parking

11. Main parking area serving central facilities
12. Dispersed parking facilities to user precincts accessible by vehicle

Spaces

13. Open grassed external event spaces of a range of sizes / scales

Signage

14. Main entry signage
15. Precinct identification signage
16. Vehicular wayfinding signage
17. Pedestrian / cycle wayfinding signage through site
18. Interpretive signage through site

Paths / Tracks

19. Shared pedestrian cycle track
20. Pedestrian walking tracks of varied levels (that is width and surface)
21. Cycle tracks of varied levels (that is width and surface)
22. Maintenance access tracks (supplementary to dual use of other access tracks)

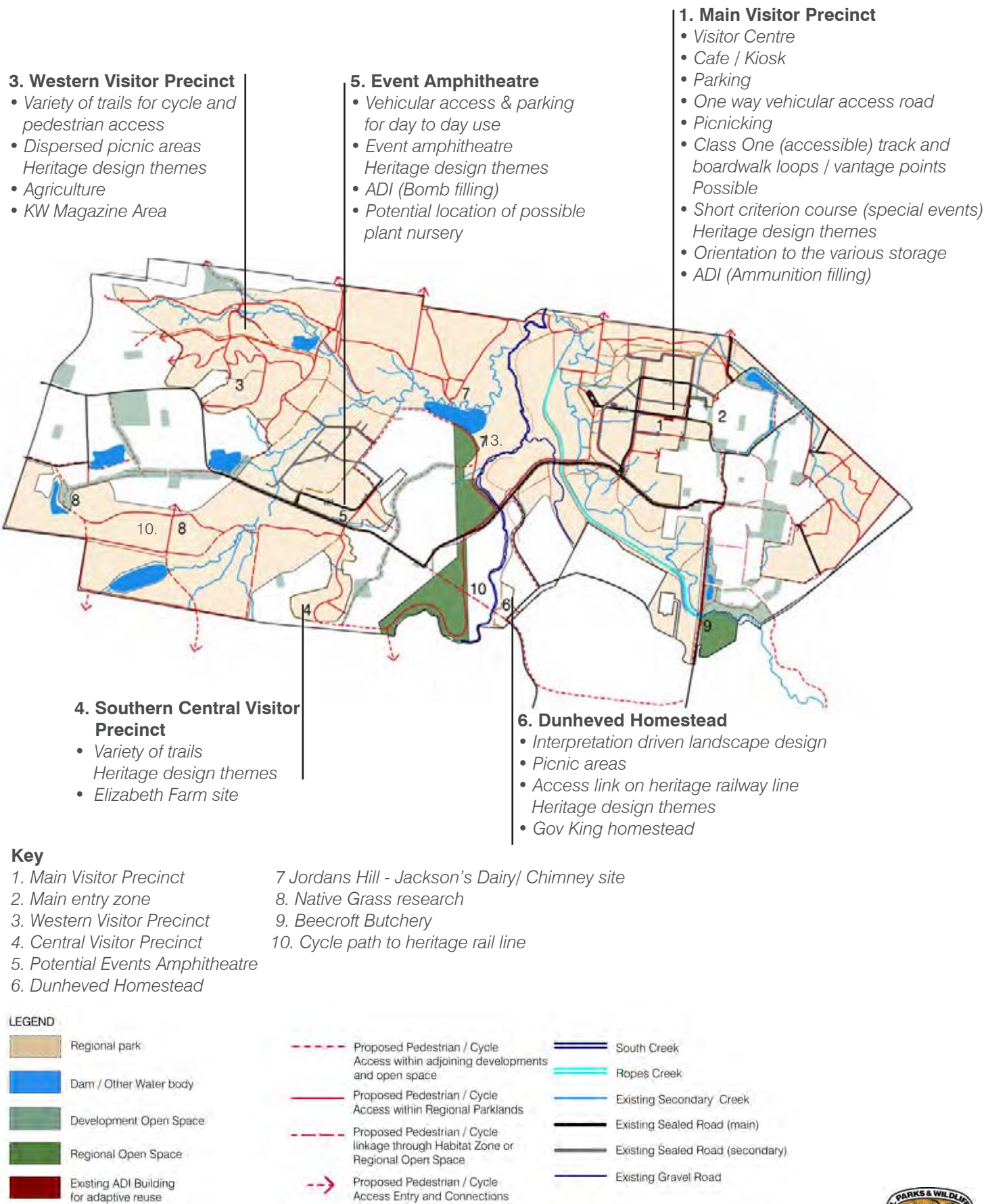


Figure 4.2.8 Recreation and Use Strategy Plan



5.0 REGIONAL PARK MASTERPLAN

5 REGIONAL PARK MASTERPLAN

5.1 Masterplan

As outlined in the masterplan strategies, a core habitat conservation goal has been the formative influence in the masterplanning process. This process reflects the following:

- The refinement of highest priority areas for pursuit of habitat and Aboriginal heritage conservation goals
- Recreational precincts located in areas with less significant existing and potential habitat value - these areas also reflect areas having a major role in ADI development history
- Recreational precincts located to integrate with adjoining urban development communities and related open space systems and access connections
- Phasing of park implementation and co - use allows for coordination of infrastructure and facilities provision (e.g. Adjoining services such as toilets can be located in development open space),
- Positive management and maintenance situation for Regional Park

Regional Park Zones 1 and 2

Required works to realise the proposed masterplan uses and management within the Regional Park will vary within each zone. Zone 1 Primary Habitat Focus and Zone 2 - Secondary Habitat Focus are typified by a generic range of works which will be required across the zones as noted below. Specific strategies for each are identified on the descriptions for Zone 1 and 2 on the following pages.

Zone 1 - Primary Habitat Focus (561ha 62% of RP area 2900 lin/m of boundary):

Ongoing general maintenance of these areas by NPWS will continue such as upgrading to existing fencing and fire trail / maintenance tracks. As well as ongoing macrofauna and vegetation management.

Zone 2 - Secondary Habitat Focus (163ha 18% of RP area 18400 lin/m of boundary):

Ongoing general maintenance of these areas by NPWS will continue such as upgrading to existing fencing and fire trail / maintenance tracks. As well as ongoing macrofauna and vegetation management.

Future staged works will undertake construction of new trail connections including;

- recreation and maintenance tracks,
- long term fauna connections
- shareway access entries,
- interpretative signage/ art and
- boundary fence removal and relocation adjoining selective development interface

Section 5.2 Precinct plans, describes the detailed proposals for each of the proposed recreational precincts.

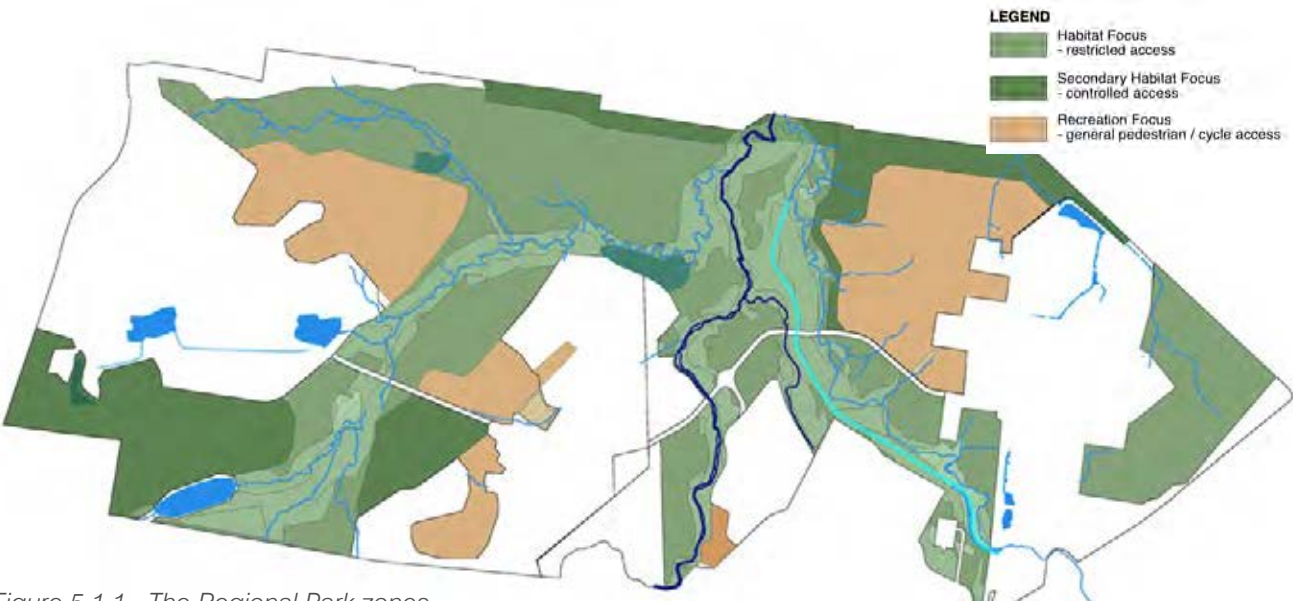


Figure 5.1.1 The Regional Park zones

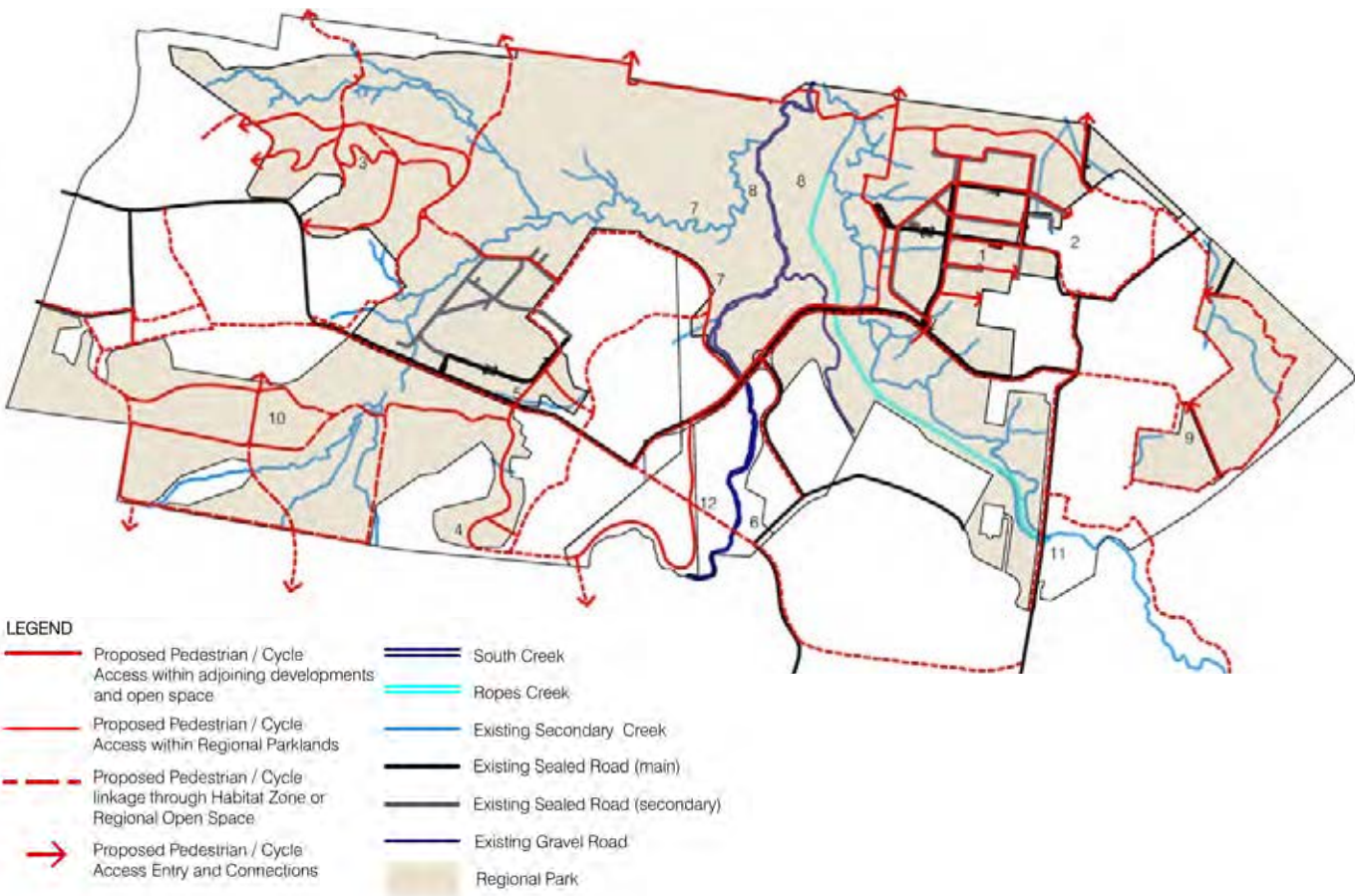


Figure 5.1.2 The Regional Park access system



Figure 5.1.3 The Regional Park Masterplan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans
Park Zone 1 - Primary Habitat Focus (163ha 18% of RP area 18400 lin/m of boundary)

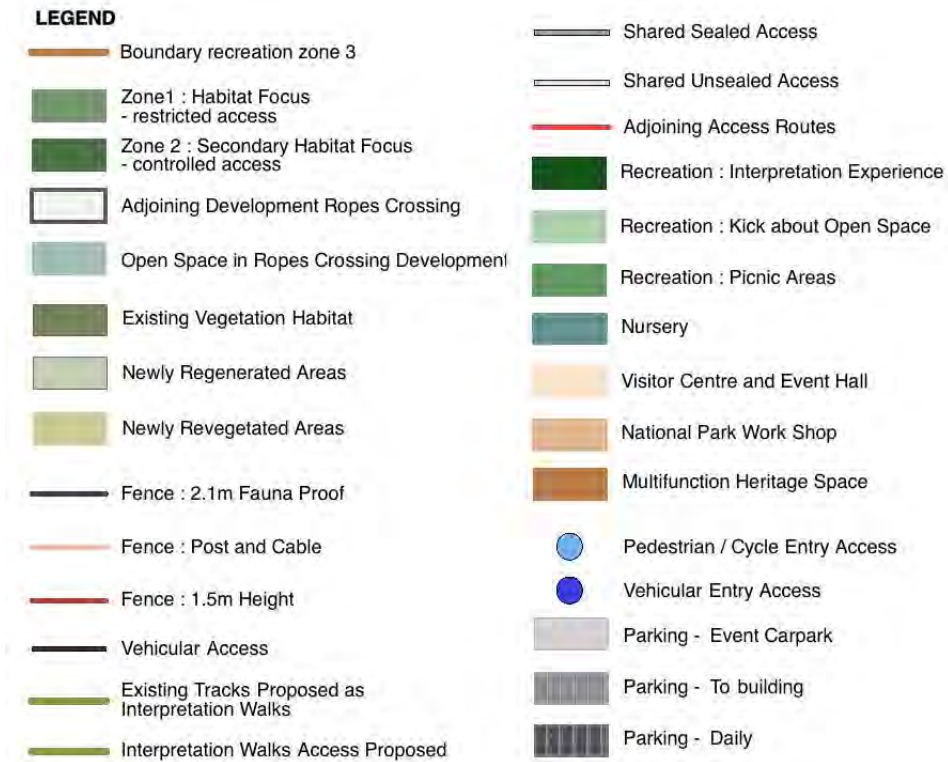


Figure 5.2.1 The Regional Park Masterplan

1. Obsolete Storage Area - provide interpretation on track access
2. Jackson's Dairy remnant building, house site and cleared area
3. Jordan Hill house site and cleared area
4. Access for guided walks in zone 1 from Main Visitors Precinct
5. Opportunity to interpret Silcrete Quarry on adjoining Asset Protection Zone (APZ) pathway/ maintenance and guided access entry
6. Coordinate construction / protection of remnant Chimney in Regional Park Site
7. East West public shared access link corridor with security fence set back from path edge (visual buffer)

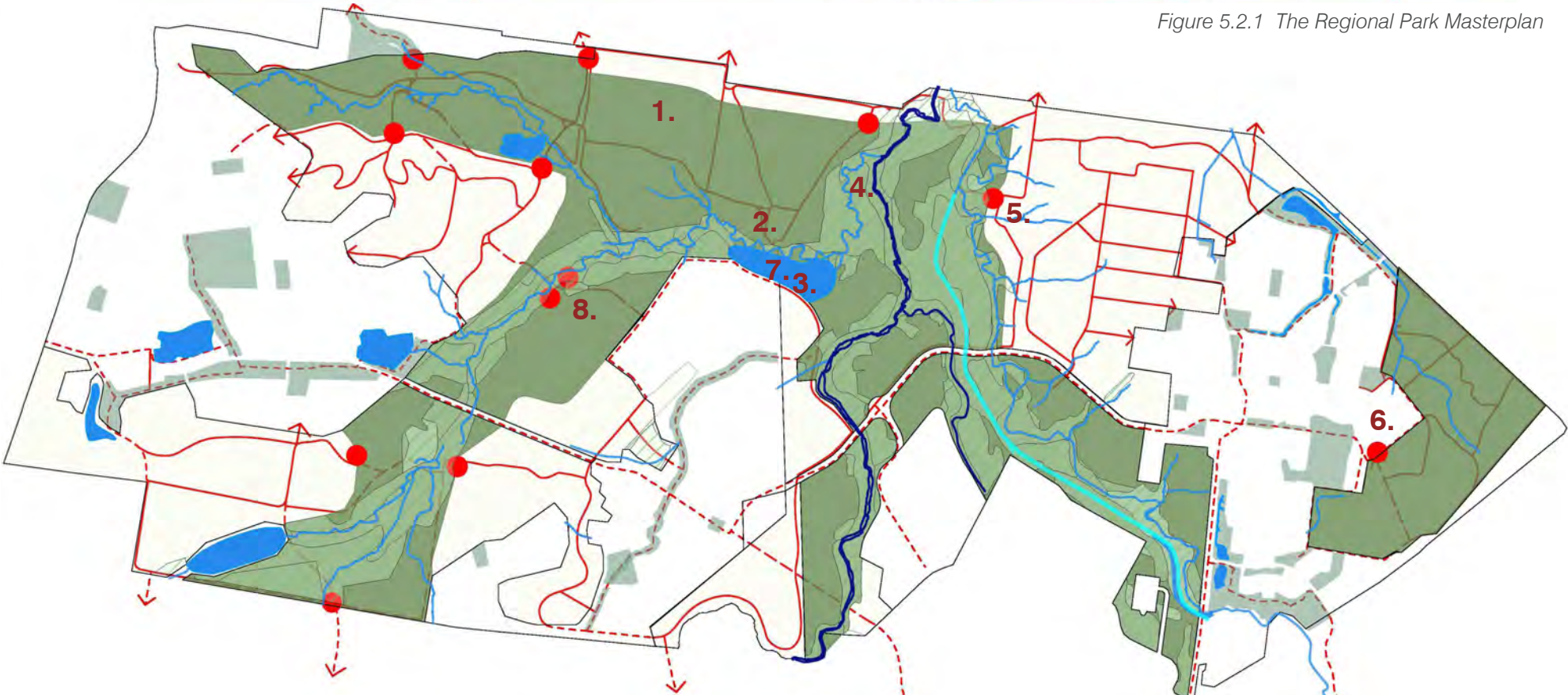


Figure 5.2.2 Zone 1 - Primary Habitat Focus



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans
Flora & Fauna Management

- Weed management and regeneration of Alluvial Woodland riparian corridors
- Weed management and regeneration of other Cumberland Plains sub communities
- Long term macrofauna community resides within Zone 1 of the Regional Park
- Selected management of existing cleared areas to support heritage significant house sites
- Selected management of existing exotic plantings to support heritage significant house sites
- Areas adjoining boundary fencelines to adjoining development are to be planted at denser spacings to ensure maximum visual buffer
- Fauna links via underpasses between sections of Zone 1



Site Image : Fauna connections (Source : EP NSW)



Site Image : Habitat focus (Source : EP NSW)

Heritage / Interpretation

- Explore virtual visits through online interpretation resources
- Track system will function for maintenance and research functions in addition to providing for signage for guided tours through Zone 1
- Interpretation should address the layered values of natural and cultural heritage
- Potential “time capsule” interpretation of natural environment management through use of “then and now” views of bushland
- Interpretation / place marker signage at locations of cultural heritage significance:
 - Jacksons dairy and related clearings / plantings
 - Jordan Hill home site
 - obsolete ADI storage area (possible markers)
- Aboriginal naming of areas of Zone 1 as determined by Aboriginal stakeholders
- Aboriginal naming of track links through all park areas
- Develop public artwork programmes to interpret the history and heritage of the site
- Specific historic phases eg munitions may be interpreted



Illustrative view of trackside interpretation (Source : EP NSW)



Conservation and interpretation of cultural landscape features

Access, Circulation and Carparking

- Secured boundary with 2.1m high black macrofauna proof chain wire fencing to contain macrofauna but maintain movement of smaller fauna via canopy etc.
- General retention of existing track system to provide for maintenance access and research functions through Zone 1
- Retention of key east west public shared access link through Zone 1 between central precinct of urban development and western regional park recreational precinct - provision of security fencing set back from track edge with visual buffer
- Maintain existing bridge crossing to creek line of east west link track
- Monitoring of track surfacing - progressively upgrade crushed rock surface and cross track drainage to highest use / most needing links
- Potential for loop track access as aboriginal “song line” with supporting interpretive signage and markers
- Track system to provide for guided tours through Zone 1
 - run as themed events eg:
 - environment and habitat
 - aboriginal heritage



Site Image : Secure boundary (Source : EP NSW)

Recreation, Visitor Facilities & Services Infrastructure

- Secured boundary to full perimeter of zone 1
- Security gates at designated access points on existing track network to provide for management and guided group access
- Interpretation / place marker signage at locations of cultural heritage significance as per heritage / interpretation
- Selected placement of sitting rocks at gathering / interpretive points along song line walk and other interpretive walks



Site Image : Guided tours (Source : EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans

Park Zone 2 - Secondary Habitat Focus (163ha 18% of RP area 18400 lin/m of boundary):



Figure 5.2.3 The Regional Park Masterplan

- Key
1. Grass clearings - potential native grass research - interpretative signage for past CSIRO use
 2. South Creek Bridge (repair / refit deck upgrade for pedestrian / cycle areas & provide signage map)
 3. Ropes Creek Bridge (repair and adapt upgrade for pedestrian / cycle areas & provide signage map)
 4. Road alignment - conserved as shared access trail - provide interpretative signage
 5. Luxford orchard site - interpret with historic photos
 6. Past property boundaries reflected by existing track alignment

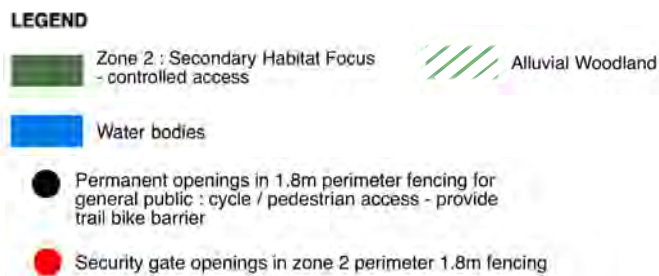


Figure 5.2.4 Zone 2 - Secondary Habitat Focus



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans Flora & Fauna Management

- Long term weed management and regeneration of Cumberland Plains sub communities
- Revegetation to provide visual buffer along boundary and to adjoining development
- Long term macrofauna community to be removed from zone 2 to ensure safety for important public access routes through the zone
- Selected management of existing cleared areas to support heritage significance of past CSIRO research area and allow for future native grass research in Regional Park

Heritage / Interpretation

- Track system will function for recreational access and connections between recreational precincts
- Interpretation related to track access should address the multiple values of natural and cultural heritage values
- Potential “time capsule” interpretation of natural environment management through use of “then and now” views of bushland
- Conserve and manage remnant orchard plantings to Luxford Orchard site
- Interpretation / place marker signage at locations of cultural heritage significance:
 - Luxford Orchard
 - Ropes Creek bridge
 - Wianamatta (South) Creek Bridge
 - Past road alignment east west along north of site
 - CSIRO research clearing
- Aboriginal naming of track links through all park areas
- Public artwork

Access, Circulation and Carparking

- Zone 2 facilitates access between recreational precincts
- General retention of existing track system to provide recreational and linking access
- Secured boundary along boundaries to adjoining landholders (1.8m high security fence)
- Secured boundary to selected locations for short term / medium term security of macrofauna management
- Vehicular/ trail bike control to any unfenced boundaries
- Permanent openings at adjoining roads and open space links for pedestrian / cycle access with trail bike barrier systems
- Monitoring of track surfacing - progressively upgrade crushed rock surface and cross track drainage to highest use / most needing links
- Entry orientation signage at public access points
- Upgrade bridge crossing at Ropes Creek for maintenance, cycle / pedestrian access having regard for heritage fabric
- Upgrade bridge crossing at Wianamatta (South) Creek for maintenance, cycle / pedestrian access - Upgrade for limited width to allow retention of relic fabric of structure for remainder subject to structural advise

Recreation, Visitor Facilities & Services Infrastructure

- Interpretation / place marker signage at locations of cultural heritage significance as per heritage / interpretation
- Selected placement of sitting rocks at gathering / interpretive points along song line walk and other interpretive walks



Site Image : Long term macrofauna removal for safety of public access (Source: EP NSW)



Upgrade bridge link across South Creek maintaining section of bridge as relic fabric (Source: EP NSW)

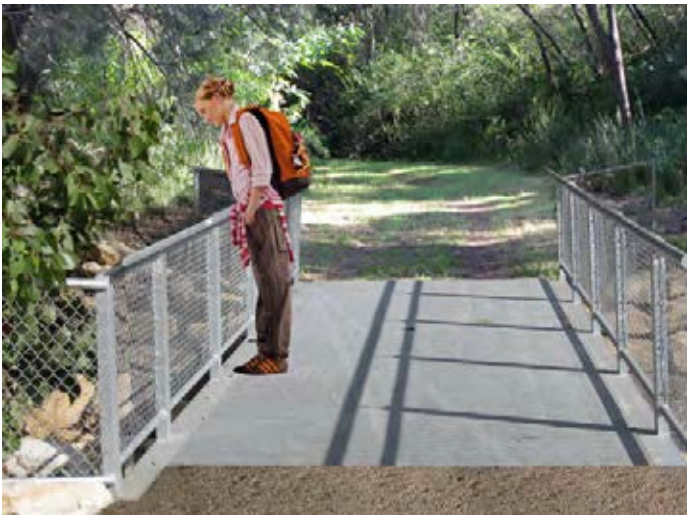


Illustration - upgrade bridge link across Ropes Creek having regard for heritage fabric (Source: EP NSW)



Site Image : Maintenance access (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans

Further detailed proposals have been developed for the recreational precincts comprising Zone 3 of the masterplan. This includes:

- | | | |
|----|-----------------------------------|--------------------------------------|
| 1. | The Main Visitor Precinct | West of Ropes Crossing Development |
| 2. | The Western Visitor Precinct | East of Western Development Precinct |
| 3. | Northern Central Visitor Precinct | East of Central Development Precinct |

It is anticipated that these precincts will be undertaken as highest priority implementation works to facilitate opening of the park to recreational use.

Within the other recreational precincts of Zone 3, planning, design and implementation will be undertaken over a programme to be determined:

- | | | |
|----|----------------------------|--|
| 4. | Southern Central precinct | West of North Central Development Precinct |
| 5. | Dunheved heritage precinct | East of Regional Open Space |

These last two precincts will be influenced by timing of urban development to adjoining precincts (that is Central Development Precinct) and the Regional Open Space, along with outcomes of further heritage investigations to the Dunheved heritage recreational precinct, whilst having regard for the programming of adjoining development.

Landscape Precinct Plans Objectives and Outcomes

Key precinct objectives are listed below:

- To provide detailed advice on the development and management of these landscape zones;
- To provide strong rationale for the design principles and design elements proposed for the zones;
- To provide detailed illustrative plans, sections and perspectives of key landscape areas and elements to clearly illustrate the design intention of the developed zones; and
- To provide innovative and environmentally sustainable design solutions to all aspects of parklands design including solutions to car parking, road works and infrastructure that incorporate 'landscape' or 'soft' civil engineering principles.

To meet these objectives the precinct plans have:

- Taken into account the findings of the Wianamatta Regional Park Plan of Management and Conservation Management Plan;
- Considered the natural and cultural values of the places as well as community aspirations and needs;
- Considered the recreational needs of future park visitors; and
- Been prepared with a long term view to developing visitor improvements in the park.

Staged Works programme

It is envisaged that within Zones 1 and 2 fencing management, high priority weed management, and management of track access will be commenced early in the programme and be ongoing whilst recreational precincts are being

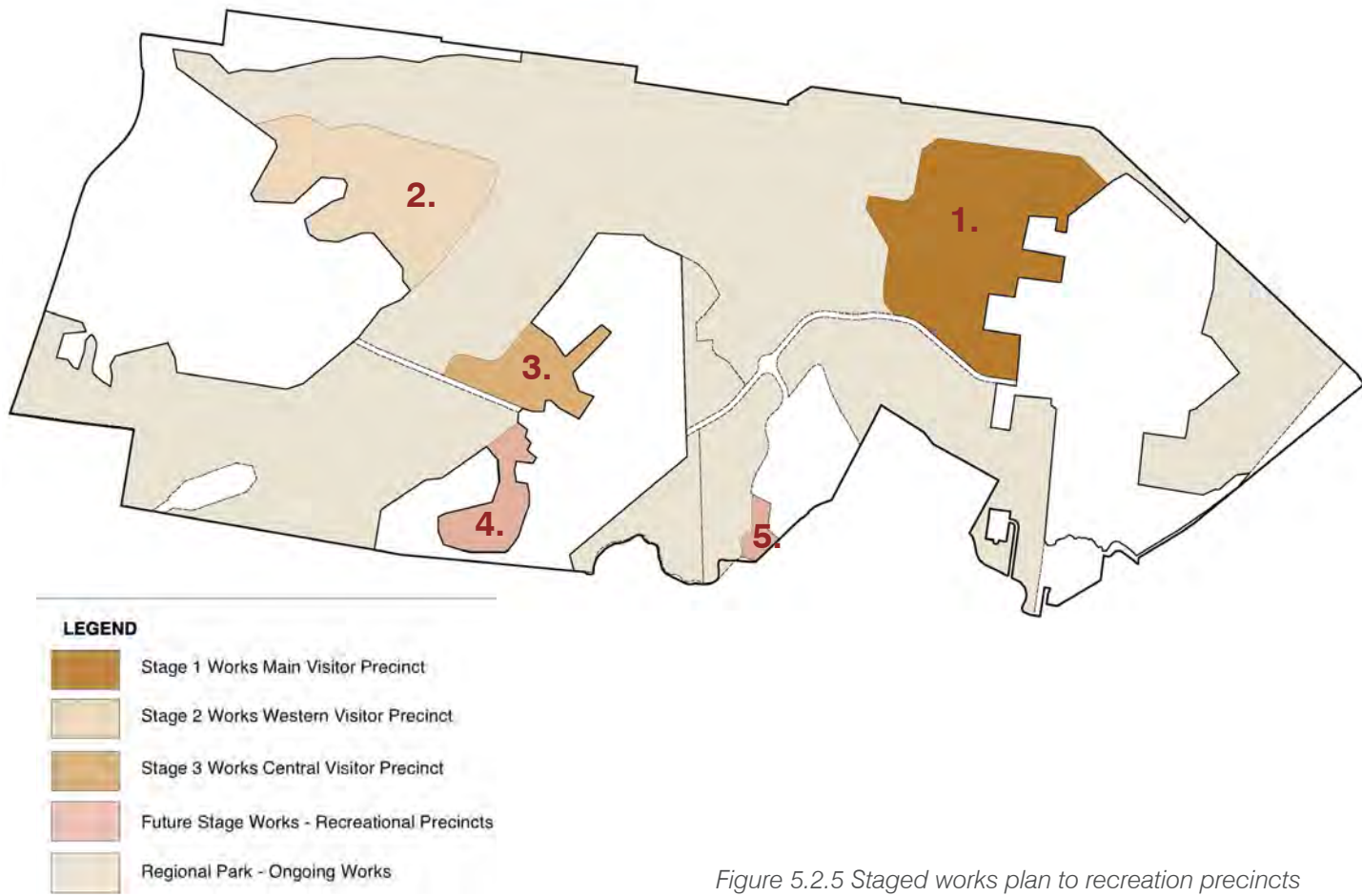


Figure 5.2.5 Staged works plan to recreation precincts

upgraded. Section 5.1 outlined works to be undertaken within zones 1 and 2 in further detail.

Implementation within the recreational precincts (zone 3) as listed above is anticipated to roll out to coincide with adjoining development staging to enable coordination of construction access, servicing etc:

Stage 1 - Main Visitor Precinct

Stage 2 - Western Visitor Precinct

Stage 3 - Northern Central Recreation Precinct

Future Works - Southern Central Recreation Precinct and Dunheved Heritage Precinct

Co-ordination of Precinct Plans undertaken to date

Co-ordination meetings and review of the landscape design plans prepared by Delfin Lend Lease consortium were critical in the preparation and understanding of the opportunities for the Masterplan for Wianamatta Regional Park. This coordination allowed for sensible outcomes to access into the Regional Park via the development areas managed by Delfin Lend Lease.

Further Co-ordination of Development Precinct Plans

NPWS will undertake co-ordination meetings and liaise with the landscape consultants from Delfin Lend Lease to ensure a coordinated landscape planning approach of the Regional Park and the key Precinct Plans and a seamless relationship between the two projects. Facilitation of a holistic design process incorporating heritage and habitat issues to elements such as the water quality control ponds lying at the boundary of the Regional Park will be critical.

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans Park Zone 3 - Recreation Focus: Stage One Works Main Visitor Precinct

A detailed precinct plan has been prepared for the Main Visitor Precinct in the east of the park. It is anticipated that this precinct will be undertaken as priority stage works.

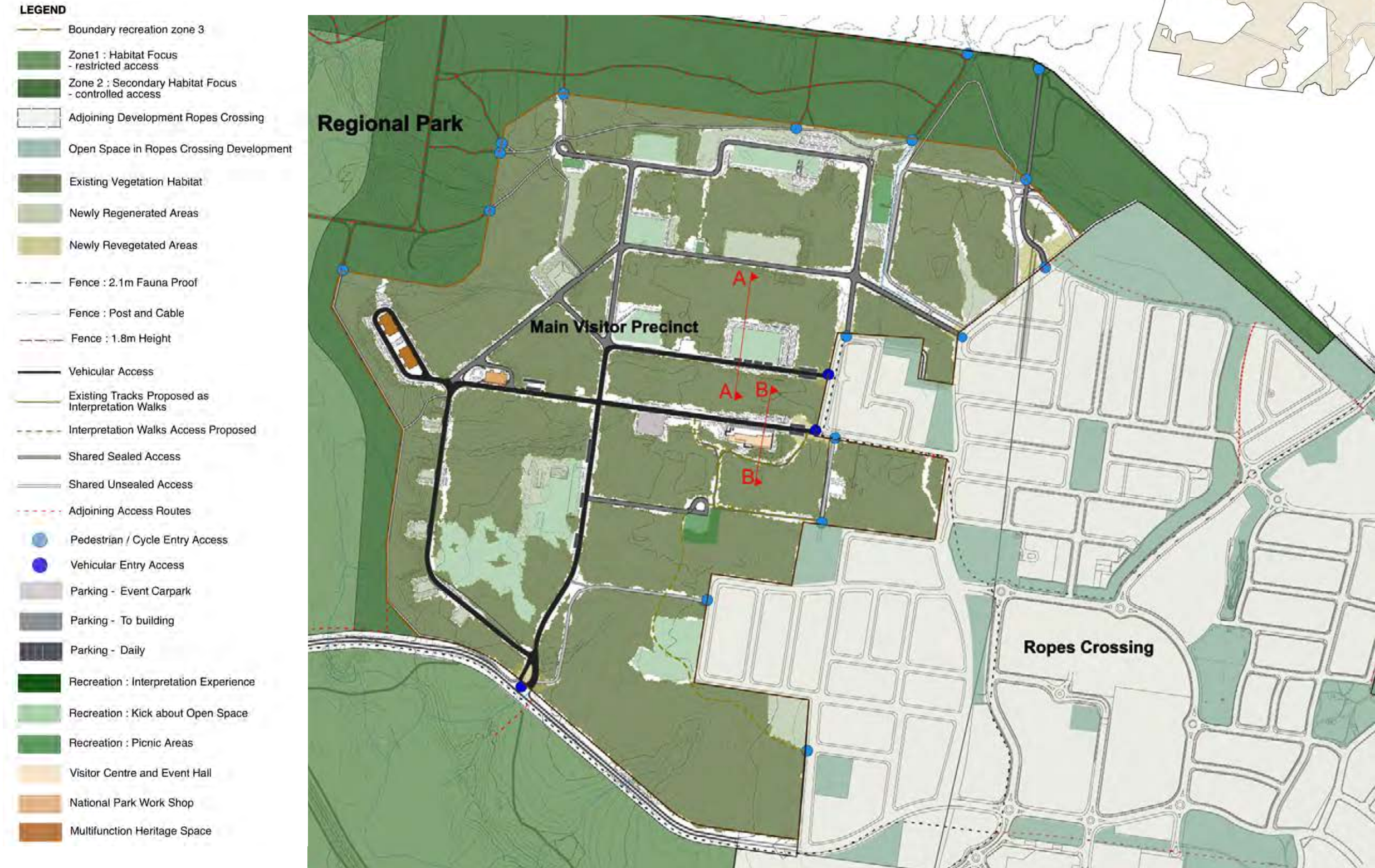
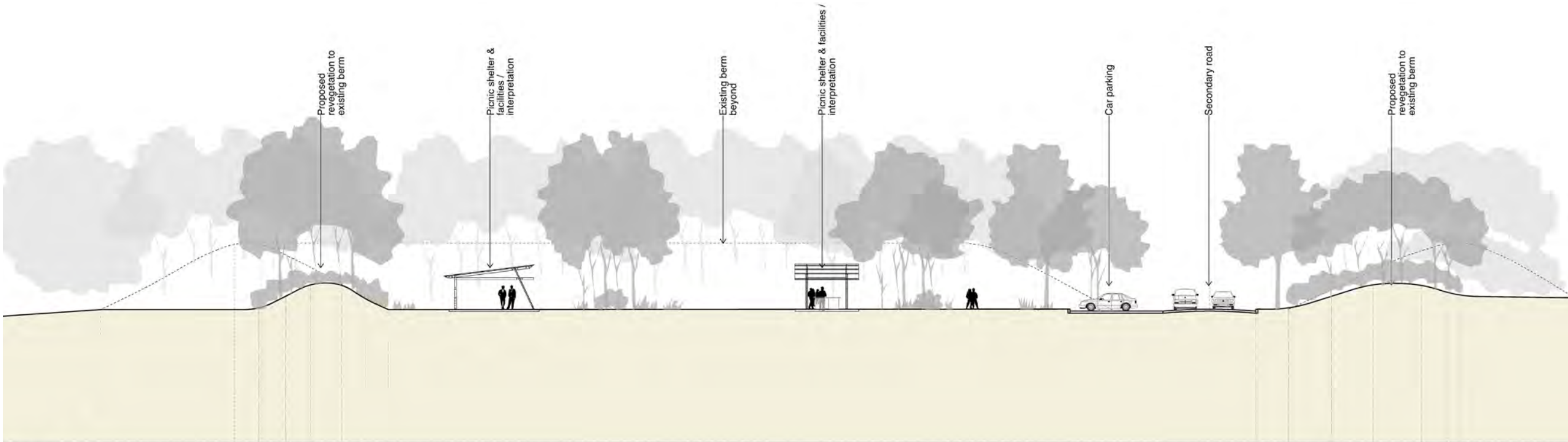


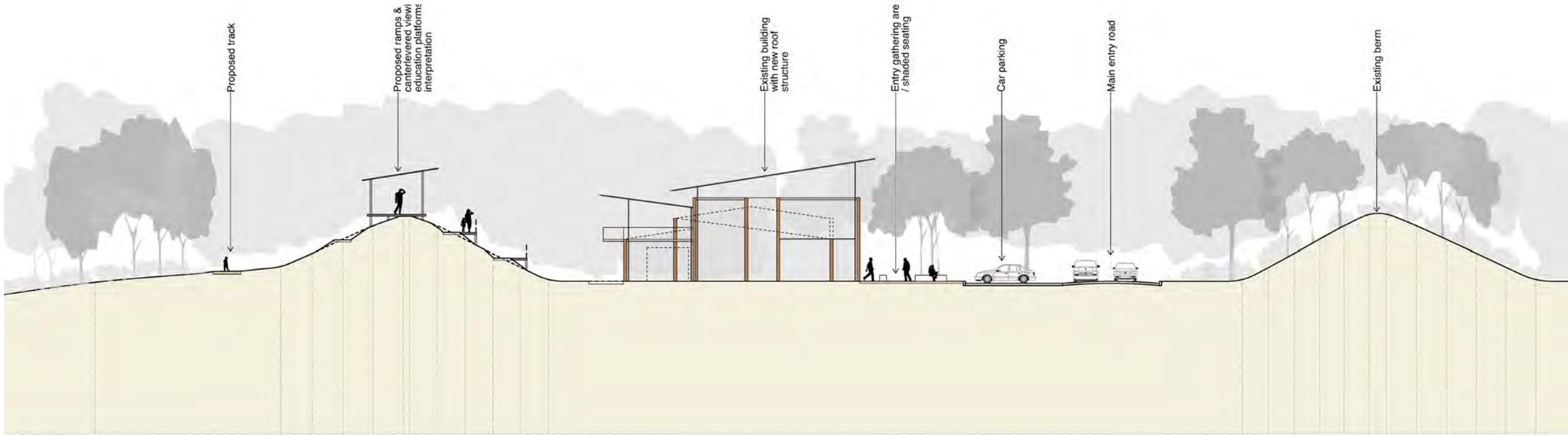
Figure 5.2.6 Main Visitor Recreation Precinct Masterplan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct



Section AA
scale 1:300 @ A3
Figure 5.2.7 Main Visitor Recreation Precincts Section AA (Source: EP NSW)



Section AA
scale 1:300 @ A3
Figure 5.2.8 Main Visitor Recreation Precincts Section BB (Source: EP NSW)



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Traffic Circulation and Car parking, Connectivity & Linkages

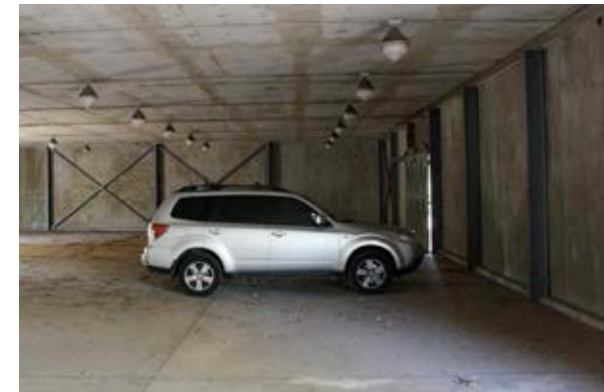
Brief

In developing design solutions for access within the sub-precinct the landscape plans must:

- Provide design solutions for the road network within the individual sub-precincts.
- Consider the existing path and road network;
- Consider wider regional park connections as documented in the "Ropes + South Creek Management Plan" prepared by the Department of Planning in 2005, refer Appendix 9; and
- Take into account the findings of the CMP and Overview Master Plan when determining connections between sub-precincts.

Design Concept

- Two key vehicular entry points are proposed, one from the Ropes Crossing Development to the east linking to an internal one way sealed road system and a second exit (or possible entry / exit) on the East-West Road located to the south of the Precinct.
 - A number of pedestrian/ cycle entries will be provided along the precinct boundaries to the adjoining development. As this precinct will contain facilities such as the main visitor centre that are prone to vandalism the precinct is proposed to be secured in the evenings, and as such these will be lockable gateways. Refer to 4.2 Masterplanning Strategies - Access & Circulation for broader access network.
- To several locations sections of parkland will be permanently publicly accessible through openings in a post and cable barrier that prevents vehicular access (refer section 6.3 fencing and barriers)
- Several key pedestrian / cycle (and Maintenance) entry / links will also be provided through the Regional Park to the Central Visitor Precinct, and to Shanes Park (to the north) and northern regional links.
- A series of existing ADI tracks have been retained to provide the basis for walk /cycle track networks within the precinct.
- The existing sealed roadway network will provide for internal vehicular circulation to proposed picnic and gathering uses in cleared areas. This roadway (potentially including road not generally open to public) could also be used for special events such as criterium cycling or the start of fun runs. Major upgrading of sealed roads is not required. The retention of character width alignment is desirable.
 - The remainder of the existing sealed road will provide for cycle / walking access to the balance of the recreational precinct. Major upgrading of roadways is not required. It is desirable to retain the character of the munitions phase fabric.
- Day use parking will be limited to park edges and designated road side spaces along the one way system, one small car parking area adjacent the Main Visitor Centre (Mine Filing building - S29).
 - Bus and event parking will include two unsealed areas, one at the secondary eastern entry and one centrally located.
 - Consideration should be given to reuse of existing transit store buildings to the west for temporary undercover parking.



Site image: Temporary parking within existing transit stores (Source: EP NSW)



Site image: The main park entry will occur via Ropes Crossing Boulevard through Ropes Crossing including the public cycleway from the Forrester's Road roundabout (Source: EP NSW)

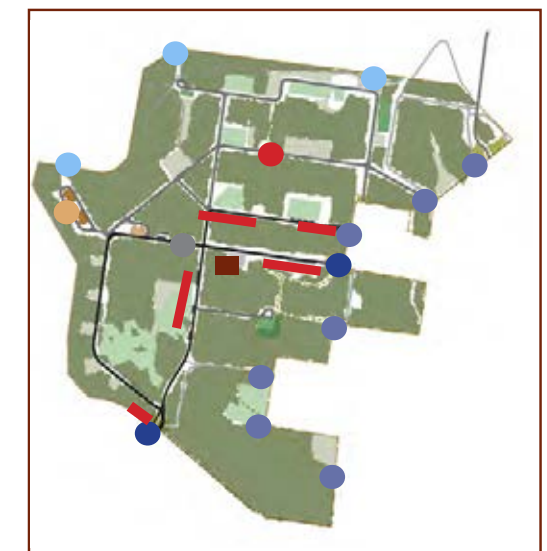
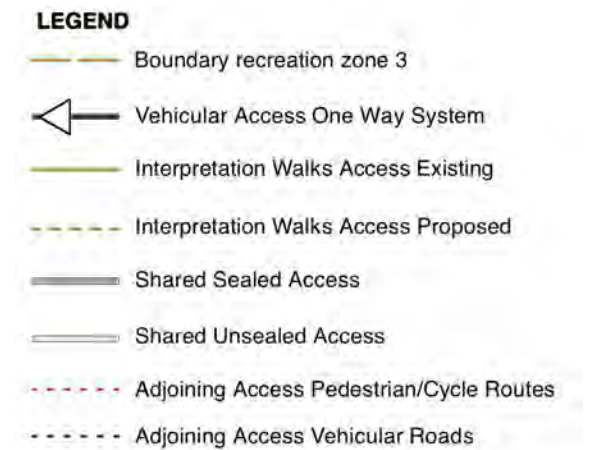


Figure 5.2.9 Traffic Circulation & Parking Precinct Plan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Vegetation management

Brief

In developing design solutions for vegetation and planting within the sub-precinct the landscape plans must:

- Provide a description and plan showing the current vegetation types and locations in the two sub-precincts;
- Identify areas that require additional planting;
- Determine the most appropriate plant species and provide key planting recommendations and plant lists in table form for both sub-precincts, and
- Outline the key management regime for vegetation management within the sub-precincts.

Design Concept

- Regeneration and selective Revegetation of Alluvial Woodland, Shale - Gravel Transition Forest, Cooks River Castlereagh Ironbark Forest and Shale Plains Woodland species to occur throughout this precinct.
- Revegetation planting areas located adjacent entries and visitor facilities are to be planted at denser spacings to ensure maximum visual impact
- Use planting to emphasise land forms to assist interpretation of the munitions phase
- Possible interpretation of the WWII test range through maintenance of cleared corridor (refer Figure 5.2.17)



Figure 5.2.10 Proposed Regeneration and Revegetation Areas



Site image: existing low lying areas to precinct
(Source: EP NSW)



Site image: existing cleared areas to be retained as open space recreation gathering
(Source: EP NSW)



Montage: frontage areas to buildings requiring further planting
(Source: EP NSW)



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct

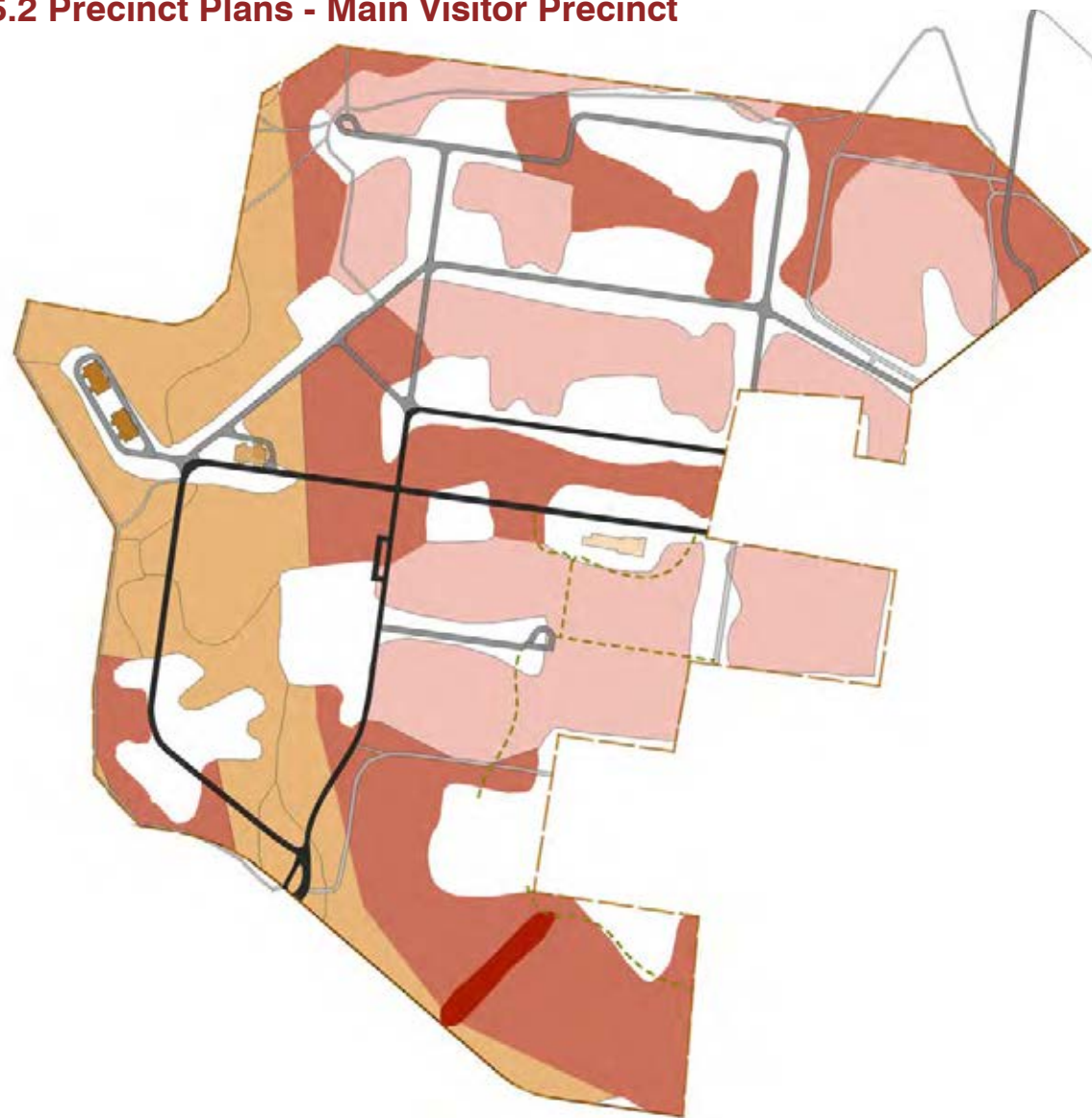


Figure 5.2.11 Existing Vegetation Communities Precinct Plan

Landscape Function	Botanic Name	Common Name	Height	AW	SGTF	CRCIF	SPW	FW	CSGW
Tree	Eucalyptus tereticornis	Forest Red Gum		X	X		X		
	Allocasuarina littoralis	Black She-Oak							X
	Eucalyptus baueriana	Blue Box		X					
	Eucalyptus crebra	Narrow-leaved Ironbark					X		
	Eucalyptus fibrosa	Broad-leaved Red Ironbark			X	X	X		
	Eucalyptus moluccana	Grey Box			X		X		
	E. parramattensis subsp. parramattensis	Parramatta Red Gum							X
	Eucalyptus sclerophylla	Scribbly Gum							X
	Bursaria spinosa	Blackthorn					X		
	Casuarina glauca	Swamp She-Oak		X					
	Dillwynia tenuifolia		0.4m - 1m				X		
	Melaleuca decora	White Feather Honeymyrtle				X			
	Melaleuca lineariifolia	Snow-In-Summer		X				X	
	Melaleuca nodosa	Ball Honeymyrtle				X			X
	Melaleuca decora),	White Feather Honeymyrtle							X
	Angophora bakeri	Narrow-leaved Apple							X
	Angophora subvelutina	Broad-leaved Apple		X					
	Angophora floribunda	Rough-barked Apple		X					
Shrub	Typha orientalis	Broad-leaved Cumbungi						X	
	Dillwynia tenuifolia		0.4m - 1m	X	X	X			
	Pultenaea parviflora		to 1m	X	X	X	X		
	Micromyrtus minutiflora		2m	X	X	X	X		
	Persoonia nutans		2.5m	X	X	X	X		
Grasses/Groundcovers	Grevillea juniperina subsp. juniperina		0.5-1.5 m	X	X	X	X		
	Centella asiatica	Gotu Kola						X	
	Juncus usitatus	Common Rush						X	
	Persicaria decipiens	Slender Knotweed						X	
	Cynodon dactylon	Couch Grass						X	

Proposed Revegetation Species List (refer Appendices for full list)



Alluvial Woodland (Source: EP NSW)



Shale - Gravel Transition Forest (Source: EP NSW)



Cooks River Castlereagh Ironbark Forest (Source: EP NSW)



Shale Plains Woodland (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Interpretation

Brief

Interpretation will be a key tool for visitors in providing park information and directions as well as information about the natural and cultural values of the place. Develop interpretation that enables visitors to understand the shell filling production process. Establish this precinct as the major arrival / visitor orientation point for the park.

The precinct plans:

- Identify locational opportunities for the provision of interpretive facilities as self guided walks, signage and brochures, as well as more contemporary materials such as downloadable from the web;
- Examine the need and desirability of establishing an interpretive/visitor information and/or education/research facility within one of the zones; and
- Present an interpretive strategy that develops key themes and sub themes for the zones and identifies key interpretive methods, sites and implementation recommendations.

Design Concept

Most of the Main Visitor Precinct was used as the Shell Filling Area (L-29) during the ADI's sites Munitions and Storage Project 590 phase which occurred on site between the 1950s and the 1990s. Four buildings were retained as they did not require remediation during site demolition/ remediation and were retained for their heritage values. As summarised below;

Figure / map reference	Heritage reference (CMP)	Heritage: Munitions & Storage 1950-1990s	Proposed NPWS reuse and building interpretation	Additional Interpretation opportunities (Refer CMP) to within buildings
●	S29	The Mine Filling Building (never commissioned)	NPWS Main Visitor Information Centre -Conservation in practice, building cut aways, cross sections, paint scrapes, & remnant layering (CMP)	- Permanent on site exhibition - Public events - Archaeology and objects - Possible display of "Brass Strip" ADI artefacts if available
●	S42	Transit Stores (used to store finished products prior to transport)	NPWS workshop maintenance depot	- Interpretative signage
●	S43 & S44		multi- function heritage space potential usage including; Shaded Parking, School camping/education & Bike storage/ rentals	- Communication media - Interpretative signage - Public Events

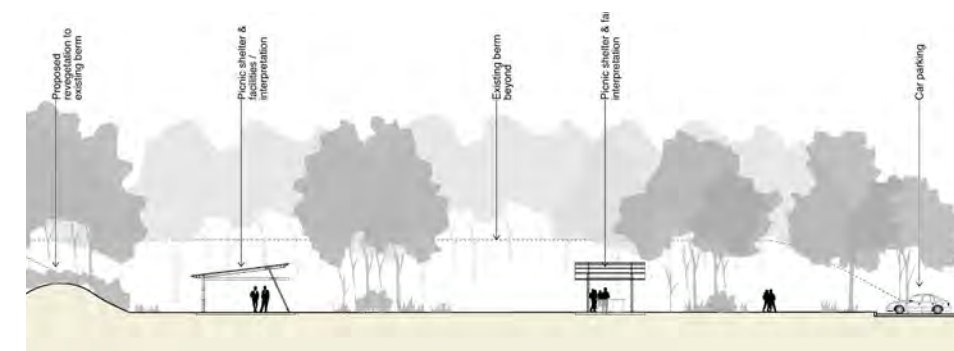


Figure 5.2.12 Cross section - showing detail of possible adaptive refurbishment of Mine Filling building

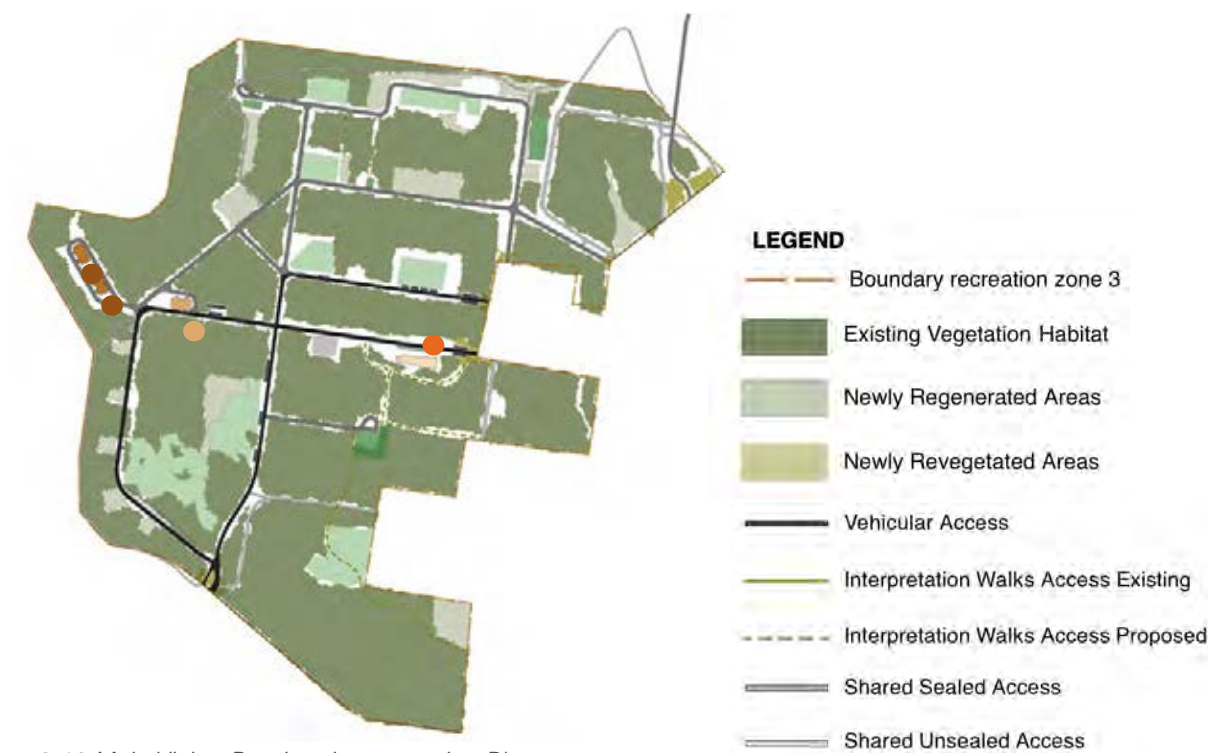


Figure 5.2.13 Main Visitor Precinct Interpretation Plan



● Figure 5.2.14 - S29 -The Mine Filling Building (Source: EP NSW)



● Figure 5.2.15- S43 & S44 -Transit Stores (Source: EP NSW)



● Figure5.2.16 - S42 Transit Store -Proposed NPWS workshop maintenance depot (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct

It is proposed that the cleared spaces in which the demolished ADI shell filling complex stood can be interpreted through:

- 1. Developing a self guided walk that follows the shell filling production process
- 2. Naming of spaces after their past munitions function including building code where applicable
- 3. Retention and adaptive reuse of hardstand areas
- 4. Ground marking through concrete and steel markers of past building footprint
- 5. Multi theme interpretational totems (see below ●)

The plan below identifies the function of the buildings through the Shell Filling area.



- | | |
|---|--|
| 1. Breaking Down Building | 6. Medium Calibre Shell Filling Building |
| 2. Rocket Assembly Building | 7. Heavy Calibre Shell Filling Building |
| 3. Cartridge Assembly Buildings (2) | 8. Mine Filling and Finishing Buildings |
| 4. Meissner Shell Filling and Finishes Building | 9. Workshops and Stores |
| 5. Test Range (WWII) | |

Figure 5.2.17 ADI Functional Areas - for potential interpretive naming of spaces



Figure 5.2.18 Montage depicting potential boardwalk access along top of berms adjoining Transit Stores in west of precinct (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Recreation and Use

Brief

The landscape plans must include:

- Information on the appropriate level of recreational access and use;
- Identification of the types of activities that may be appropriate to the sub-precinct; and
- Detailed design of the path, track and cycle networks within individual sub-precincts.

Design Concept

- Visitor facilities locations are to include picnic benches/ tables and shelter. Visitor facilities can incorporate interpretation as outlined in the Materials and Finishes section. These are to be spaced throughout the precinct to allow for differing habitat experiences within the precinct found along pedestrian and cycle track routes.
- A self guided interpretative walking track route is to circulate through the precinct which includes a sequence of historic and habitat experiences. A portion of this walk adjacent the Main Visitor Precinct is to incorporate all abilities decked access to ADI berms located around Munitions filling and remnant bushland habitat experience.
- Smaller cleared maintained grasslands area are to be maintained for day to day gathering - these are to incorporate picnic facilities and some specific interpretation art works and signage. Additional tree planting for shade should be incorporated into design development.
- A large cleared grasslands event area is to be maintained as a significant gathering open space for markets / outdoor cinema etc which includes overflow carparking area.



Figure 5.2.19 Recreation locations within Main Visitor Precinct Plan



Figure 5.2.20 Montage of Day to Day Recreation within Main Visitor Precinct - picnic use of cleared areas to past shell filling buildings (Source: EP NSW)



Figure 5.2.21 Montage of Event Recreation within Main Visitor Precinct Plan (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Visitor Facilities

Brief

The landscape plans must include:

- Details of the visitor facilities required for each sub-precinct, as per the Park Facilities Manual;
- Appropriate adaptive reuse of existing buildings for visitor facilities where appropriate; and
- Location of toilets, picnic areas, information points and food or other outlets.

Design Concept

- NPWS information points are to be located at key entries to the precinct as both a way finding tool and educational tool to promote understanding of habitat and heritage within the Wianamatta Regional Park area and specifically to the Main Visitor Precinct.
- A second series of information points are to be located throughout the precinct as both a way finding tool and interpretative walk through interactive story telling and web links which outline habitat values and heritage of the Wianamatta Regional Park area and specifically to the Main Visitor Precinct.
- 3 Toilet facilities are to be located where possible within the remnant building footprints. Disabled toilets should be incorporated into these locations.

Public toilets to more isolated areas within open spaces are to be considered as part of the overall open space network located within the adjacent Ropes Crossing precinct outside the Regional Park boundary.

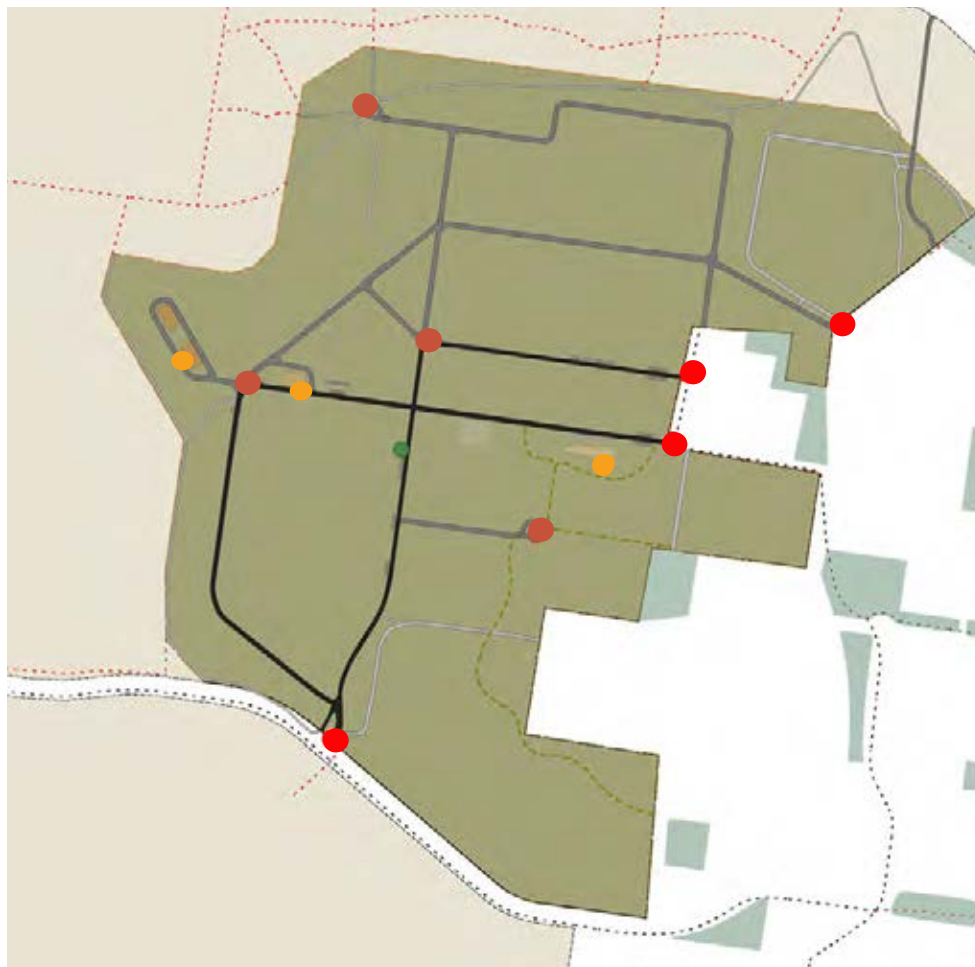


Figure 5.2.22 Visitor facility locations to Main Visitor Precinct Plan



Figure 5.2.23 Montage depicting typical Interpretative viewing point to top of berm near Visitors Centre
(Source: EP NSW)



Figure 5.2.24 Montage depicting typical toilet block provided between Transit Stores in west of precinct
(Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Main Visitor Precinct Services / infrastructure planning

Brief

A separate project mapping of existing services is to be conducted by DECCW. At this time this information is not available. Notwithstanding it's evident that there will in reality be limited potential for re-use of sewer, water, and power infrastructure due to age, compliance, and damage during demolition

Design Concept

Built Elements

- The existing path and road network to within the precinct is to form the basis of the vehicular/ pedestrian and cycle routes.
- Additional track and roads should be kept to a minimum and function only as linking existing routes.
- Remnant kerbs, gutters and drains scattered through out the precinct should be assessed for functionality and liability and retained if possible.
- Existing fences and gates are to be used along the precinct boundary to Regional Park zones where possible. All new fencing and gates are to be in line with the NPWS facilities manuals. Long term removal of boundary fences to open space areas adjoining the Ropes Crossing development should be considered.

Drainage

- Build up soil levels for proposed maintained grass areas and to key access paths to define overland flow routes.
- Provide overland flow escape routes for stormwater drainage - where levels preclude excavate to provide small wetland zones to hold and promote infiltration of drainage.
- Assess drainage adjacent to buildings and adapt if necessary to provide clear overland flow escape path building from level areas.

Services

- Water, sewer and power services from ADI phase are aged and in poor condition where present.
- It is proposed that new services connections are provided. These will be most practically provided along the proposed entry road from the Ropes Crossing urban development. This will provide the most direct route enabling reticulation to the proposed Visitors Centre and other buildings to be adaptively reused.
- Development is currently progressing in the adjoining area making connections feasible in the short term.
- Levels for sewer connection will need to be reviewed in detail from buildings and proposed toilet locations.



Site image: Existing Roads to Main Visitor Precinct
(Source: EP NSW)



Site image: Fencing/ Gates to Main Visitor Precinct
(Source: EP NSW)



Site image: Existing drains to Main Visitor Precinct
(Source: EP NSW)



Site image: Kerb and gutters to Main Visitor Precinct
(Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

Park Zone 3 - Recreation Focus: Stage Two Works Western Visitor Precinct

A detailed precinct plan has been prepared for stage two works located to the west of the park. It is anticipated that this precinct will be undertaken as the second stage of priority works, which will be programmed for construction following development and population numbers increase in the surrounding new suburbs.

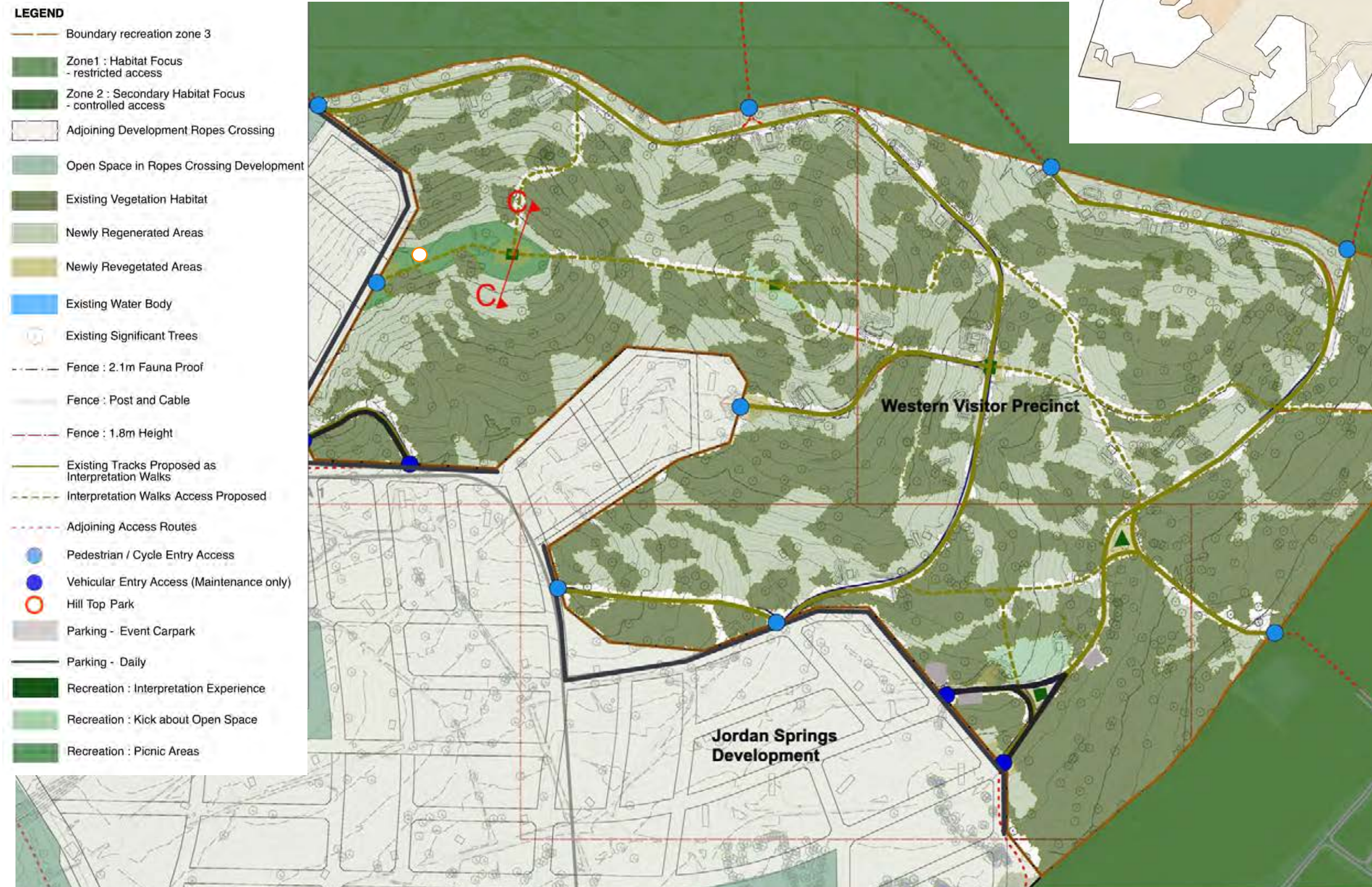


Figure 5.2.25 Western Recreation Precinct Masterplan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

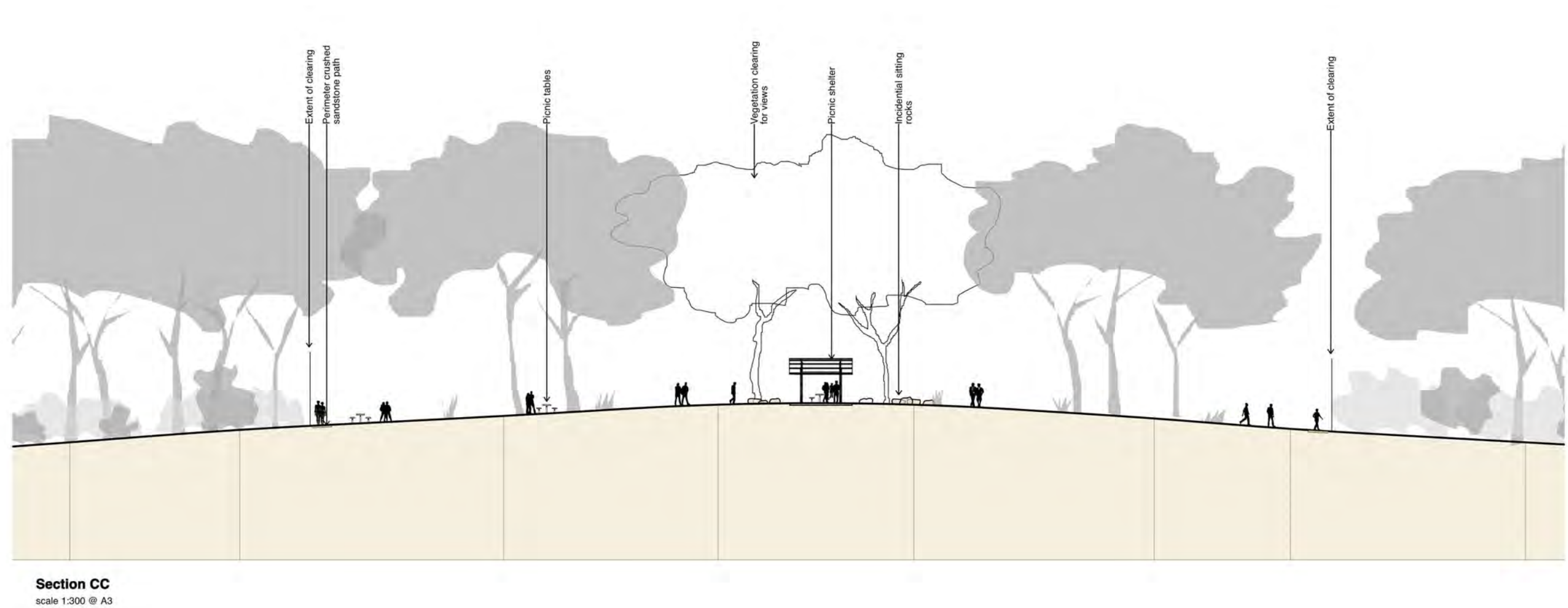


Figure 5.2.26 Western Recreation Precincts Section CC (Source: EP NSW)



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct Traffic Circulation and Car parking, Connectivity & Linkages

Brief

In developing design solutions within the Regional Park the detailed landscape plans must:

- The consultant will be required to provide design solutions for the road network within the individual sub-precincts.
- Consider the existing path and road network;
- Consider wider regional park connections as documented in the “Ropes + South Creek Management Plan” prepared by the Department of Planning in 2005, refer Appendix 9; and
- Take into account the findings of the CMP and Overview Master Plan when determining connections between sub-precincts.

Design Concept

- Two vehicular entry points are proposed along the western boundary adjoining the proposed residential development area. These are proposed only as vehicular turning, arrival and event parking access points to mitigate potential traffic congestion to residential neighbourhoods. No permanent vehicular access is proposed through the precinct.
- A number of secondary level pedestrian/ cycle entries will be provided along the precinct boundaries to the adjoining development to the south and west. Adjoining the urban development where roads front the recreational precinct it is proposed that a post and cable vehicle barrier is provide but where residences adjoin a 1.8m high security fence is provided (refer 6.3 Fences and Barriers)
- Several key pedestrian / cycle (and Maintenance) entry / links will also be provided through the Regional Park to Habitat Zones 1 & 2 to the east and north (linking through to the northern regional links) and access to Cranebrook (proposed NPWS managed site).

A series of existing tracks have been retained and form the walk /cycle track networks around the precinct. These consist of a mixture of surfaces including concrete, asphalt loose gravel, dirt and grassed. Connections to the Main Visitor Precinct are provided from the north east of the precinct

Site Parking will be limited to park edges as no day to day vehicular access will be provided within this precinct.

- Bus parking will be limited to the one way vehicular entry point to the west
- Event parking is provided adjacent the main vehicular entry points in the south, some long term additional parking may be considered necessary to the main hill top park (○ Hill top park).
- Visitor parking is to be provided as ninety degree or parallel parking within the Regional Park property but adjoining the roadway corridor anticipated to flank this section of the park



Site image: North western entry adjoining Western Precinct development (source EP NSW)



Site image: Typical grassed track within precinct (source EP NSW)



Site image: Typical gravel track within precinct (source EP NSW)

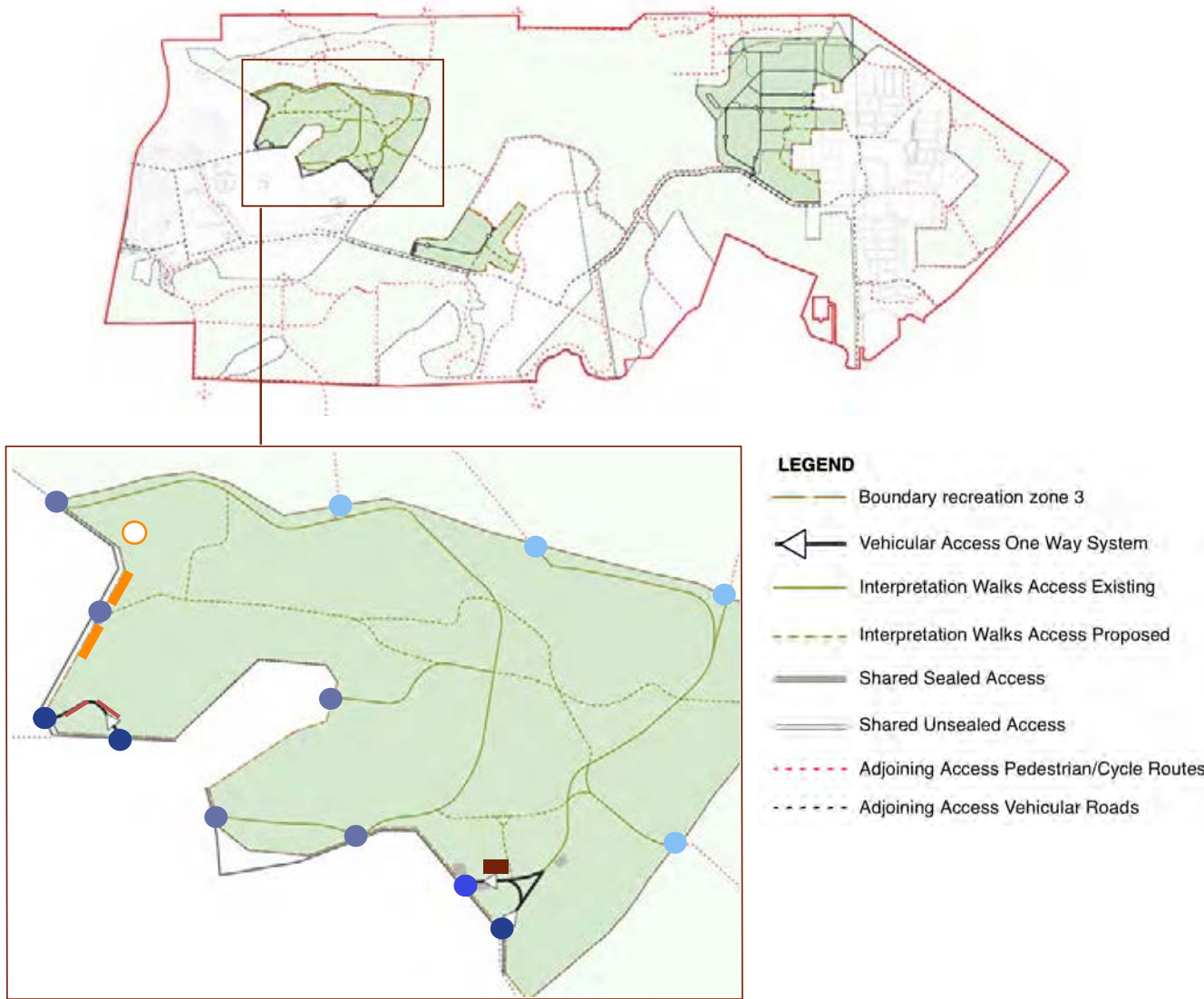


Figure 5.2.27 Traffic Circulation & Parking Precinct Plan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

Vegetation Management

NPWS Brief

In developing design solutions for vegetation and planting within the sub-precinct the landscape plans must:

- Provide a description and plan showing the current vegetation types and locations in the two sub-precincts;
- Identify areas that require additional planting;
- Revegetation plant species list and provide key planting recommendations and plant lists in table form for both sub-precincts, and
- Outline the key management regime for vegetation management within the sub-precincts.

Design Concept

- Regeneration and revegetation of Shale Plains Woodland species which predominately occur throughout this precinct. Some small areas to the south east include Alluvial Woodland species.
- Areas located adjacent entries and Visitor facilities are to be planted at denser spacings to ensure maximum visual impact
- Soils, topography and drainage are to be considered surrounding proposed visitor picnic and toilet facilities
- Weed management in accordance with NPWS practises

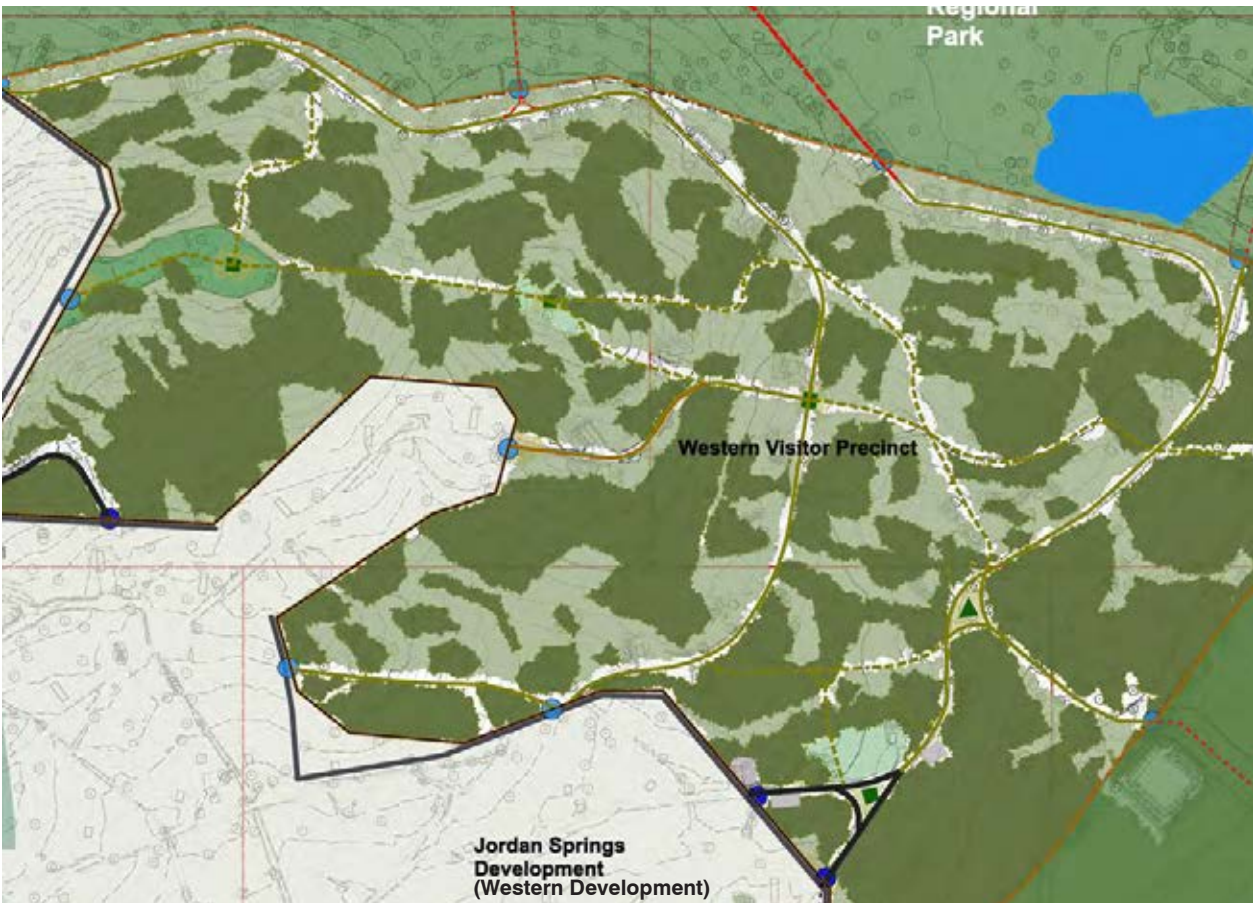


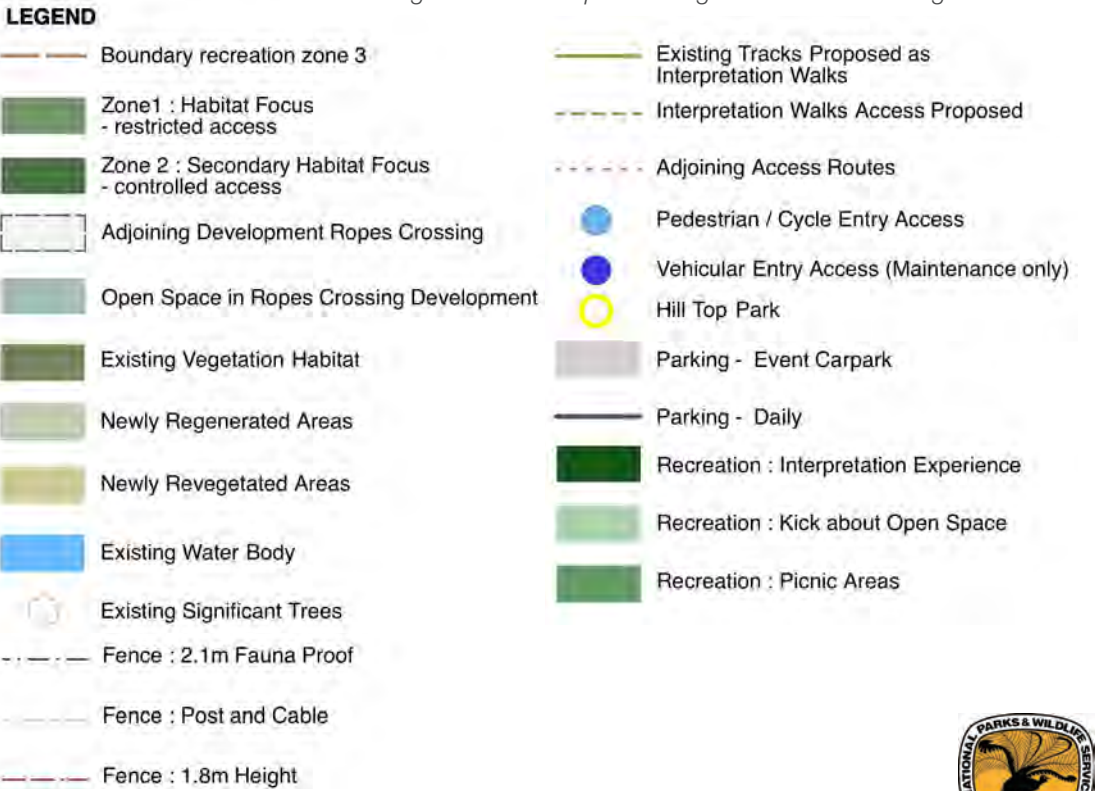
Figure 5.2.28 Proposed Regeneration and Revegetation Areas



Site Image: Vegetation Regeneration areas (source EP NSW)



Site image: existing cleared areas to be retained as open space recreation gathering (Source: EP NSW)



5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

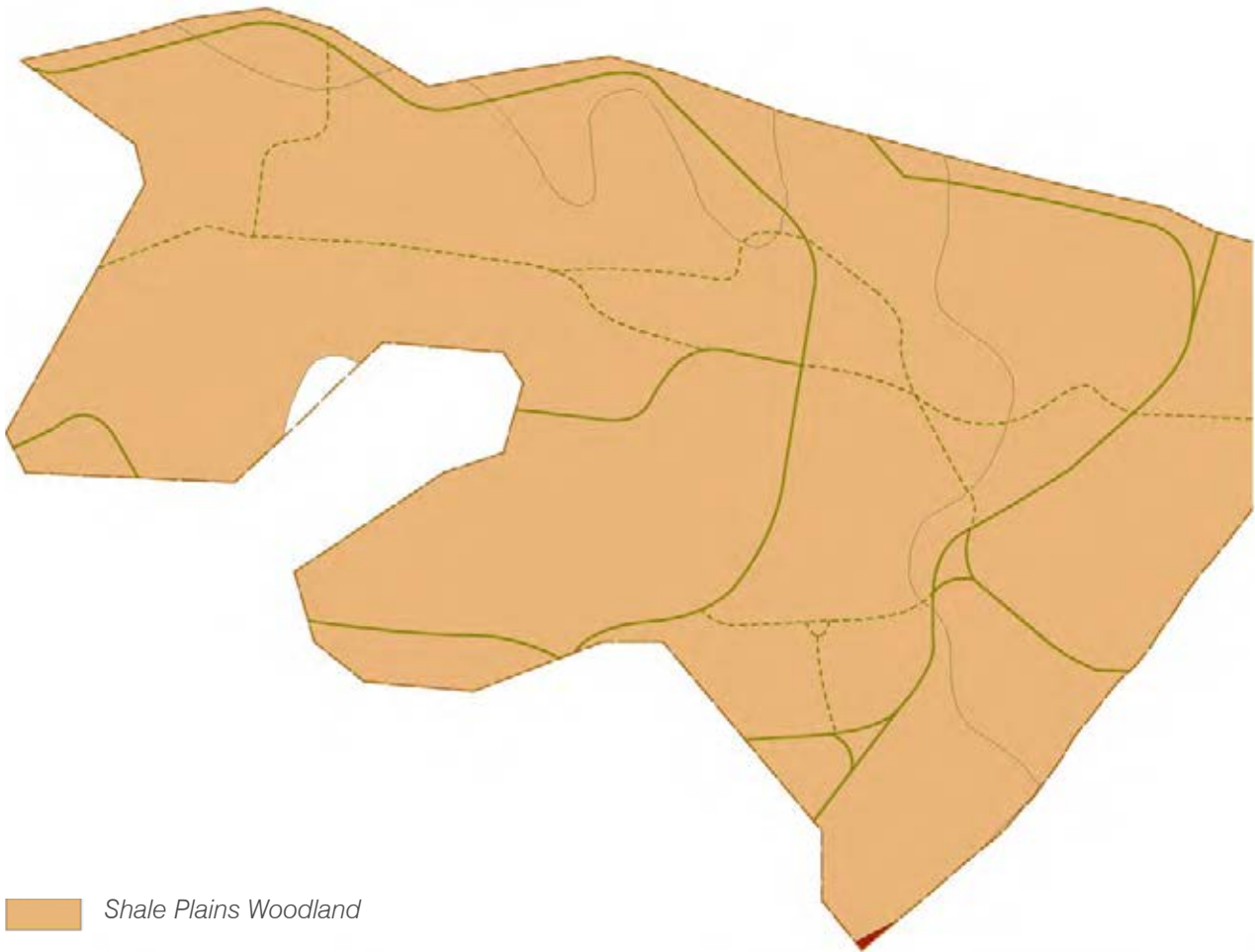


Figure 5.2.29 Existing Vegetation Communities



Site image: typical vegetation community found in the Western Precinct (source EP NSW)

Landscape Function	Botanic Name	Common Name	Height	AW	SGTF	CRCIF	SPW	FW	CSGW
Tree	Eucalyptus tereticornis	Forest Red Gum		X	X		X		
	Allocasuarina littoralis	Black She-Oak							X
	Eucalyptus baueriana	Blue Box		X					
	Eucalyptus crebra	Narrow-leaved Ironbark					X		
	Eucalyptus fibrosa	Broad-leaved Red Ironbark			X	X	X		
	Eucalyptus moluccana	Grey Box			X		X		
	E. parramattensis subsp. parramattensis	Parramatta Red Gum							X
	Eucalyptus sclerophylla	Scribbly Gum							X
	Bursaria spinosa	Blackthorn					X		
	Casuarina glauca	Swamp She-Oak		X					
	Dillwynia tenuifolia		0.4m - 1m				X		
	Melaleuca decora	White Feather Honeymyrtle				X			
	Melaleuca linearifolia	Snow-In-Summer		X				X	
	Melaleuca nodosa	Ball Honeymyrtle				X			X
	Melaleuca decora),	White Feather Honeymyrtle							X
	Angophora bakeri	Narrow-leaved Apple							X
	Angophora subvelutina	Broad-leaved Apple		X					
	Angophora floribunda	Rough-barked Apple		X					
Shrub	Typha orientalis	Broad-leaved Cumbungi						X	
	Dillwynia tenuifolia		0.4m - 1m	X	X	X			
	Pultenaea parviflora		to 1m	X	X	X	X		
	Micromyrtus minutiflora		2m	X	X	X	X		
	Persoonia nutans		2.5m	X	X	X	X		
	Grevillea juniperina subsp. juniperina		0.5-1.5 m	X	X	X	X		
Grasses/Groundcovers	Centella asiatica	Gotu Kola						X	
	Juncus usitatus	Common Rush						X	
	Persicaria decipiens	Slender Knotweed						X	
	Cynodon dactylon	Couch Grass						X	

Proposed Revegetation Species List table (refer Appendices for full list)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

Interpretation

Brief

Interpretation will be a key tool for visitors in providing park information and directions as well as information about the natural and cultural values of the place.

The precinct plans:

- Identify locational opportunities for the provision of interpretive facilities such as signage and brochures as well as more contemporary materials such as downloadable material from the web;
- Examine the need and desirability of establishing an interpretive/visitor information and/or education/research facility within one of the zones; and
- Develop an interpretive strategy that focuses on the following themes key themes and sub themes for the zones and identifies key interpretive methods, sites and implementation recommendations;
 - Native Landscapes,
 - Colonial lands
 - growth development
 - Munitions especially KMA remnant storage area

Design Concept

The main remnant physical fabric to this precinct includes the ADI track network used between 1941 and the 1990's, cleared (pastoral) grasslands and views to adjoining ridge lines and the Blue Mountains.

The area comprises part of the Kingswood Magazine phase of ADI. Remnant hardstand areas are to be retained with in pavement marker / identifier of past uses and adaptively re-used where possible for park facilities.

Markers to identify bunker names / numbers should be used to the small bunkers lining the track network. These bunkers are generally overgrown. A representative sample of the best preserved bunker sites should be kept cleared. These could function as small picnic areas.

Interpretative design locations for precinct heritage items are to be in line with past uses identified in the Conservation Management Plan (CMP) including;

- Colonial Growth and development of the area during Colonial times (1860-1940s). Including Land subdivision, Village settlement, expansion of industry through selective breeding/ viticulture/ tobacco/ cotton, hemp and indigo, as well as timber cutting, tanneries, sawmills, brick making and wheelwrights as initiated by Governor King
- A portion of this precinct falls into what was known as the "Castlereagh Common" (CMP 2010 page 14), an area of land granted by Governor King in 1810 for use by the public for grazing and timber gathering purposes during colonial times. Interpretation through art works, interactive web information and signage should be incorporated into cleared areas located in the hill top park to reflect this past use of the Regional Park site.
- Hilltop views of between ridge tops and cleared grasslands provides interpretation opportunities for past colonial landscapes for pastoral heritage of the precinct including historic themes of convicts, pastoralism, Land tenure, land subdivision and transport routes.
- Remnant storage areas related to Kingswood Magazine Area. A small sample (maybe 3-5) of the best preserved bunker sites kept clear for small picnic areas.
- Remnant stand of pre 1940s trees to be retained and incorporated into open space design.

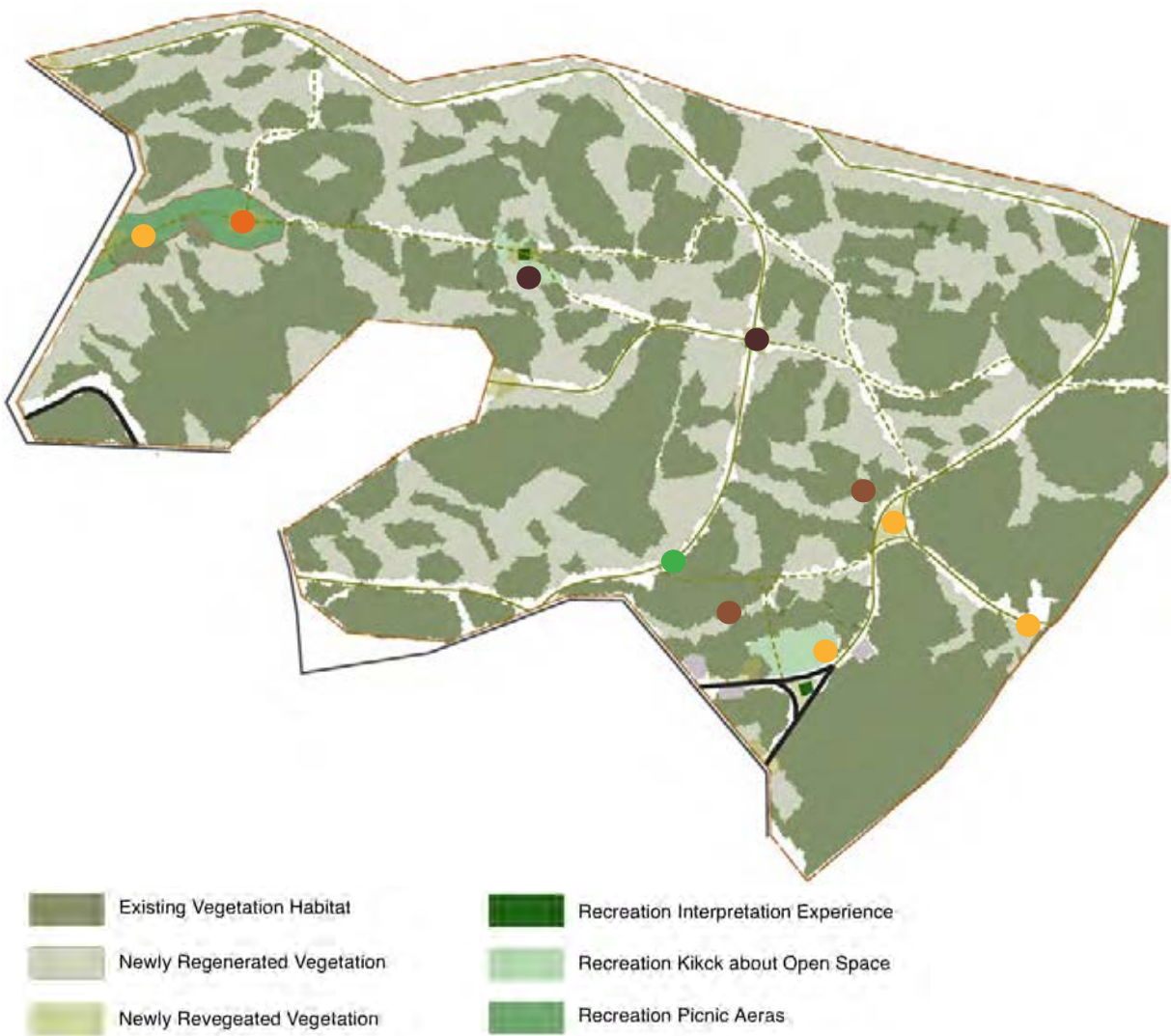


Figure 5.2.30 Proposed revegetation and regeneration areas



Site image: Views to development hill top park from Regional Park to be retained along interface of development - open spaces are to interpret rural pastoral heritage of the site (Source: EP NSW)



Site image: Reuse of existing ADI tracks and road layout for recreational paths - interpretational signage / artworks to provide further interpretation (Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct

Recreation and Use

Brief

The landscape plans must include:

- Information on the appropriate level of recreational access and use;
- Identification of the types of activities that may be appropriate to the sub-precinct; and
- Detailed design of the path, track and cycle networks within individual sub-precincts.

Design Concept

A series of remnant ADI track networks of mostly loose gravel surface and varying topography are the basis for exploration / circulation around the precinct. As vehicular traffic will be kept to minimal locations and event only access times, the precinct provides good opportunity for daily pedestrian/ cycle circulation and family picnic areas.

- Visitor facilities as located are to include picnic benches/ tables and shelters as outlined in the Materials and Finishes section. These are to be spaced throughout the precinct to allow for differing experiences within the precinct along pedestrian and cycle track routes.
- A self guided interpretative walking track route is to circulate through the precinct which includes a sequence of historic pastoral and topographical experiences.
- Smaller cleared maintained grasslands areas are to be maintained for day to day gathering - these are to incorporate picnic facilities and some specific interpretation art works and signage. Additional tree planting for shade should be incorporated into design development for amenity.
- A large cleared grasslands gathering / event area located in the south west of the site is to be maintained as a large open space for large gatherings / community events. Vehicular entry and circulation with overflow carparking area for events is located adjacent.
- A second open space located along the ridge top and fronting onto residential streets has been selected as the main recreational open space park area for family picnicking. Visitor facilities and parking will be included into this area. Interpretive art, signage and cultural plantings will contribute to the understanding of colonial heritage of the precinct.



Figure 5.2.31 Recreation locations within Main Visitor Precinct Plan



Site image: southern open space events area (Source: EP NSW)



Site image: existing track network within precinct (Source: EP NSW)



Site image: existing open grassed areas to precinct

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct Visitor Facilities

Brief

The landscape plans must include:

- Details of the visitor facilities required for each sub-precinct, as per the Park Facilities Manual;
- Appropriate adaptive reuse of existing buildings for visitor facilities where appropriate; and
- Location of toilets, picnic areas, information points and food or other outlets.

Design Concept

- NPWS information points are to be located at key entries to the precinct as both a way finding tool and educational tool to protect habitat and heritage within the Wianamatta Regional Park area and specifically to the Western Visitor Precinct.
- A second series of information points are to be located throughout the precinct as both a way finding tool and interpretative walk through interactive story telling and web links which outline habitat values and heritage of the Wianamatta Regional Park area and specifically the Western Visitor Precinct.
- One Toilet facility is to be located to the hill top open space area close to parking.

Public toilets to more isolated areas within open spaces are to be considered as part of the overall open space network located within the adjacent the Ropes Crossing precinct outside the Regional Park boundary.



Figure 5.2.32 Montage depicting typical informal seating in hilltop parkland (Source: EP NSW)

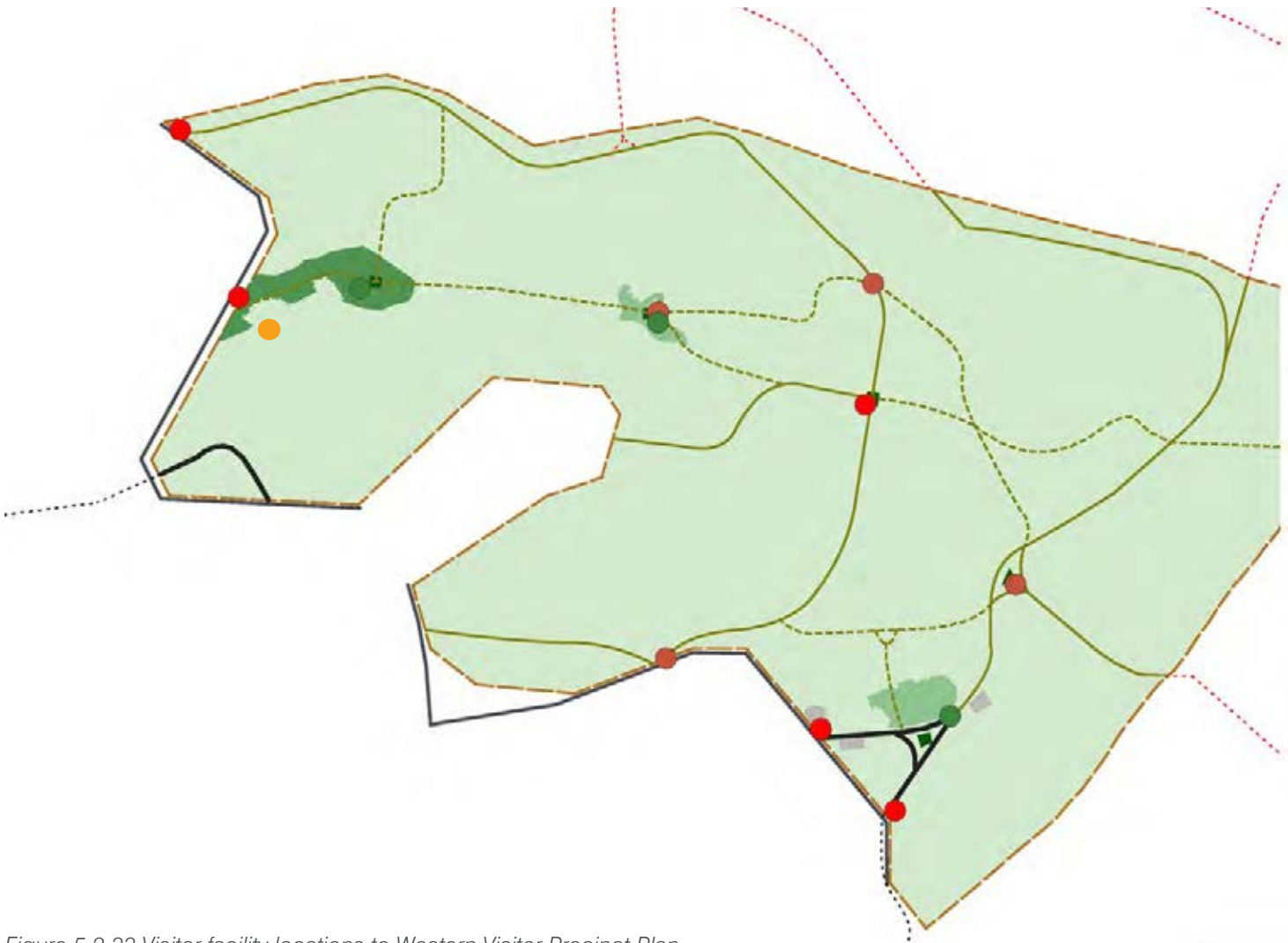


Figure 5.2.33 Visitor facility locations to Western Visitor Precinct Plan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Western Visitor Precinct Services / infrastructure planning

Brief

A separate project mapping existing services is to be conducted by DECCW. At this time this information is not available. Notwithstanding its is evident that there will in reality be limited potential for re-use of sewer, water, and power infrastructure due to age, compliance, and damage during demolition

Design Concept

Built Elements

- The existing track to within the precinct is to form the basis of the vehicular/ pedestrian and cycle routes.
- Additional track and roads should be kept to a minimum and function only as linking existing routes.
- Remnant kerbs, gutters and drains are limited but should be assessed for functionality and liability and retained if possible as ADI heritage fabric.
- Existing fences and gates are to used along the precinct boundary to Regional Park zones where possible. All new fencing and gates are to be in line with the NPWS facilities manuals. Long term removal of boundary fences to open space areas adjoining the Western Precinct urban development should be considered.

Drainage

- The steeper grades through this precinct will ensure overland flow away from hilltop recreation areas if effective - new drainage infrastructure is to be minimised to track drainage crossings to prevent erosion.
- Provide overland flow escape routes for stormwater drainage - where levels preclude excavate to provide small wetland zones to hold and promote infiltration of drainage.

Services

- Water, sewer and power services from ADI phase are aged and in poor condition where present.
- It is proposed that new services connections are provided but can be limited due to the minimal facilities development in this precinct.
- A sewer and water connection and power for lighting should be provided from the urban development adjoining the hilltop open space
- A sewer and water connection and power for lighting should be provided from the urban development adjoining the southern clearing and proposed event space. Sewer should allow for provision of temporary toilets
- Development has not yet commenced in the western precinct area and such provision of these services may be a long term proposition.
- Levels for sewer connection will need to be reviewed in detail from buildings and proposed toilet locations.



Site image: Existing Roads to Western Visitor Precinct
(Source: EP NSW)



Site image: Fencing/ Gates to Western Visitor Precinct
(Source: EP NSW)



Site image: Existing drains to Western Visitor Precinct
(Source: EP NSW)



Site image: Creek adjacent to Western Visitor Precinct
(Source: EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans

Future Works Precincts - Northern Central Visitor Precinct:

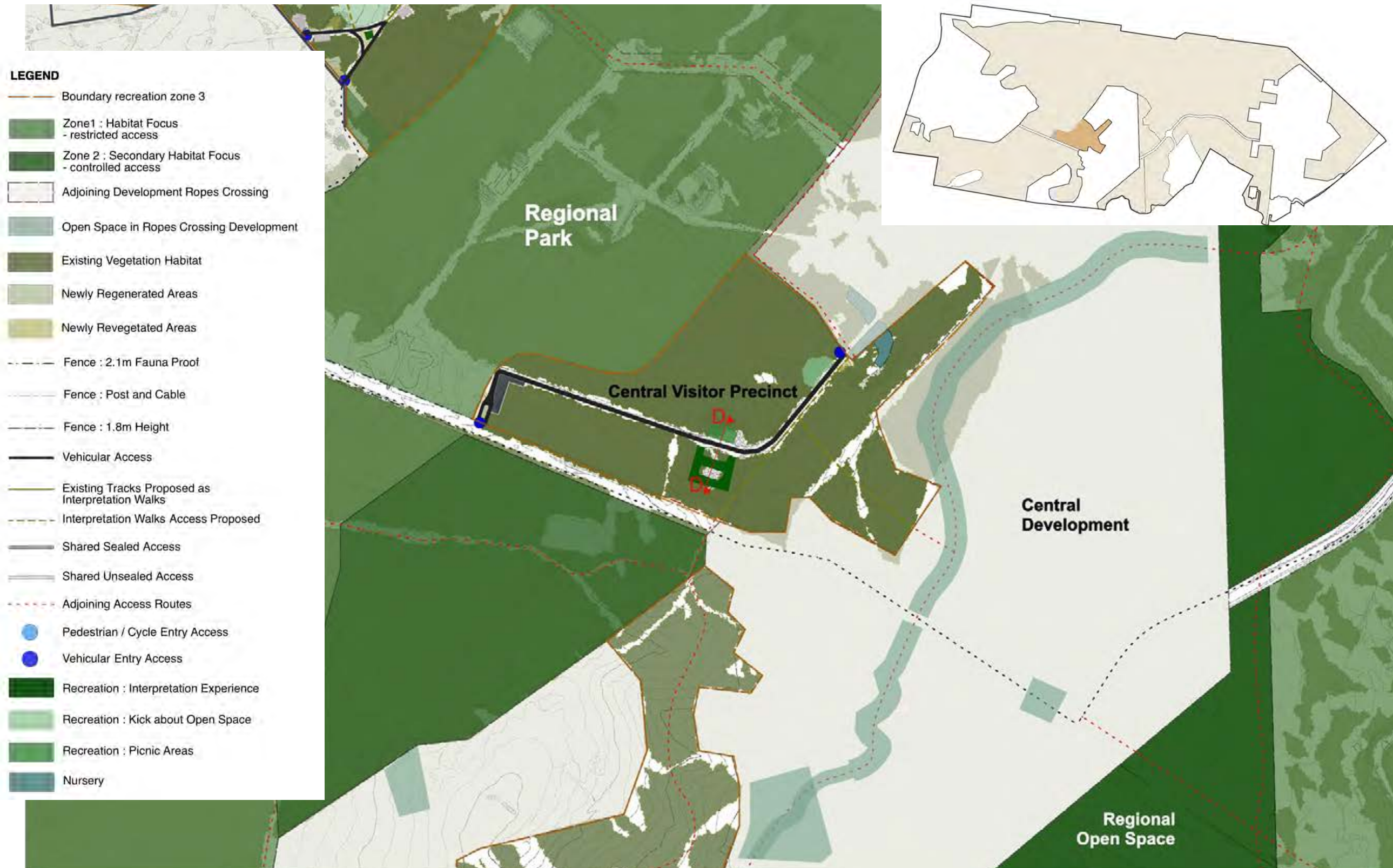
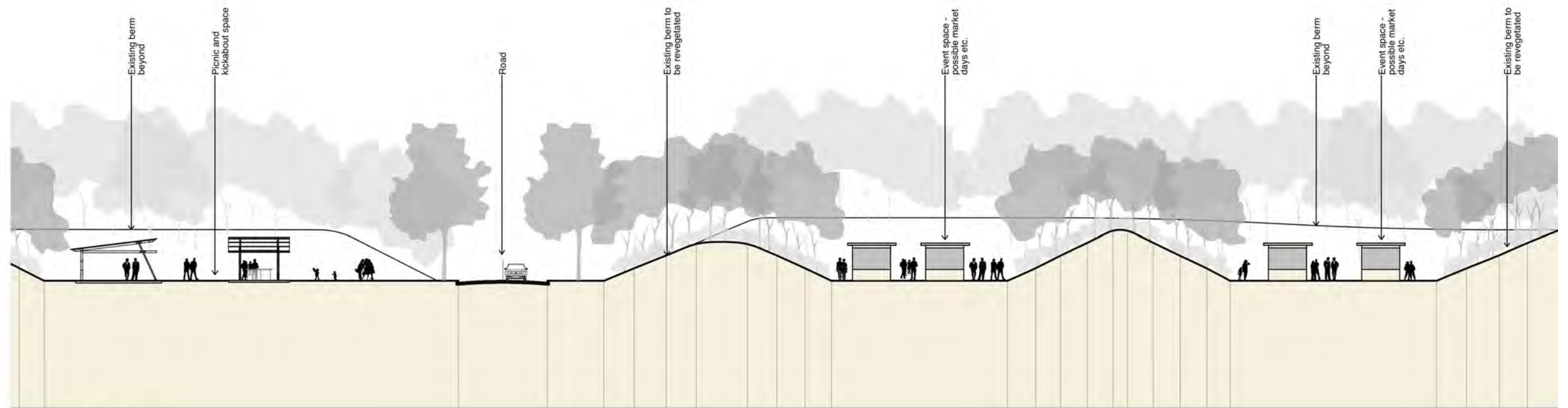


Figure 5.2.34 Central Recreation Precinct Masterplan

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Northern Central Visitor Precinct



Section DD
scale 1:300 @ A3

Figure 5.2.35 Central Recreation Precinct Section DD

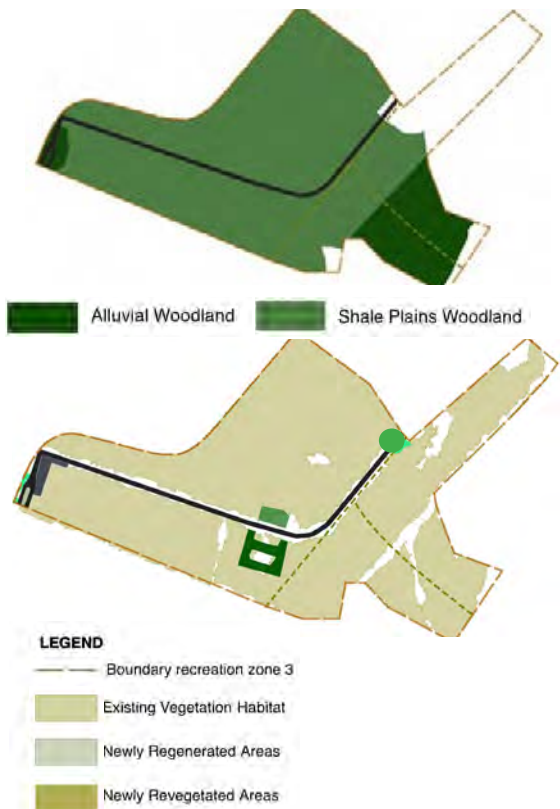
5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans- Northern Central Visitor Precinct

Flora & Fauna Management

Regeneration and Revegetation of Alluvial Woodland and Shale Plains Woodland species to occur throughout the precinct.

- A native nursery to be located adjoining development lands along the north eastern precinct boundary to be considered during precinct design development.



Site image: Vegetation communities



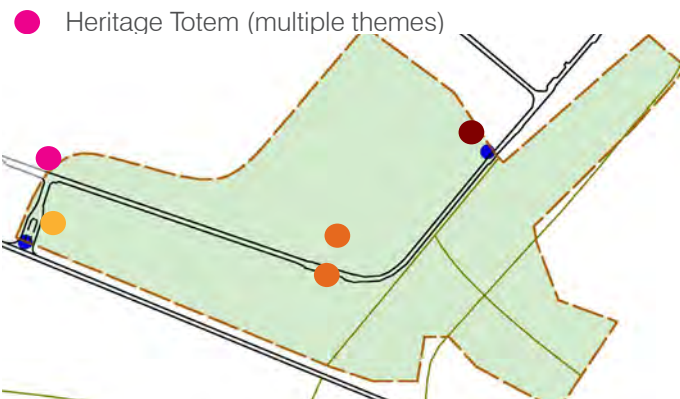
Site image: low lying areas (EP NSW)

Heritage / Interpretation

The main remnant physical fabric to this precinct is the ADI road/track network used between 1950s and earth mounding associated with the Bomb Filling function of the ADI. These elements form the basis for exploration / circulation around the precinct and recreational use. The interpretative design for precinct is to be in line with recommendations outlined in the CMP including;

- ADI munitions and storage phase including remnant ADI circulation networks & remnant earth mounds in the Bomb Filing areas
- Provide markers and space naming to reflect past ADI functional naming as per diagram on opposite page
- Remnant ADI 'clean areas' located at the precinct entry

Rare and endangered species/ vegetation communities including, Alluvial Woodland & Shale Plains Woodland interpretation to be considered as part of nursery located to northern eastern precinct boundary.



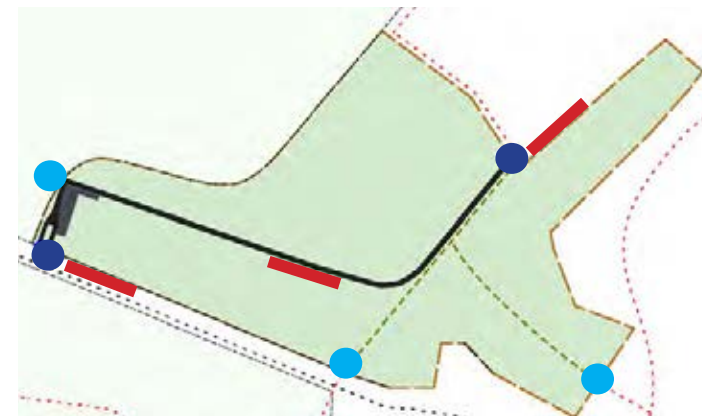
Site image: ADI munitions and storage berms (EP NSW)

Access, Circulation and Carparking

A series of existing tracks some of which post date ADI have been retained to provide the basis for walk /cycle track networks.

- Two key entry points one from the Central Development Precinct and another to the East-West Link Road "book mark" the sealed roadway spine which runs centrally through the Precinct.
- A series of secondary lower level entries will be provided along the precinct boundaries to the adjoining development for general pedestrian/ cycle track entry. The regional park's western precinct will be access directly via a fenced access track which will run east west through zone 1 and 2 of the Regional Park.

— Parking will be limited to a central area and at park edges within this precinct.



Site image: Existing track and road network (EP NSW)

Recreation, Visitor Facilities & Services Infrastructure

- Visitor facilities nodes as located are to include picnic benches/ tables and shelters as outlined in the Materials and Finishes section.
 - Public toilets to be considered as part of the nursery located to the adjacent the Central Development Precinct entry gate outside the Regional Park boundary.
 - Cleared grasslands event area is to be maintained as a large gathering open space for markets / outdoor cinema etc.
- Interpretive walk / bike riding



Site image: Precinct events areas (EP NSW)

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans - Northern Central Visitor Precinct

Within the Northern Central Visitor Precinct it is proposed that the cleared spaces in which the demolished ADI Bomb Filling complex stood can be interpreted through:

1. Naming of spaces after their past munitions function including building code where applicable
2. Retention and adaptive reuse of hardstand areas
2. Ground marking through concrete and steel markers of past building footprint
3. Develop a self guided walk that enables visitors to understand bomb filling process by following the production route through the landscape.

The plan below identifies the function of the buildings through the Bomb Filling area including the area lying within the Regional Park. It is noted that the Bomb Filling complex covered a much greater area extending to the north during the ADI phase of the sites use.

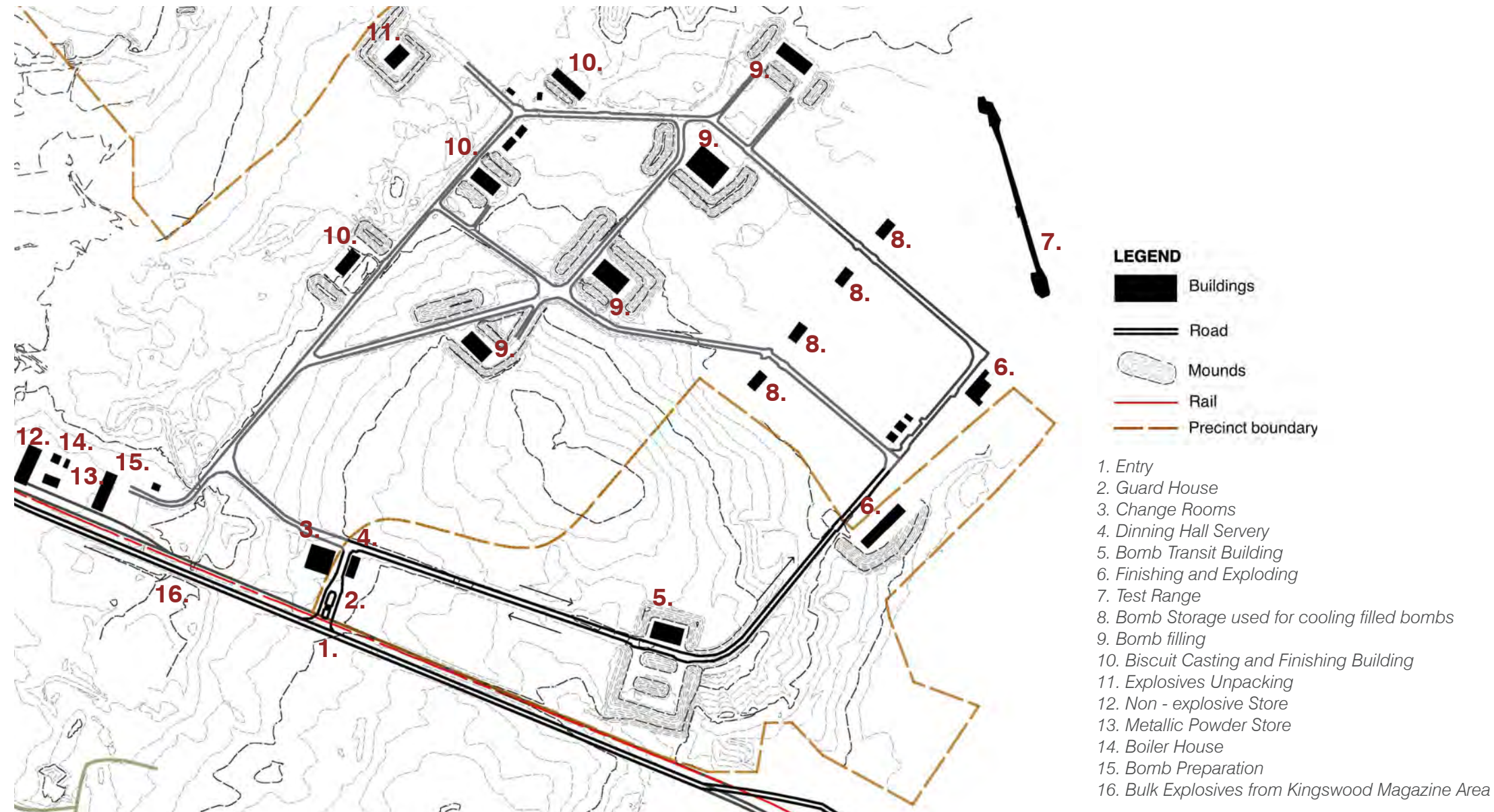


Figure 5.2.36 ADI Functional Areas - for potential interpretive naming of spaces

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans

Future Works Precincts - Southern Central Visitor Precinct:



Figure 5.2.37 Park Zone 3 - Southern Central Visitor Precinct

Flora & Fauna Management

Regeneration of Shale Plains Woodland species which predominately occur throughout this precinct.

Some historic plantings maybe used to interpret colonial heritage of the precinct and adjoining Elizabeth King farmlands to the east.

Maintain grassland character through management of understorey - as part of cultural heritage reference to Elizabeth King farm holdings to facilitate recreational use.

Heritage / Interpretation

The design for heritage is to be designed in line with recommendations outlined in the Conservation Management Plan (CMP) including;

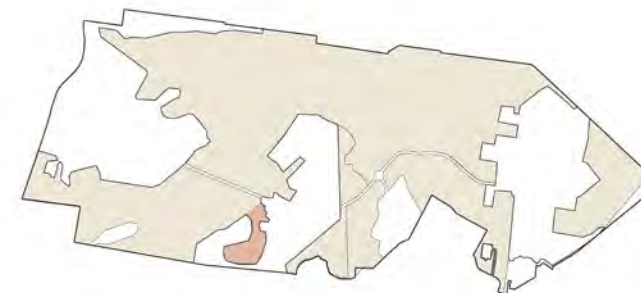
- The Colonial Landscape 1800-1850, interpret connections to the Elizabeth King farmlands. Visual link to King family heritage stands of tree plantings
- Brick making - relics and footprint
- Interpretative play
- Cultural plantings eg non fruiting heirloom varieties



Site image: Vegetation communities (Source: EP NSW)



Site image: grasslands and understorey (Source: EP NSW)



Access, Circulation and Carparking

Walk /cycle track recreational networks are to be based on existing roads and tracks where possible.

Several secondary level entries will be provided along the precinct boundaries to the adjoining development for pedestrian/ cycle entry into the precinct

Several key entry / links are to be provided through the precinct to the Northern Central Visitor Precinct, and northern regional links.

No public vehicle access will be provided into this precinct.

Parking will be limited to park edges as no day to day vehicular access will be provided within this precinct.

Recreation, Visitor Facilities & Services Infrastructure

Recreational development is proposed to be low key for predominately local residential use and access stopover / rest

Visitor facilities are to include picnic benches/ tables and shelters as outlined in the Materials and Finishes section.

Public toilets are not proposed in this precinct.

Cleared grasslands through the precinct are to be maintained as informal gathering open spaces for family gathering and picnics.

Post and cable barrier with openings for cycle / pedestrian access proposed adjoining urban development of Central Precinct

5 REGIONAL PARK MASTERPLAN

5.2 Precinct Plans

Future Works Precincts - Dunheved Precinct:



Figure 5.2.38 Park Zone 3 - Dunheved Precinct

Flora & Fauna Management

Alluvial Woodland weed management and regeneration to riparian corridor

Retain cleared character of floodplain zone of site, predominantly cleared with scattered native trees and significant native plantings

Possible additional plantings to reflect past cultural avenues to access roads etc

Some historic orchard/ vegetable species maybe used to interpret colonial heritage of the precinct.

Heritage / Interpretation

The design for heritage is to be developed in line with recommendations outlined in the Conservation Management Plan (CMP) including;

- The Colonial Landscape 1800-1850, interpret Crops, kitchen gardens and fruit trees found on the King family homesteads.
- Possible markers to past building footprints / roadways
- Visual link to Elizabeth farm heritage stands of tree plantings
- Western Arm of the ADI Rail route from explosives and filling 1941- 1946
- Interpret / use remnant rail tracks to Links Road in entry statement to precinct.

Access, Circulation and Carparking

Further investigation of past planning / layout of homestead can inform layout of new recreational cycle and pedestrian access, with additional access as necessary

Main pedestrian / cycle entry at corner on Links Road near rail crossing - can act as key entry to Regional Park and Regional Open Space

A key link is to be provided to the west through the Regional Open Space to the Central Development Precinct and beyond to the Central Visitor Precinct. This will require an access bridge in the area of the past rail bridges and earlier farm bridges.

In addition a recreational loop through interpretative locations (possible boardwalk) is recommended.

Parking will be provided as formalised bays within site adjoining Links Road.

No day to day vehicular access beyond this parking.

Recreation, Visitor Facilities & Services Infrastructure

Visitor facilities as located are to include picnic benches/ tables and shelters as outlined in the Materials and Finishes section.

Public toilets to be considered as part of the entry located to the adjacent to the corner of Links Road.

Cleared grasslands areas over much of the precinct are to be maintained as informal gathering open spaces for family gathering and picnics.

Historic guided tours as well as signage/ interactive web self guided tours to Governor King Homestead site.



Site image: grasslands and understorey (EP NSW)



Site image: remnant rail tracks to Links Avenue (EP NSW)



Site image: cultural plantings (EP NSW)



Site image: cleared grasslands (EP NSW)

6.0 MATERIALS AND FINISHES

6 MATERIALS & FINISHES

6.1 Generally

Generally materials and finishes should reflect the principles of the NSW NPWS Parks Facilities Manual in which simple robust material fit for purpose provide the key fabric of the parklands. The strong cultural heritage references of the site also suggest that concrete and steel in existing infrastructure are important connections to this industrial past.

This section identifies some key principles for the main materials components required for park design and implementation

A total life-cycle approach should be considered in the design, construction, maintenance and end-of-life disposal of all parkland improvements. Key issues related to materials and finishes (and their sustainability) as identified in the Parks Facilities Manual are outlined following:

Materials

- Re-use demolition component materials or recycled content materials that meet engineering specifications
- Source materials locally to reduce transport impacts and support the local community
- Use materials adequate for a job and not of an excessive standard (eg. don't use stainless steel when galvanised will do)
- Use materials that have a lower environmental footprint

Fabrication

- Use prefabricated structures or fabricate components off-site where possible
- Build bulk quantities of structures / components if practical
- Use techniques that maximise recovery at end of life (eg. screwing or bolting not nailing)

Construction

- Keep construction sites as small as possible and manage these carefully
- Use environmentally friendly construction techniques
- Minimise material and vehicle movements on and off the site

Maintenance

- Maintain maintenance schedules to maximise life span
- Fix things as soon as a problem is identified
- Use long life and low-toxicity materials where possible
- Repair vandalism and graffiti immediately

Disposal at end-of-life

- Maximise the quantity of materials recovered at end of life with landfill as last option
- Re-use and recycle components and materials where possible

Materials and finishes

Design and materials principles are provided for the following

1. Roads Tracks and Paths
2. Fencing and barriers
3. Planting
4. Facilities
5. Signage
6. Public Art



6 MATERIALS & FINISHES

6.2 Roads, Tracks and Paths

The table below identifies the key functional and design parameters for implementation of general access improvements

User	Activity / description	Trail	Topography	Length	Fitness	Experience	Compatibility	Conflicts
VEHICLES	Car Typical street vehicle	5.5m wide sealed road for two way. 3m wide for 1 way. Requires parking at destination	Maximum gradient to be confirmed	N/A	N/A	N/A	Coach and maintenance vehicle. Could be compatible with Road Cyclists if vehicle speed is controlled	Generally conflicting with most cycling and walking users
	Coach Typical 14.5m bus	6.5m wide sealed road for two way. 3.5m wide for 1 way. Required parking at destination. Large turning circle required.	As above	N/A	N/A	N/A	Car and maintenance vehicle.	Generally conflicting with most cycling and walking users
	Maintenance vehicle Ute or light truck	2.5m wide road. Could be sealed or unsealed.	As above	N/A	N/A	N/A	Car and coach on sealed roads. Mountain bike on unsealed maintenance trails	
	Fire Fighting	2.5m wide road. Could be sealed or unsealed.	As above	N/A	N/A	N/A	Mountain bike	
WALKERS	Disabled access An opportunity for visitors with limited mobility to experience the landscape and access essential services	1.5m min with and paved eg. AS2156 Class 1	Flat	1-2km	Low - medium	Low	Compatible with general walkers and possibly recreational cyclists. May be compatible with maintenance vehicle access.	
	Walkers For fitness and to experience the site from a high quality track surface	1.2m min width and paved eg. AS2156 Class 122	Flat - undulating	1-5km	Low - medium	Low	Recreational cyclists. Maintenance vehicles.	
	Bush walkers For fitness and to experience the site from a more natural perspective on a more rugged trail	0.5m min width and not paved eg. AS2156 Class 3-5	Ranging from flat to steep and everything in between	3-20km	Medium - high	Medium	May be compatible with cross country mountain bikers, cross country runners and horses	
RUNNERS	Joggers	1.2m min width paved surface eg. AS2156 Class 1-3	Preferably flat to undulating	2-15km	Medium - high	Medium	Most sealed track users	
	Cross country runners	4-5m wide mown track Specialised area already provided in precinct 7.	Flat - undulating	5-15km	Medium - high	Medium	Equestrian	
FAMILY / CASUAL CYCLISTS	Recreational road bikes \$500-\$1500 Bikes with skinny tires made for use on sealed tracks	Sealed track with relatively smooth surface Eg. Shared path 2.5m	Ranging from flat to undulating. Preferably avoid steep slopes.	5-30 km depending on individual fitness	Varies and influences length of ride / topography that can be accessed	Low - high	May be compatible with vehicle access if speed of vehicle is limited. Compatible with walkers on a shared trail.	
	Recreational mountain bike / hybrid \$500-1000 Bikes with medium - fat tyres. May have front suspension	Sealed / road base tracks. Generally not suitable for extensive 'off road' use Eg. Shared path 2.5m	Ranging from flat to undulating. Preferably avoid steep slopes	5-30 km depending on individual fitness	Varies and influences length of ride / topography that can be accessed	Low - high	May be compatible with vehicle access if speed of vehicle is limited. Compatible with walkers on a shared trail.	
	Children's bikes \$200-500 Smaller bicycles without gears	Short circuit with hard pavement within view of adults	Flat	100-250m	Generally not able to ride for long distances	Low	Non powered scooters	Most other users
MOUNTAIN BIKERS	Cross country / trail \$1000+ Fat tyres, good front suspension (some with rear suspension)	Trail conditions vary relative to difficulty rating. Natural / road base surface ranging from 'single track' 15-200cm width to 'fire trail' 2.5m in width.	Varies from flat (less than 5% / 1:20) to steep (20% / 1:5 or more) relative to level of difficulty	6-100km depending on level of difficulty	Low - High depending on level of difficulty	Low - High Technical obstacle hardness is relative to trail level of difficulty	Fire trail may be compatible with 4x4 maintenance vehicle access.	Trails potentially ridden in one way direction if a popular loop to reduce conflicts and issues with sight distance
	Down hill \$3000+ Very fat tyres, and specialised suspension	Down hill specific tracks with very difficult obstacles. Vehicle access to top of hill required.	Sloping - steep terrain with ride starting from top of a hill	3-5km	Medium - High	Medium - High		
	BMX / 4X \$500+ BMX - tough bicycles with small wheels designed for stunts \$3000+ 4X - similar to down hill mountain bikes	Undulating small circuit with jumps. Similar to 4x track at Sydney Olympic Park	Track usually constructed on reasonable flat site	0.5-1km	Medium - High	Medium - High		
ROAD CYCLISTS	Road / racers \$2000+ Light weight bike with very skinny tires.	Smooth surface suitable for high speed Eg. road / highway	No sudden changes of direction or gradient	50-200km	Medium - High	Medium-High	Cars	Most other cycle / walking types due to speed
	Bridle trails	2.5m wide unsealed track. Potential to expand nodal role to larger areas along corridor	Flat - undulating	3-20km	Medium – high	Medium - high	May be compatible with cross country mountain bikers and bush walkers	

6 MATERIALS & FINISHES

6.2 Roads, Tracks and Paths

Pedestrian and cycle access

The Wianamatta Park Masterplan describes a network of pedestrian access that links usage nodes and precincts, provides loop recreational trails and provides interconnections between adjoining communities where sustainable with natural values.

A path hierarchy should be implemented to reflect elements appropriate to site conditions and recreational opportunities as derived from AS 2156 Walking Tracks, and adapted in the NSW NPSW Parks Facilities Manual 2008. As described in the table below:

The following performance criteria apply to path design and implementation as derived from the NSW NPSW Parks Facilities Manual:







Description of track	Class 1 'All Access Track'	Class 2 'Graded Track'	Class 3 'Walking Track'	Class 4 'Hiking Track'	Class 5 'Marked Route'	Class 6 'Unmarked Route'
						
Surface	Hard surface suitable for wheelchair access eg. concrete, asphalt, paver, elevated boardwalks	Generally a hard surface dependent on level of usage eg. concrete, asphalt, bitumen, pavers, elevated boardwalks	Generally a modified surface eg. bitumen, stone, gravel, mulch, board and chain, boardwalks	Distinct surface often without major modification eg. gravel, mulch, natural surface	Limited modification to natural surface and track alignment may be indistinct in places	No modification of the natural environment eg. wilderness areas
Width	Constant 1500mm min.	Constant 1200mm min.	Variable 1200mm preferred	Variable 600mm max	N/A	N/A
Path gradient / access requirements	Compliant with AS1428 Design for Access and Mobility (refer general requirements page)	1:10 max gradient Minimal steps	No steeper than 1:10 preferred but may exceed this gradient for short lengths dependent on soil stability Steps may be common	Limited by environmental and maintenance considerations	May include steep sections of unmodified surfaces	Likely to include steep sections of unmodified surfaces
Example	Discovery track located adjoining visitor centre	Very high-use tracks located adjoining park focal points eg. visitor centre, lookouts	High-use tracks in high visitation areas	Medium-use tracks in high visitation areas, high-use tracks in low visitation areas	Low-use routes	Occasional-use routes

Figure 6.2.1 Walking track guidelines (NPWS Facilities Manual 2007I)



6 MATERIALS & FINISHES

6.2 Roads, Tracks and Paths

Pedestrian and cycle access - Track Form

Track form should be considered in implementation and opening of track access. Functional connections and loops adjoining points of entry to the park should be a focus

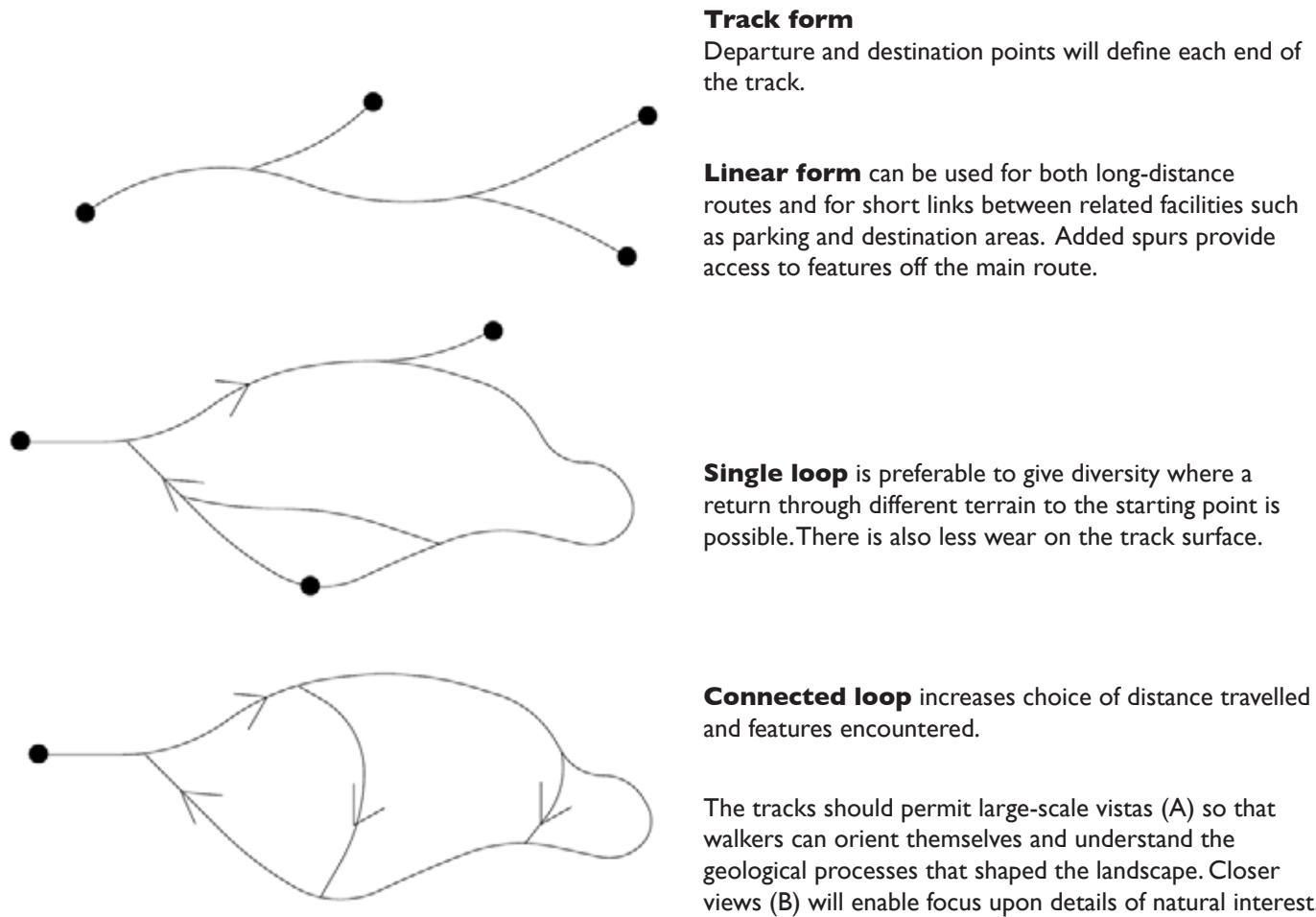


Figure 6.2.2 Walking track guidelines (NPWS Facilities Manual 2007)



Site image: existing asphalt road
(Source: EP NSW)



Site image: existing track
(Source: EP NSW)



Site image: Existing concrete roadway
(Source: EP NSW)

Materials and Finishes

Design principles:

- Provide a unified palette of materials to each access type across the site
- Retain existing track and path alignments reflecting past site use

Materials principles:

Roads

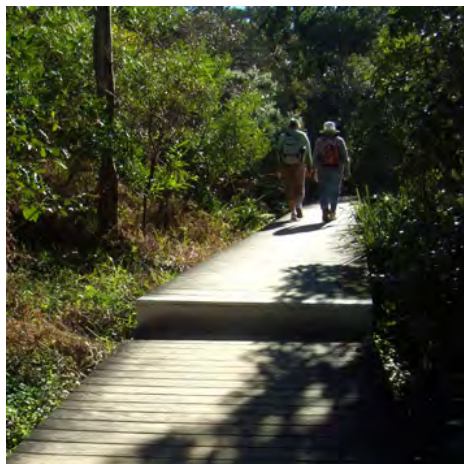
- Limit extent of asphalt surfacing to existing sealed roads
- If upgrading asphalt surface use a course grade of aggregate to integrate with existing aged material
- If upgrading concrete road - infill with asphalt

Tracks

- Review existing stabilised tracks to determine material used in base course. Unless strong theme present employ crushed sandstone material as track base as it provides a good surface for cycle or pedestrian use

Boardwalks

- Generally employ steel frame or recycled plastic bearers
- Plantation hardwood or recycled plastic boardwalk



Boardwalk (EP NSW)



Typical asphalt path (class 1 access)
(Source: EP NSW)



Typical Gravel pathway
(Source: EP NSW)



Typical path to adjoining dev't
(Source: EP NSW)

6 MATERIALS & FINISHES

6.3 Fencing and Barriers

Fence types

Three key fence types are proposed for use by the masterplan

1. 2.1m high fauna proof fence to general perimeter for Zone 1 areas to provide secure boundary and to prevent macrofauna movement
2. 1.8m high security fence to boundaries of Zone 2 which require security or to zone 3 boundaries adjoining residential allotments
3. 0.8m high post and cable barrier to edges of Zone 3 areas which adjoin public roadways

Gate / entry types

Gate types / openings are required in each of the fence types

1. 2.1m high fauna proof fence
to have security gates to allow for maintenance vehicle access
2. 1.8m high security fence
where entries are provided to public streets or adjoining open space -
provide permanently open access for cycles and pedestrians with trail bike barrier
3. 0.8m high post and cable barrier
where entries are provided to public streets or adjoining open space -
provide permanently open access for cycles and pedestrians with trail bike barrier

Materials and Finishes

Design principles:

- Provide a unified palette of fence treatments to each fence type across the site
- Provide safe and secure barriers to vehicle access

Materials principles:

- Fence types 1-3 to be in accordance with NSW NPWS Parks Facilities Manual
- Fencing and barriers to be durable and of high quality materials
- Fencing and barriers to respond to heritage and rural character of the site - to curtilage of Dunheved and house sites in zone 1 consider post and rail rural fence



2.1m fence to zone 1 (Source: EP NSW)



1.8m security fence (Source: EP NSW)



Feature gates (Source: EP NSW)



Trail bike barriers (Source: EP NSW)



Post and cable barrier (Source: EP NSW)



Rural fence (Source: EP NSW)

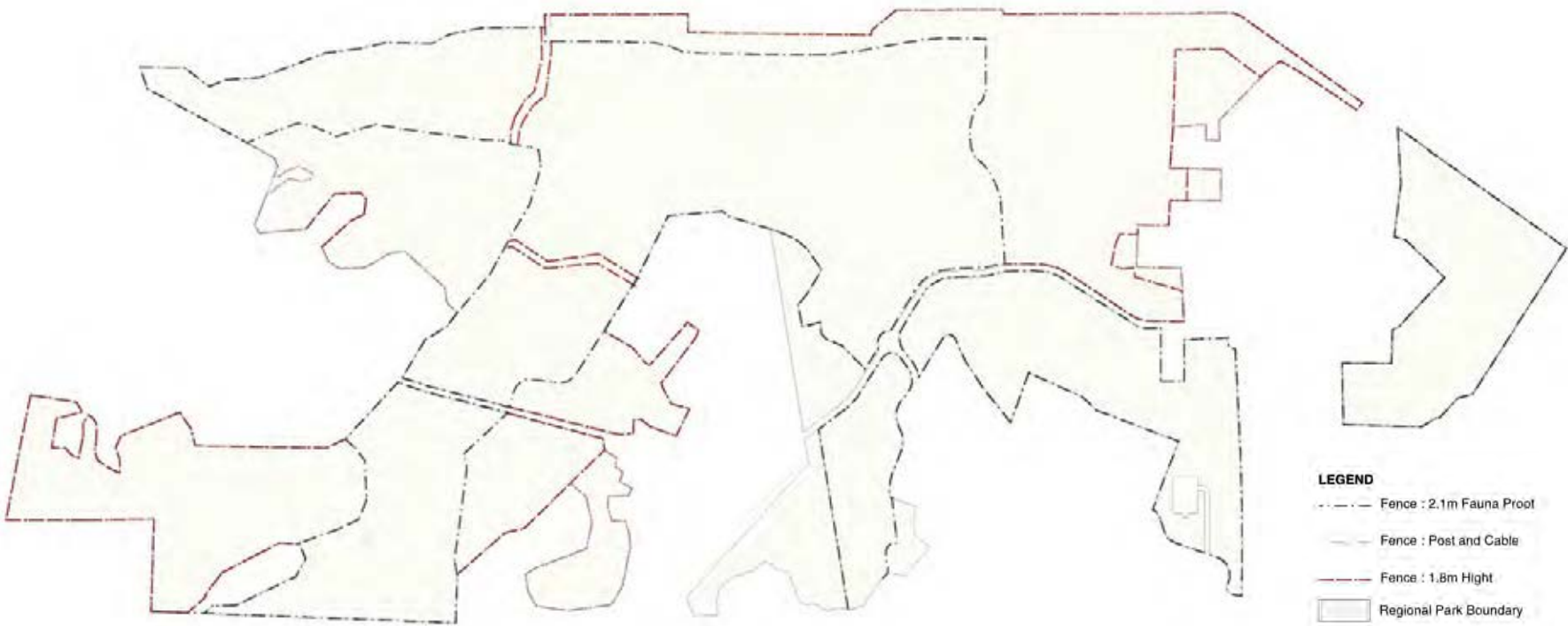


Figure 6.3.1 Proposed location of fencing / barrier types



6 MATERIALS & FINISHES

6.4 Planting

Design principles:

- Retain existing tree canopy
- Limit mid-storey planting to enable views across the site
- Conserve existing cleared / grassland areas
- Raise levels through additional soil to selected grassed gathering spaces for drainage and to provide maintainable surface

Materials principles:

- Species to reflect existing planting on site
- Use of species of the Cumberland Plain Woodland community
- Propagate plants from site seed stock through establishment of on site nursery

Landscape Function	Botanic Name	Common Name	Height	AW	SGTF	CRCIF	SPW	FW	CSGW
Tree	Eucalyptus tereticornis	Forest Red Gum		X	X		X		
	Allocasuarina littoralis	Black She-Oak							X
	Eucalyptus baueriana	Blue Box		X					
	Eucalyptus crebra	Narrow-leaved Ironbark					X		
	Eucalyptus fibrosa	Broad-leaved Red Ironbark			X	X	X		
	Eucalyptus moluccana	Grey Box			X		X		
	E. parramattensis subsp. parramattensis	Parramatta Red Gum							X
	Eucalyptus sclerophylla	Scribbly Gum							X
	Bursaria spinosa	Blackthorn					X		
	Casuarina glauca	Swamp She-Oak		X					
	Dillwynia tenuifolia		0.4m - 1m				X		
	Melaleuca decora	White Feather Honeymyrtle				X			
	Melaleuca lineariifolia	Snow-In-Summer		X				X	
	Melaleuca nodosa	Ball Honeymyrtle				X			X
	Melaleuca decora),	White Feather Honeymyrtle							X
	Angophora bakeri	Narrow-leaved Apple							X
	Angophora subvelutina	Broad-leaved Apple		X					
	Angophora floribunda	Rough-barked Apple		X					
Shrub	Typha orientalis	Broad-leaved Cumbungi						X	
	Dillwynia tenuifolia		0.4m - 1m	X	X	X			
	Pultenaea parviflora		to 1m	X	X	X	X		
	Micromyrtus minutiflora		2m	X	X	X	X		
	Persoonia nutans		2.5m	X	X	X	X		
	Grevillea juniperina subsp. juniperina		0.5-1.5 m	X	X	X	X		
Grasses/Groundcovers	Centella asiatica	Gotu Kola						X	
	Juncus usitatus	Common Rush						X	
	Persicaria decipiens	Slender Knotweed						X	
	Cynodon dactylon	Couch Grass						X	

Proposed Revegetation Species List (refer appendices for full list)



Site Image: No mow / regeneration zones (Source: EP NSW)



Site Image: Existing buffer planting (Source: EP NSW)



Site Image: Existing tree canopy (Source: EP NSW)

6 MATERIALS & FINISHES

6.5 Furniture

Materials and Finishes

Design principles:

Park bench

- Provide to Zone 3 recreational precincts within cleared areas supporting picnic and gathering use
- Provide to Zone 3 recreational precincts adjoining major path links and outside major building facilities
- Locate with back to planted zones

Bench

- As for above but with flexibility to have oriented two ways

Picnic table

- Provide to Zone 3 recreational precincts within cleared areas supporting picnic and gathering use

Table seats

- Provide to Zone 3 recreational precincts within cleared areas supporting picnic and gathering use to provide for flexible range of use and less formal / structured character

Informal rock seating

- Provide to Zone 3 recreational precincts within cleared areas supporting picnic and gathering use to provide for flexible range of use and less formal / structured character
- Provide to Zone 1 and 2 areas adjoining interpretive signage / points of interest to cater for rest stopover

Precast concrete bollards

- Limit extent to main visitor precinct adjoining Visitor Centre

Cycle racks

- Provide at Visitor Centre
- Provide at Transit Stores - multi function buildings
- Provide at larger gathering / picnic spaces

Bins

- Provide at larger gathering / picnic spaces to main visitor precinct, western visitor precinct, central visitor precinct, and Dunheved visitor precinct

Materials principles:

- Furniture to be in accordance with NSW NPWS Parks Facilities Manual



Site Image: NPWS Park bench (Source: EP NSW)



Site Image: NPWS bench (Source: EP NSW)



Site Image: NPWS Picnic table / seats (Source: EP NSW)



Site Image: Table / seats (Source: EP NSW)



Site Image: Informal rock seating (Source: EP NSW)



Site Image: Precast concrete bollards / seats (Source: EP NSW)



Site Image: Bicycle racks (Source: EP NSW)



Site Image: Bins (Source: EP NSW)



6 MATERIALS & FINISHES

6.6 Facilities

Materials and Finishes

Design principles:

Generally facilities should follow the principles and standards outlined in the NSW NPWS Parks Facilities Manual. The opportunity exists for some specific / non standard facilities and these should develop a site specific design response but have regard for materials and related principles outlined in manual.

Visitors Centre

- Adaptive re-use of Mine Filling store - site specific design retaining shell of existing structure and infilling with new fabric

Picnic shelters

- Parks Facilities Manual gable or skillion shelters

Toilets

- Parks Facilities Manual gable or skillion toilets as quad or double

Materials principles:

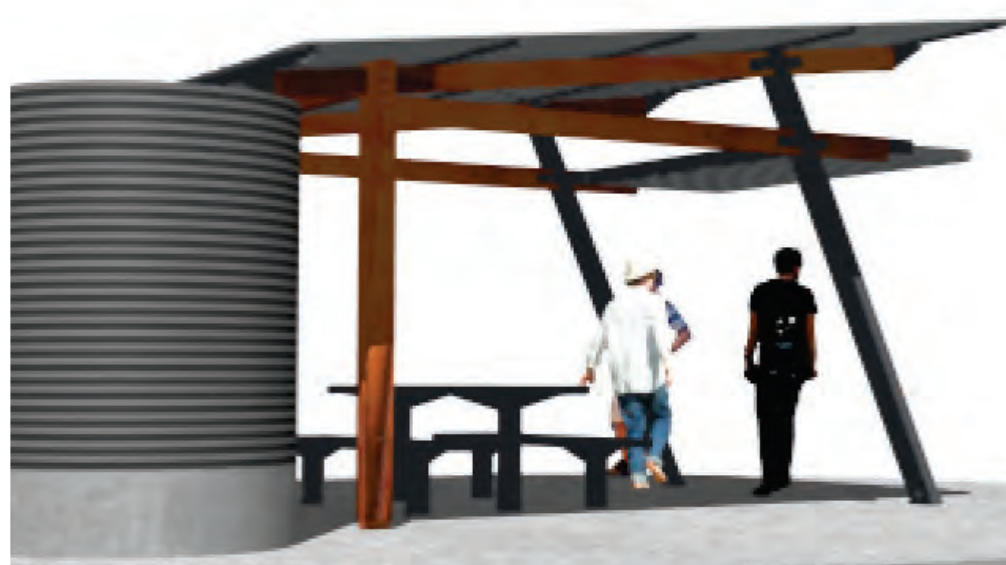
- Generally apply steel as predominant facade material with timber accent in accordance with NSW NPWS Parks Facilities Manual



Single Toilet (Source: NPWS Manual 2007)



Gable Picnic Shelters (Source: NPWS Manual 2007)



Skillion Picnic Shelters (Source: NPWS Manual 2007)



Quad Toilets (Source: NPWS Manual 2007)



Visitors Centre - site specific design precedents (Source: EP NSW)

6 MATERIALS & FINISHES

6.7 Signage

Materials and Finishes

Design principles:

As part of initial design development for the first stages of implementation in the park it is desirable that a Signage Plan be prepared that further details the hierarchy of signage, develops a design and graphic approach, and researches raw material for interpretive signage. This exercise must have regard for existing NPWS signage strategies as applicable.

Interpretive development will draw upon the recommendations of the CMP for Wianamatta Regional Park

Some basic principles for key signage elements are listed

Place markers / signage

- Provide to identify recreational places and other places of significance
- Locate at major approaches to spaces as markers
- Integrate interpretive information where possible

Vehicular wayfinding

- Located prior to and at key traffic decision points.
- Ideally should reflect a general NPWS character but retain a component of site specific reference - it is noted that use of Aboriginal and ADI related terminology / names will be a key aspect of this goal

Pedestrian cycle wayfinding

- Located at track heads and at track decision points
- Smaller scale than vehicular signage

Ground level markers

- Provide to reflect past building footprints and potentially building names / functions

Interpretive totem

- To be provided along the major track access routes as part of an integrated sequence of educational and informative signage
- Ideally will provide a layered approach whereby each totem addresses a brief component of the key topics and their individual themes. Key topics include natural heritage, aboriginal occupation, early colonial history, growth and development, ADI phases, and community action

Interpretive panels

- To be provided to illustrate and inform key locations on site and may address a single or multiple topics

Materials principles:

- Materials should reflect the post industrial character of the site and employ concrete, stone, and weathering steel as core elements.



Example of Interpretation panels



Example of Interpretation totem - multi themed (source Victoria Parks)



Example of Place markers / signage



vehicle wayfinding



Pedestrian / cycle wayfinding



Ground level markers



6 MATERIALS & FINISHES

6.8 Public Art

Key principles:

An element that is potentially closely related to signage and interpretation is public art in the Regional Park. It is desirable that art play a role in the functional and aesthetic design development of park improvements.

As for signage an integrated strategy developed at the outset of implementation is the most effective way of facilitating this.

A series of themes building on the CMP outcomes can be effectively linked to information objectives and integrated into the fundamental spatial and elemental design of spaces so that art is not limited to installed objects.

Design principles:

- Incorporate public art to reinforce site character and identity
- Provide artworks as integrated components of landscape improvements

Materials principles:

- Art components to be of durable materials, resistant to potential vandalism
- Reuse where possible with found materials from site - reflecting the sites past use (refer ssection 6.9)



Example of Fusion between art and signage



Example of Artwork installations



Example of Artwork integrated to entry fence element

6 MATERIALS & FINISHES

6.9 Found Materials

Materials and Finishes

Design principles:

The development of building, road, hardstand, and services infrastructure through the ADI complex's history was extensive. The majority of these structures were dismantled as part of the decommissioning of the site, with construction materials including brick masonry, concrete, pipes, telegraph poles etc stockpiled on the site (currently within the Urban Development Central precinct).

A review of these stockpile holding areas identified a wide diversity of elements across the eras of the sites use. A number of footings for poles etc appear to be very early based on the composition and types of aggregate materials.

Materials are generally broken from the demolition process, with concrete often having twisted plumes of reinforcement steel attached along with remnants of operational paint markings etc. Overall the effect of these found materials is highly evocative of the working industrial nature of the ADI landuse past, and its haphazard demolished character reflective of its post industrial present. It is considered that adaptive re-use of these materials affords a significant design opportunity that has both interpretive and sustainability potential to add further dimensions to the Regional Parks ongoing implementation.

It is proposed that these found materials can play a significant role in the landscape enhancement of the recreational precincts through the Regional Park along with effective and sustainable treatment of infrastructure such as drainage and roads / tracks.

The images this page indicate some examples of existing found material ith potential for re-use - some possibilities are listed below the images.

It is noted that contamination potential would need to be assessed prior to re-use of any found materials.



Masonry rubble

- crush for use as aggregate to new concrete finishes and as road base/ track material



Larger concrete sections, footings etc

- reuse as elements (eg pillars, face sections etc) within new walls
- reuse as seats / markers



Pipes

- reuse as elements (eg pillars, face sections etc) within new walls
- reuse as seats / markers
- reuse within structure or within play landscapes to create viewing points / tunnels etc



Power poles and power fixtures

- evocative potential as element in public artworks / landscape designs interpreting site use and history
- reuse as seats / markers



Concrete and reinforcement / steel fixtures

- evocative potential as element in public artworks / landscape designs interpreting site use and history



Concrete rubble

- crush for use as aggregate to new concrete finishes and as road base/ track material
- crush for use in filling of gabion baskets for wall construction and mattresses for stabilisation / erosion control



Light fittings

- potential for selected re-use for lighting near visitors centre

7.0 ACTION PLAN

7 ACTION PLAN

This masterplan report describes the full range of proposed strategies proposed for long term development and management of the Wianamatta Regional Park. In implementing these strategies, a range of actions encompassing a broad range of activities from investigation to construction works will be required.

This section identifies those actions and identifies a potential prioritisation of these based on a set of criteria specific to Wianamatta Regional Park, and is set out as follows:

1. Identification of the suggested criteria for prioritisation of actions and related rationale
2. Application of the criteria to a possible staging approach providing a listing of actions required for masterplan implementation including outline implementation costs
3. Full listing of initial implementation costs by the zones identified in the masterplan

7.1 Criteria for establishing priorities

As identified earlier in this report, the full realisation of a Regional Park and related uses and management of the scale of Wianamatta Regional Park will be a long term undertaking. Required actions must be prioritised to enable available resources to be best focussed on those actions that will enable recreational use to be commenced by the public and important conservation and habitat management actions to be initiated.

As such it is necessary to think of implementation of the park in both the short term and long term. The masterplan has identified visions to reach each of these phases of park implementation, along with having regard for the specific objectives that were developed in the Wianamatta Regional Park Plan of Management (prepared by NPWS) guided the masterplan process. As such criteria for priority decision making should have regard for the short and long term visions along with addressing each of the objectives

Short term vision

Provide for initiation of high priority management regimes for habitat and cultural heritage conservation, and actions for commencement of public use, enjoyment and appreciation of the park.

Long term vision

Consolidate habitat and cultural heritage conservation to complement recreational use and education, and involve the broad range of stakeholders in its planning and management.

Build upon core recreation opportunities of walking, cycling, and picnicking in a bushland setting. Provide dynamic interpretation of conservation values, special events areas and programmed education.

Prioritisation Criteria

dPoM Management Objective	No	Criteria for prioritisation
Protection and enhancement of the natural heritage of the Park, particularly the endangered ecological communities and the threatened flora and fauna species through the management of fire, disturbed areas, drainage, introduced species, access and visitor use.	1.1	Implementation of required actions for stabilisation (ie prevention of further degradation) of sensitive or threatened environmental systems in the park
	1.2	Support implementation of recreational activities with require environmental protection measures as it proceeds
Recognition and protection of traditional and contemporary Aboriginal cultural heritage, landscape and spiritual values through providing opportunities for the involvement of the traditional owners and the local Aboriginal community in the protection, interpretation and management of their heritage and values	2.1	Implementation of required actions for protection / management of locations of Aboriginal cultural heritage significance
	2.2	Facilitation of structure that will promote and manage involvement of traditional owners in ongoing planning and design along with operation and management of the park

dPoM Management Objective	No	Criteria for prioritisation
Protection of historic heritage through identifying, recording, conserving and interpreting historic items and places	3.1	Implementation of required actions for protection / management of locations of historic heritage significance
Protection of the catchment values of South and Ropes Creeks through managing any disturbances, particularly those associated with fire, access and drainage		Refer 1.1
Provision of recreational facilities that are appropriate in a regional context and are designed, located and managed to protect the natural and cultural heritage and visual values of the Park	4.1	Implementation of initial recreational facilities in locations with good accessibility to adjoining communities to : - establish awareness and profile of park - assist with management of security
	4.2	Implementation of recreational facilities as a holistic functional precinct to: - provide maximum impact in initial stages of community use - assist in simplification of management and maintenance in initial stages of community use
	4.4	Relate development of recreational precincts to the programme for implementation of adjoining urban development to: - take advantage of access and infrastructure availability - optimise security (avoid isolated recreational precincts in short term)
	4.5	Supplement functional precinct with path network beyond to support and enhance recreational experience
Provision of interpretive and educational opportunities through signage, park brochures and activities to assist visitor understanding and enjoyment of the Park.	5.1	Coordinated approach required to guide implementation of signage
	5.2	Implement to support functional precincts and to path network beyond
Improving knowledge of natural / cultural heritage, related threats and evaluation of management programs through research and monitoring. Working with other agencies and authorities, the community and commercial interests to maximise community interest and involvement in the conservation of the Park, and the implementation of sympathetic conservation measures in the neighbouring environment.	6.1	Refer 5.1 and 5.2 Management of the park to develop and pursue partnerships in research, and provision and management of facilities

The criteria for prioritisation generate several common principles:

- Ensure that any required protection and management works to habitat and environmental systems that are threatened are undertaken as high priority
- Focus first priority recreational works on establishment of a holistic functional recreational precinct with good accessibility to adjoining community (urban development)

7 ACTION PLAN

7.2 Works action plan

The Works Action Plan table following identifies the range of actions encompassing a broad range of activities from investigation to construction works required to implement the masterplan proposals. The Works Action Plans are in the form of a schedule that:

- Lists works in suggested priority order based on the criteria for prioritisation;
- Describes the broad actions required including pre-construction elements for capital works items;
- Describes the nature of actions required (capital works, policy review, management, liaison action);
- Notes any specific comments relating to the implementation of that item.

Ultimately actual staging of implementation will be influenced by a range of factors including availability of funding and its (potential) relationship to specific recreational uses, environmental or conservation activities along with other factors. As such this process will need to be flexible and opportunistic, always having regard for the criteria noted in 7.1 but recognising that flexibility to maximise implementation opportunities is essential.

The staging described by the Action Plan is illustrated in Figure 7.1 Staging Plan to opposite page. Refer to key plan page 104 for location of sub zones upon which costing is based.

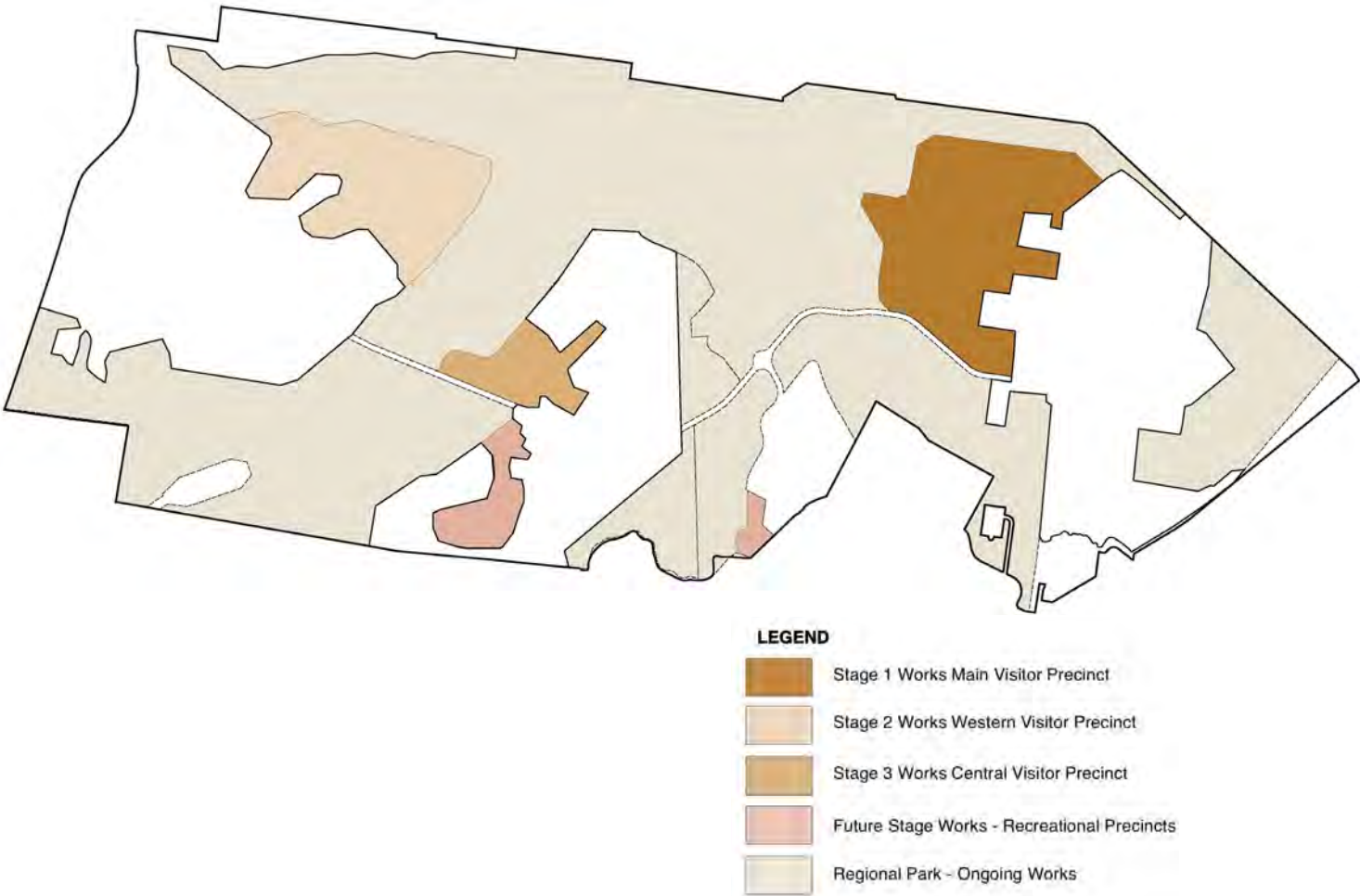


Figure 7.1 Staging Plan

No	Action	Indicative costing ('000)	Points for consideration
1.0	STAGE ONE - MAIN VISITOR PRECINCT AND ZONE ONE / TWO PRIORITY WORKS		
1.1	Pre Construction -general & precinct based		
1.1.1	Heritage investigation - property boundaries	\$18k	<ul style="list-style-type: none">• Specific significance and sequence of boundary lines and owners and relationship to road system• Interpretation potential
1.1.2	Integrated Interpretation and Wayfinding Strategy	\$45k \$15k	<ul style="list-style-type: none">• Develop coordinated approach to interpretation and wayfinding as framework from implementation including text and imagery, elements and detailing
1.1.3	Fencing Audit - zone 1B and 3A - main Visitor Precinct	\$22k	<ul style="list-style-type: none">• Review all fence lines and identify actions for retention / replacement (\$61.5k across all zones)
1.1.4	Design & documentation - Zones 1/2	\$161k	<ul style="list-style-type: none">• 33% of total allowance for Zones 1/2
1.1.5	Design & documentation - Zone 3 - Main Visitor Precinct	\$297k	<ul style="list-style-type: none">• 70% of total allowance for Zone 3 including adaptive re-use
1.2	Zone 1 / 2 - Environmental Management Works		
1.2.1	Weed management to creeklines - ongoing	\$138k	<ul style="list-style-type: none">• One third budget for weed management through zones 1-2
1.3	Zone 1 / 2 - Heritage Management Works		
1.3.1	Protection and interpretation of remnant chimney in zone 1B	\$75k	<ul style="list-style-type: none">• Required works and interpretation for guided walks or from adjoining areas
1.3.2	Protection of burial / potential arch'l sites	\$10k	<ul style="list-style-type: none">• Required works and interpretation for guided walks or from adjoining areas
1.4	Zone 1 / 2 - Recreational & Infrastructure Works		
1.4.1	Partial fencing to zone 1	\$500k	<ul style="list-style-type: none">• 10% of overall fencing (to 10% total of \$4,559k for 1/2)
1.4.2	Guided walk establishment / setup including signage in Zone 1	\$100k	<ul style="list-style-type: none">• Formalisation of approach / management and supporting signage and controls (fencing)
1.5	Main Visitor Precinct Infrastructure, Heritage, Environment & Recreational & Works		
1.5.1	Infrastructure and Recreation works excluding building adaptive re-use to zone 3A	\$2544.6k	<ul style="list-style-type: none">• Formalisation of approach / management and supporting signage and controls (fencing)
1.5.2	Infrastructure and Recreation works - Building adaptive re-use - phase one	\$1,996k	<ul style="list-style-type: none">• Adaptive re-use works - 50% completed
Sub Total - Stage One		\$5,921.6k	
Total - Stage One works incl Misc / Accel'n		\$6,430.5k	



7 ACTION PLAN

No	Action	Indicative costing ('000)	Points for consideration
2.0	STAGE TWO - WESTERN VISITOR PRECINCT AND ZONE ONE / TWO PRIORITY WORKS		
2.1	Pre Construction		
2.1.1	Heritage investigation / survey - Zone 1 B Aboriginal Cultural Heritage (eg Burial site)	\$50k	
2.1.2	Heritage investigation - agricultural and ADI landuse	\$15k	<ul style="list-style-type: none">Specific significance and sequence of boundary lines and owners and relationship to road systemInterpretation potential
2.1.3	Heritage investigation - creek bridge crossings and past road in north	\$20k	
2.1.4	Heritage investigation - Luxford Dairy	\$13k	
2.1.5	Heritage investigation - Arch Design and materials options / interpretation - adaptive re-use	\$25k	
2.1.6	Fencing Audit - balance of areas	\$39.5k	<ul style="list-style-type: none">Review all fence lines and identify actions for retention / replacement
2.1.7	Design & documentation - Zones 1/2	\$161k	<ul style="list-style-type: none">33% of total allowance for Zones 1/2
2.1.8	Design & documentation - Zone 3A - Main Visitor Precinct - building adaptive re-use remaining works from 1.1.4	\$128k	
2.1.9	Design & documentation - Zone 3B - Western Visitor Precinct	\$105k	
2.2	Zone 1 / 2 - Environmental Management Works		
2.2.1	Weed management to zones 1 / 2	\$205.5k	<ul style="list-style-type: none">Balance of budget for weed management through zones 1-2
2.3	Zone 1 / 2 - Heritage Management Works		
2.3.1	Protection and interpretation of Jacksons Dairy clearing	\$30k	<ul style="list-style-type: none">Required works and interpretation for guided walks or from adjoining areas
2.3.2	Protection and interpretation of Jordans Hill house site and cleared area	\$100k	<ul style="list-style-type: none">Required works and interpretation for guided walks or from adjoining areas
2.4.5	General interpretation works through zone 1 and 2	\$176k	
2.4	Zone 1 / 2 - Recreational & Infrastructure Works		
2.4.1	Services & roadworks to zone 1/2 (excl fencing)	\$85k	<ul style="list-style-type: none">50% of Services & roadworks to zone 1/2 (to 50%)
2.4.2	Partial fencing to zone 1/2	\$1,500k	<ul style="list-style-type: none">33% of overall fencing (to 43% total of \$4,559k for 1/2)
2.4.3	Pedestrian / cycle link between zones 3A and 3B through zone 1B	\$100k	<ul style="list-style-type: none">Formalisation of track link and supporting signage and controls (fencing)
2.4.4	Pedestrian / cycle access works through zone 1 and 2	\$819k	<ul style="list-style-type: none">50% of general access works to zone 1 and 2
2.4.5	Interpretation works through zone 1 and 2	\$3k	<ul style="list-style-type: none">Partial completion
2.5	Main Visitor Precinct Recreational & Infrastructure Works		
2.5.1	Infrastructure and Recreation works Zone 3A - Building adaptive re-use - phase two	\$1,996k	<ul style="list-style-type: none">Adaptive re-use works - 100% completed
2.6	Western Visitor Precinct Infrastructure, Heritage, Environment & Recreational & Works		
2.6.1	Infrastructure and Recreation works to zone 3B	\$1,616.8k	
	Sub Total - Stage Two	\$7,183.8k	
	Total - Stage Two works incl cont / Accel'n	\$7,794.5k	

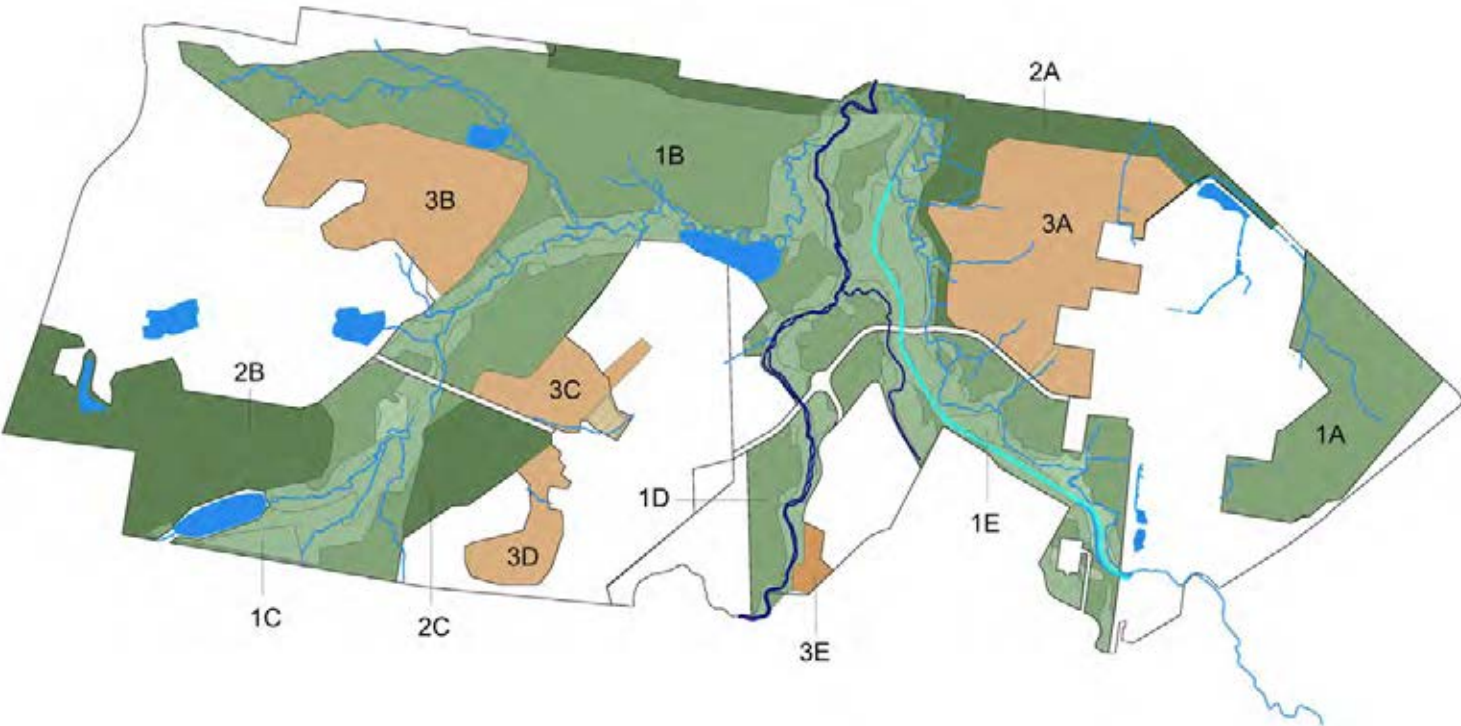
No	Action	Indicative costing ('000)	Points for consideration
3.0	STAGE THREE - CENTRAL VISITOR PRECINCT AND ZONE ONE / TWO PRIORITY WORKS		
3.1	Pre Construction		
3.1.1	Heritage investigation - CSIRO research	\$15k	
3.1.2	Heritage investigation - Elizabeth King Farmlands	\$15k	
3.1.3	Heritage investigation - ADI Bomb Filling	\$15k	
3.1.4	Heritage investigation - Dunheved	\$40k	
3.1.5	Design & documentation - Zones 1/2	\$161k	<ul style="list-style-type: none">33% of total allowance for Zones 1/2
3.1.6	Design & documentation - Zone 3C - Central Visitor Precinct	\$79k	
3.2	Zone 1 / 2 - Environmental Management Works		
	No capital works		
3.3	Zone 1 / 2 - Heritage Management Works		
3.3.1	Protection and interpretation of Obsolete Storage Area	\$20k	<ul style="list-style-type: none">Required works and interpretation for guided walks or from adjoining areas
3.3.2	Protection and interpretation of creek road bridges and past road	\$50k	<ul style="list-style-type: none">Required works and interpretation to supplement bridge and track upgrade works
3.3.3	Protection and interpretation of CSIRO research area	\$25k	<ul style="list-style-type: none">Required works and interpretation to supplement bridge and track upgrade works
3.3.4	Protection and interpretation of King Farmlands	\$15k	<ul style="list-style-type: none">To address adjoining site
3.4	Zone 1 / 2 - Recreational & Infrastructure Works		
4.4.1	Services & roadworks to zone 1/2 (excl fencing)	\$85k	<ul style="list-style-type: none">50% of Services & roadworks to zone 1/2 (to 100%)
4.4.2	Partial fencing to zone 1/2	\$1,279.5k	<ul style="list-style-type: none">28% overall fencing (to 71% total of \$4,559k for 1/2)
4.4.3	Pedestrian access works through zone 1 and 2	\$819k	<ul style="list-style-type: none">50% of general access works to zone 1 / 2 (to 100%)
3.5	Central Visitor Precinct Infrastructure, Heritage, Environment & Recreational & Works		
3.5.1	Infrastructure and Recreation works to zone 3C	\$1,210.7k	
	Sub Total - Stage Three	\$3,829.2k	
	Total - Stage Three works incl cont / Accel'n	\$4,151.5k	
4.0	ONGOING WORKS - ZONES 1 / 2 & SECONDARY VISITOR PRECINCTS		
4.1	Pre Construction		
4.1.1	Heritage investigation / survey - Zone 1 B Aboriginal Cultural Heritage (eg Silcrete Quarry)	\$25k	
4.1.2	Design & documentation - Zone 3D - South Central Visitor Precinct	\$34k	
4.1.3	Design & documentation - Zone 3E - Dunheved Visitor Precinct	\$75k	
4.2	Zone 1 / 2 - Heritage Management Works		
4.2.1	Protection and interpretation of Silcrete Quarry Area	\$20k	<ul style="list-style-type: none">Required works and interpretation for guided walks or from adjoining areas
4.3	Zone 1 / 2 - Recreational & Infrastructure Works		
4.3.1	Partial fencing to zone 1/2	\$1,279.5k	<ul style="list-style-type: none">28% overall fencing (to 100% total of \$4,559k for 1/2)
4.4	South Central precinct Infrastructure, Heritage, Environment & Recreational & Works		
4.4.1	Infrastructure and Recreation works to zone 3D	\$1,083.3k	
4.5	Dunheved precinct Infrastructure, Heritage, Environment & Recreational & Works		
4.5.1	Infrastructure and Recreation works to zone 3E	\$523.7k	
	Sub Total - Ongoing works	\$3,040.5k	
	Total - Ongoing works incl cont / Accel'n	\$3,294.9k	

7 ACTION PLAN

7.3 Masterplan Costings

The tables following identify initial costings for masterplan implementation. General preliminaries and pre construction items are identified followed by costings within the proposed sub zones as identified on the diagram below.

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
1.0 Preliminaries & General Pre Construction items					
1.1	Masterplan Consultancy		item		\$200,000.00
1.2	Heritage Investigation – property boundaries		item		\$18,000.00
1.3	Integrated Interpretation Strategy		item		\$45,000.00
1.4	Integrated Signage Design		item		\$15,000.00
	Sub total (note: excluded from Zone 1 total)				\$278,000.00



ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
2.0 Zone 1: Habitat Focus					
2.1 Zone 1A					
2.1.0 Pre construction tasks					
2.1.0.1	Fencing audit – status and recommendations		item		\$6,000.00
2.1.0.2	Aboriginal cultural heritage survey of key sites – silcrete quarry site etc		item		\$25,000.00
2.1.0.3	Design documentation (6.5% of capital cost)		item		\$47,339.24
2.1.0.4	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$18,207.40
	Sub total				\$96,546.64
2.1.1 Services & infrastructure, fencing & barriers					
2.1.1.1	Fauna proof security fence 2.1m	4,162	lin/m	\$140.00	\$582,680.00
2.1.1.2	General Security fence 1.8m		lin/m	\$90.00	
	Sub total				\$582,680.00
2.1.2 Traffic circulation & parking					
2.1.2.1	Gravel road resheeting (partial allowance say 10%)	854	m2	\$45.00	\$38,448.00
2.1.2.2	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	2,136	lin/m	\$20.00	\$42,720.00
2.1.2.3	Vehicular entry security gate	1	no	\$2,500.00	\$2,500.00
	Sub total				\$83,668.00
3.1.3 Track and path access					
3.1.3.1	Crushed sandstone resurfacing / refurbishment (1.2m)	170	m2	\$15.00	\$2,556.00
3.1.3.2	New crushed sandstone path surfacing 1.2m)	652	m2	\$45.00	\$29,322.00
3.1.3.3	Upgrade general path drainage (crossovers etc) – allowance for all tracks	690	lin/m	\$3.00	\$2,070.00
3.1.3.4	Steel and timber bridge link (2.5m wide)		lin/m		
3.1.3.5	Steel and timber boardwalk (1.5m wide)		lin/m		
3.1.3.6	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
	Sub total				\$33,948.00
3.1.4 Vegetation Management					
3.1.4.3	Selective weed management through general conservation areas	50,000	m2	\$0.10	\$5,000.00
3.1.4.2	Weed management through regeneration areas		m2		
3.1.4.3	Revegetation areas		m2		
3.1.4.4	Native grassing		m2		
3.1.4.5	Pasture Grassing		m2		
	Sub total				\$5,000.00
3.1.5 Conservation management, Interpretation & Signage					
3.1.5.1	Major Interpretive totems	1	no	\$3,000.00	\$3,000.00
3.1.5.2	Secondary Interpretive markers		no		
3.1.5.3	Skillion signage shelter		no		
3.1.5.4	Pedestrian wayfinding signage		no		
3.1.5.5	Place marker signage		no		
3.1.5.6	Conservation / protection works and interpretation to Silcrete Quarry area		item		\$20,000.00
	Sub total				\$23,000.00
3.1.6 Facilities					
3.1.6.1	Park seat		no		
3.1.6.2	Table seat		no		
	Sub total				\$0.00
	Total Zone 1A works				\$728,296.00
	Total Zone 1A including pre construction works				\$824,842.64

Figure 7.2 Masterplan Costing Zones



7 ACTION PLAN

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
2.2 Zone 1B					
2.2.0	Pre construction tasks				
2.2.0.1	Fencing audit – status and recommendations		item		\$18,000.00
2.2.0.2	Design documentation (6.5% of capital cost)		item		\$179,594.38
2.1.0.3	Aboriginal cultural heritage survey of key sites – burial site etc		item		\$50,000.00
2.1.0.4	Design input / coordination with Water Quality pond design by developer		item		\$5,000.00
2.2.0.5	Acceleration (2.5 % total allowance – ongoing implementation)		no	allowace	\$69,074.76
	Sub total				\$321,669.14
2.2.1	Services & infrastructure, fencing & barriers				
2.2.1.1	Fauna proof security fence 2.1m	12,411	lin/m	\$140.00	\$1,737,540.00
2.2.1.2	General Security fence 1.8m	2,396	lin/m	\$90.00	\$215,640.00
	Sub total				\$1,953,180.00
2.2.2	Traffic circulation & parking				
2.2.2.1	Gravel road resheeting (partial allowance say 10%)	781	m2	\$45.00	\$35,154.00
2.2.2.2	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	1,953	lin/m	\$20.00	\$39,060.00
2.2.2.3	Vehicular entry security gate	8	no	\$750.00	\$6,000.00
	Sub total				\$80,214.00
2.2.3	Track and path access				
2.2.3.1	Crushed sandstone resurfacing / refurbishment (1.2m)	11,242	m2	\$15.00	\$168,624.00
2.2.3.2	New crushed sandstone path surfacing 1.2m)		lin/m	\$35.00	\$0.00
2.2.3.3	Upgrade general path drainage (crossovers etc) – allowance for all tracks	9,368	lin/m	\$3.00	\$28,104.00
2.2.3.4	Steel and timber bridge link (2.5m wide)		lin/m		
2.2.3.5	Steel and timber boardwalk (1.5m wide)		lin/m		
2.2.3.6	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
2.2.3.7	Additional tasks / works incl signage – setup of east west link through Zone 1B		Item		\$100,000.00
	Sub total				\$296,728.00
2.2.4	Vegetation Management				
2.2.4.3	Selective weed management through general conservation areas	912,684	m2	\$0.10	\$91,268.40
2.2.4.2	Weed management through regeneration areas		m2		
2.2.4.3	Revegetation areas		m2		
2.2.4.4	Native grassing		m2		
2.2.4.5	Pasture Grassing		m2		
	Sub total				\$91,268.40
2.2.5	Conservation management, Interpretation & Signage				
2.2.5.1	Major Interpretive totems	1	no	\$3,000.00	\$3,000.00
2.2.5.2	Secondary Interpretive markers		no		
2.2.5.3	Skillion signage shelter		no		
2.2.5.4	Pedestrian wayfinding signage	12	no	\$300.00	\$3,600.00
2.2.5.5	Protective measures to burial site		item		\$10,000.00
2.2.5.6	General supplementary interps for guided walks & walk setup		item		\$100,000.00
2.2.5.7	Place marker signage		no	incl in 2.2.5.6	
2.2.5.8	Conservation / protection and interpretation of remnant chimney		item		\$75,000.00
2.2.5.9	Conservation / protection and interpretation of Jacksons dairy clearing		item		\$30,000.00
2.2.5.10	Conservation / protection and interpretation of Jordans Hill remnant house & clearing		item		\$100,000.00
2.2.5.11	Conservation / protection and interpretation of obsolete storage area		item		\$20,000.00
	Sub total				\$341,600.00
2.2.6	Facilities				
2.2.6.1	Park seat		no		
2.2.6.2	Table seat		no		
	Sub total				\$0.00
Total Zone 1B works					\$2,762,990.40
Total Zone 1B including pre construction works					\$3,084,659.54

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
2.3 Zone 1C					
2.3.0	Pre construction tasks				
2.3.0.1	Fencing audit – status and recommendations		item		\$6,000.00
2.3.0.2	Design input / coordination with Water Qality pond design by developer		item		\$5,000.00
2.3.0.3	Design documentation (6.5% of capital cost)		item		\$55,204.86
2.3.0.4	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$18,207.40
	Sub total				\$84,412.26
2.3.1	Services & infrastructure, fencing & barriers				
2.3.1.1	Fauna proof security fence 2.1m	4,628	lin/m	\$140.00	\$647,920.00
2.3.1.2	General Security fence 1.8m		lin/m	\$90.00	
	Sub total				\$647,920.00
2.3.2	Traffic circulation & parking				
2.3.2.1	Gravel road resheeting (partial allowance say 10%)	33	m2	\$45.00	\$1,476.00
2.3.2.2	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	82	lin/m	\$20.00	\$1,640.00
2.3.2.3	Vehicular entry security gate	3	no	\$750.00	\$2,250.00
	Sub total				\$5,366.00
2.3.3	Track and path access				
2.3.3.1	Crushed sandstone resurfacing / refurbt (1.2m)	1,676	m2	\$15.00	\$25,146.00
2.3.3.2	New crushed sandstone path surfacing 1.2m)	2,315	m2	\$45.00	\$104,166.00
2.3.3.3	Upgrade general path drainage (crossovers etc) – allowance for all tracks		lin/m	\$3.00	
2.3.3.4	Steel and timber bridge link (2.5m wide)		lin/m		
2.3.3.5	Steel and timber boardwalk (1.5m wide)		lin/m		
2.3.3.6	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
	Sub total				\$129,312.00
2.3.4	Vegetation Management				
2.3.4.3	Selective weed management through general conservation areas	637,075	m2	\$0.10	\$63,707.50
2.3.4.2	Weed management through regeneration areas		m2		
2.3.4.3	Revegetation areas		m2		
2.3.4.4	Native grassing		m2		
2.3.4.5	Pasture Grassing		m2		
	Sub total				\$63,707.50
2.3.5	Conservation management, Interpretation & Signage				
2.3.5.1	Major Interpretive totems	1	no	\$3,000.00	\$3,000.00
2.3.5.2	Secondary Interpretive markers		no		
2.3.5.3	Skillion signage shelter		no		
2.3.5.4	Pedestrian wayfinding signage		no	\$300.00	
2.3.5.5	Place marker signage		no		
	Sub total				\$3,000.00
2.3.6	Facilities				
3.1.6.1	Park seat		no		
3.1.6.2	Table seat		no		
	Sub total				\$0.00
Total Zone 1C works					\$849,305.50
Total Zone 1C including pre construction works					\$933,717.76

7 ACTION PLAN

7.3 Masterplan Costings

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
2.4 Zone 1D					
2.4.0	Pre construction tasks				
2.4.0.1	Fencing audit – status and recommendations		item		\$6,000.00
2.4.0.2	Design documentation (6.5% of capital cost)		item		\$27,333.84
2.4.0.4	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$10,513.02
	Sub total				\$43,846.85
2.4.3	Services & infrastructure, fencing & barriers				
2.1.1.1	Fauna proof security fence 2.1m	2,681	lin/m	\$140.00	\$375,340.00
2.1.1.2	General Security fence 1.8m		lin/m	\$90.00	
	Sub total				\$375,340.00
2.4.2	Traffic circulation & parking				
2.4.2.1	Gravel road resheeting (partial allowance say 10%)			\$15.00	
2.4.2.2	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads		lin/m	\$5.00	
2.4.2.3	Vehicular entry security gate			\$750.00	
	Sub total				\$0.00
2.4.3	Track and path access				
2.4.3.1	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m	\$15.00	
2.4.3.2	New crushed sandstone path surfacing 1.2m)	312	m2	\$45.00	\$14,040.00
2.4.3.3	Upgrade general path drainage (crossovers etc) – allowance for all tracks		lin/m	\$3.00	
2.4.3.4	Steel and timber bridge link (2.5m wide)		lin/m		
2.4.3.5	Steel and timber boardwalk (1.5m wide)		lin/m		
2.4.3.6	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
	Sub total				\$14,040.00
2.4.4	Vegetation Management				
2.4.4.3	Selective weed management through general conservation areas	281,406	m2	\$0.10	\$28,140.60
2.4.4.2	Weed management through regeneration areas		m2		
2.4.4.3	Revegetation areas		m2		
2.4.4.4	Native grassing		m2		
2.4.4.5	Pasture Grassing		m2		
	Sub total				\$28,140.60
2.4.5	Conservation management, Interpretation & Signage				
2.4.5.1	Major Interpretive totems	1	no	\$3,000.00	\$3,000.00
2.4.5.2	Secondary Interpretive markers		no		
2.4.5.3	Skillion signage shelter		no		
2.4.5.4	Pedestrian wayfinding signage		no		
2.4.5.5	Place marker signage		no		
	Sub total				\$3,000.00
2.4.6	Facilities				
2.4.6.1	Park seat		no		
2.4.6.2	Table seat		no		
	Sub total				\$0.00
	Total Zone 1D works				\$420,520.60
	Total Zone 1D including pre construction works				\$464,367.45

3.0 Zone 2: Secondary Habitat Focus					
ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
3.1 Zone 2A					
3.1.0	Pre construction tasks				
3.1.0.1	Fencing audit – status and recommendations		item		\$4,000.00
3.1.0.2	Detailed heritage review – creek bridge crossings and past road		item		\$20,000.00
3.1.0.3	Detailed heritage review – Luxford Dairy		item		\$13,000.00
3.1.0.4	Design documentation (6.5% of capital cost)		item		\$85,637.71
3.1.0.5	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$32,937.58
	Sub total				\$155,575.30
3.1.1	Services & infrastructure, fencing & barriers				
3.1.1.1	Stormwater – Open Swales		lin/m		
3.1.1.2	Stormwater – Piped connections		lin/m		
3.1.1.3	Stormwater -headwall / outfall		no		
3.1.1.4	Fauna proof security fence 2.1m		lin/m		
3.1.1.5	General Security fence 1.8m	4,622	lin/m	\$90.00	\$415,980.00
3.1.1.6	Vehicular entry security gate	3		\$750.00	\$2,250.00
3.1.1.7	Post & cable vehicular barrier to park perimeter		lin/m		
3.1.1.8	Square bollard to park perimeter		no		
	Sub total				\$418,230.00
3.1.2	Traffic circulation & parking				
3.1.2.1	Post & cable vehicular barrier to road / carpark edge		lin/m		
3.1.2.2	Square bollard to park perimeter to road / carpark edge		lin/m		
	Sub total				\$0.00
3.1.3	Track and path access				
3.1.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	17,950	m2	\$15.00	\$269,250.00
3.1.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		\$0.00
3.1.3.3	New crushed sandstone path surfacing (2.5m)	1,690	m2	\$45.00	\$76,050.00
3.1.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
3.1.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks		no		
3.1.3.6	Steel and timber bridge link (2.5m wide)	80	lin/m	\$5,000.00	\$400,000.00
3.1.3.7	Steel and timber boardwalk (1.5m wide)		lin/m		
3.1.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
3.1.3.9	Entry stockades (trail bike proof) at path heads	3	no	\$2,000.00	\$6,000.00
	Sub total				\$751,300.00
3.1.4	Vegetation Management				
3.1.4.3	Selective weed management through general conservation areas	821,733	m2	\$0.10	\$82,173.30
3.1.4.2	Weed management through regeneration areas		m2		
3.1.4.3	Revegetation areas		m2		
3.1.4.4	Native grassing		m2		
	Sub total				\$82,173.30
3.1.5	Conservation management, Interpretation & Signage				
3.1.5.1	Major Interpretive totems	2	no	\$3,500.00	\$7,000.00
3.1.5.2	Secondary Interpretive markers	4	no	\$1,200.00	\$4,800.00
3.1.5.3	Skillion signage shelter		no		
3.1.5.4	Pedestrian wayfinding signage	8	no	\$500.00	\$4,000.00
3.1.5.5	Place marker signage		no		
3.1.5.6	Conservation / protection and interpretation of past road		item		\$20,000.00
3.1.5.7	Conservation / protection and interpretation of bridges (see also 3.1.3.6)		item		\$30,000.00
	Sub total				\$65,800.00
3.1.6	Facilities				
3.1.6.1	Park seat		no		
	Sub total				\$0.00
	Total Zone 2A works				\$1,317,503.30
	Total Zone 2A including pre construction works				\$1,473,078.60



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ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
3.2 Zone 2B					
3.2.0	Pre construction tasks				
3.2.0.1	Fencing audit – status and recommendations		item		\$5,500.00
3.2.0.2	Detailed heritage review – CSIRO research		item		\$15,000.00
3.2.0.3	Design documentation (6.5% of capital cost)		item		\$66,902.31
3.1.0.4	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$50,625.82
	Sub total				\$138,028.12
3.2.1 Services & infrastructure, fencing & barriers					
3.2.1.1	Stormwater – Open Swales		lin/m		
3.2.1.2	Stormwater – Piped connections		lin/m		
3.2.1.3	Stormwater -headwall / outfall		no		
3.2.1.4	Fauna proof security fence 2.1m		lin/m		
3.2.1.5	General Security fence 1.8m	5,006	lin/m	\$90.00	\$450,540.00
3.2.1.6	Vehicular entry security gate	3		\$2,500.00	\$7,500.00
3.2.1.7	Post & cable vehicular barrier to park perimeter		lin/m		
3.2.1.8	Square bollard to park perimeter		no		
	Sub total				\$458,040.00
3.2.2 Traffic circulation & parking					
3.2.2.1	Post & cable vehicular barrier to road / carpark edge		lin/m		
3.2.2.2	Square bollard to park perimeter to road / carpark edge		lin/m		
	Sub total				\$0.00
3.2.3 Track and path access					
3.2.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	9,423	m2	\$15.00	\$141,337.50
3.2.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		\$0.00
3.2.3.3	New crushed sandstone path surfacing (2.5m)	4,053	m2	\$45.00	\$182,362.50
3.2.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
3.2.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks		no		
3.2.3.6	Steel and timber bridge link (2.5m wide)	80	lin/m	\$2,000.00	\$160,000.00
3.2.3.7	Steel and timber boardwalk (1.5m wide)		lin/m		
3.2.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
3.2.3.9	Entry stockades (trail bike proof) at path heads	2	no	\$2,000.00	\$4,000.00
	Sub total				\$487,700.00
3.2.4 Vegetation Management					
3.2.4.3	Selective weed management through general conservation areas	500,263	m2	\$0.10	\$50,026.30
3.2.4.2	Weed management through regeneration areas		m2		
3.2.4.3	Revegetation areas		m2		
3.2.4.4	Native grassing		m2		
	Sub total				\$50,026.30
3.2.5 Conservation management, Interpretation & Signage					
3.2.5.1	Major Interpretive totems		no		
3.2.5.2	Secondary Interpretive markers	4	no	\$1,500.00	\$6,000.00
3.2.5.3	Skillion signage shelter		no		
3.2.5.4	Pedestrian wayfinding signage	5	no	\$500.00	\$2,500.00
3.2.5.5	Place marker signage		no		
3.2.5.6	Conservation / protection and interpretation of CSIRO Research area		item		\$25,000.00
	Sub total				\$33,500.00
3.2.6 Facilities					
3.2.6.1	Park seat		no		
	Sub total				\$0.00
	Total Zone 2B works				\$1,029,266.30
	Total Zone 2B including pre construction works				\$1,167,294.42

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
3.3 Zone 2C					
3.3.0	Pre construction tasks				
3.3.0.1	Fencing audit - status and recommendations		item		\$3,000.00
3.3.0.2	Detailed heritage review - Elizabeth King farmlands		item		\$15,000.00
3.3.0.3	Design documentation (6.5% of capital cost)		item		\$12,944.94
3.3.0.4	Acceleration (2.5 % total allowance - ongoing implementation)		item		\$4,978.82
	Sub total				\$35,923.76
3.3.1 Services & infrastructure, fencing & barriers					
3.3.1.1	Stormwater - Open Swales		lin/m		
3.3.1.2	Stormwater - Piped connections		lin/m		
3.3.1.3	Stormwater -headwall / outfall		no		
3.3.1.4	Fauna proof security fence 2.1m		lin/m		
3.3.1.5	General Security fence 1.8m	1,390	lin/m	\$90.00	\$125,100.00
3.3.1.6	Vehicular entry security gate	2		\$750.00	\$1,500.00
3.3.1.7	Post & cable vehicular barrier to park perimeter		lin/m		
3.3.1.8	Square bollard to park perimeter		no		
	Sub total				\$126,600.00
3.3.2 Traffic circulation & parking					
3.3.2.1	Post & cable vehicular barrier to road / carpark edge		lin/m		
3.3.2.2	Square bollard to park perimeter to road / carpark edge		lin/m		
	Sub total				\$0.00
3.3.3 Track and path access					
3.3.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	1,640	m2	\$15.00	\$24,600.00
3.3.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		\$0.00
3.3.3.3	New crushed sandstone path surfacing (2.5m)		lin/m	\$35.00	\$0.00
3.3.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
3.3.3.5	Upgrade general path drainage (crossovers etc) - allowance for all tracks		no		
3.3.3.6	Steel and timber bridge link (2.5m wide)		lin/m	\$1,100.00	\$0.00
3.3.3.7	Steel and timber boardwalk (1.5m wide)		lin/m		
3.3.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	
3.3.3.9	Entry stockades (trail bike proof) at path heads		no	\$2,000.00	\$0.00
	Sub total				\$24,600.00
3.3.4 Vegetation Management					
3.3.4.3	Selective weed management through general conservation areas	232,529	m2	\$0.10	\$23,252.90
3.3.4.2	Weed management through regeneration areas		m2		
3.3.4.3	Revegetation areas		m2		
3.3.4.4	Native grassing		m2		
	Sub total				\$23,252.90
3.3.5 Conservation management, Interpretation & Signage					
3.3.5.1	Major Interpretive totems	1	no	\$4,000.00	\$4,000.00
3.3.5.2	Secondary Interpretive markers	1	no	\$1,200.00	\$1,200.00
3.3.5.3	Skillion signage shelter		no		\$0.00
3.3.5.4	Pedestrian wayfinding signage	5	no	\$500.00	\$2,500.00
3.3.5.5	Place marker signage	1	no	\$2,000.00	\$2,000.00
3.3.5.6	Conservation interpretation of King Farmlands adjoining		item		\$15,000.00
	Sub total				\$24,700.00
3.3.6 Facilities					
3.3.6.1	Park seat		no		
	Sub total				\$0.00
	Total Zone 2C works				\$199,152.90
	Total Zone 2C including pre construction works				\$235,076.66
	TOTAL ZONE 2				\$2,875,449.68

7 ACTION PLAN

7.3 Masterplan Costings

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
4.1 Zone 3A					
4.1.0	Pre construction tasks				
4.1.0.1	Fencing audit – status and recommendations		item		\$4,000.00
4.1.0.2	Detailed heritage review – buildings for adaptive re-use		item		\$25,000.00
4.1.0.3	Design documentation (6.5% of capital cost)		item		\$424,844.99
4.1.0.4	Acceleration (2.5 % total allowance – ongoing implementation)		item		\$163,401.92
	Sub total				\$617,246.90
4.1.1 Services & infrastructure, fencing & barriers					
4.1.1.1	Power connection / control		item		\$50,000.00
4.1.1.2	Power reticulation	1,500	lin/m	\$75.00	\$112,500.00
4.1.1.3	Sewer connection		item		\$30,000.00
4.1.1.4	Sewer reticulation	855	lin/m	\$120.00	\$102,600.00
4.1.1.5	Stormwater – Open Swales	1,500	lin/m	\$10.00	\$15,000.00
4.1.1.6	Stormwater – Piped connections	200	lin/m	\$85.00	\$17,000.00
4.1.1.7	Stormwater -headwall / outfall	2	no	\$1,500.00	\$3,000.00
4.1.1.8	Telecommunications connection		item		
4.1.1.9	Telecommunications cabling	855	lin/m	\$100.00	\$85,500.00
4.1.1.10	Fauna proof security fence 2.1m		lin/m	\$140.00	\$0.00
4.1.1.11	General Security fence 1.8m	3,190	lin/m	\$90.00	\$287,100.00
4.1.1.12	Post & cable vehicular barrier to park perimeter	1,588	lin/m	\$100.00	\$158,800.00
4.1.1.13	Square bollard to park perimeter		no	\$60.00	\$0.00
4.1.1.14	Pedestrian security gate	3	no	\$750.00	\$2,250.00
	Sub total				\$863,750.00
4.1.2 Traffic circulation & parking					
4.1.2.1	Asphalt road resheeting (partial allowance say 10%)	2,000	lin/m	\$25.00	\$50,000.00
4.1.2.2	Gravel road resheeting (partial allowance say 10%)	1,500	lin/m	\$15.00	\$22,500.00
4.1.2.3	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	4,000	lin/m	\$50.00	\$200,000.00
4.1.2.4	Vehicular entry security gate		no	\$750.00	
4.1.2.5	Carpark two coat seal		m2	\$75.00	
4.1.2.6	Carpark crushed sandstone surface	1,800	m2	\$40.00	\$72,000.00
4.1.2.7	Wheelstop to parking space (recycled plastic or concrete)	80	no	\$20.00	\$1,600.00
4.1.2.8	Post & cable vehicular barrier to road / carpark edge	1,000	lin/m	\$100.00	\$100,000.00
4.1.2.9	Square bollard to park perimeter to road / carpark edge	200	lin/m	\$60.00	\$12,000.00
4.1.2.10	Feature entry gate	2	lin/m	\$5,000.00	\$10,000.00
	Sub total				\$468,100.00
4.1.3 Track and path access					
4.1.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	7,605	m2	\$15.00	\$114,075.00
4.1.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		
4.1.3.3	New crushed sandstone path surfacing (2.5m)	5,330	m2	\$45.00	\$239,850.00
4.1.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
4.1.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks	5,100	lin/m	\$6.00	\$30,600.00
4.1.3.6	Steel and timber bridge link (2.5m wide)		lin/m		
4.1.3.7	Steel and timber boardwalk (1.5m wide)	116	lin/m	\$1,100.00	\$127,600.00
4.1.3.8	Steel and timber lookout (nom 16m2)	1	no	\$25,000.00	\$25,000.00
4.1.3.9	Entry stockades (trail bike proof) at path heads	5	no	\$2,000.00	\$10,000.00
	Sub total				\$547,125.00
4.1.4 Vegetation Management					
4.1.4.3	Selective weed management through general conservation areas	636,585	m2	\$0.10	\$63,658.50
4.1.4.2	Weed management through regeneration areas	43,341	m2	\$0.20	\$8,668.20
4.1.4.3	Revegetation areas	6,487	m2	\$25.00	\$162,175.00
4.1.4.4	Native grassing (15% of cleared areas 54107m2)	8,100	m2	\$12.00	\$97,200.00
4.1.4.5	Pasture Grassing (10% of cleared areas 54107m2)	5,400	m2	\$3.00	\$16,200.00
4.1.4.6	Spot tree planting (15% of cleared areas 54107m2)	100	no	\$12.00	\$1,200.00
4.1.4.7	Recreational grassed areas (10% of cleared areas 54107m2)	5,400	m2	\$13.00	\$70,200.00
	Sub total				\$419,301.70
4.1.5 Conservation management, Interpretation & Signage					
4.1.5.1	Major Interpretive totems	2	no	\$4,000.00	\$8,000.00
4.1.5.2	Secondary Interpretive markers	8	no	\$1,000.00	\$8,000.00
4.1.5.3	Skillion signage shelter		no		\$0.00
4.1.5.4	Vehicular wayfinding signage	8	no	\$300.00	\$2,400.00
4.1.5.5	Pedestrian wayfinding signage		no	\$500.00	\$0.00
4.1.5.6	Place marker signage	4	no	\$750.00	\$3,000.00
4.1.5.7	Conservation and interpretation of ADI Armaments Filling		item		\$225,000.00
	Sub total				\$246,400.00
4.1.6 Facilities					
4.1.6.1	Park single shelters with picnic table	14	no	\$11,000.00	\$154,000.00
4.1.6.2	Park single shelters with BBQ	8	no	\$12,000.00	\$96,000.00
4.1.6.3	Park double shelters with picnic tables	3	no	\$20,000.00	\$60,000.00
4.1.6.4	Park double shelters with BBQ	1	no	\$22,000.00	\$22,000.00
4.1.6.5	Skillion quad toilet block		no	\$30,000.00	\$0.00
4.1.6.6	Picnic table	8	no	\$1,500.00	\$12,000.00
4.1.6.7	Park seat	16	no	\$1,000.00	\$16,000.00
4.1.6.8	Table seat	8	no	\$800.00	\$6,400.00
4.1.6.9	Visitors Centre refurbishment				
	Hulk (2 storey) 676m2	1	item	\$3,000,000.00	\$3,000,000.00
	Western building 606m2				
4.1.6.10	Transit Store (x2) refurbishment for adaptive re-use	1	item	\$500,000.00	\$500,000.00
	Each buildingm2 x 2 =m2				
4.1.6.11	Transit Store refurbishment for NPWS depot	1	item	\$125,000.00	\$125,000.00
m2				
	Sub total				\$3,991,400.00
	Total Zone 3A				\$6,536,076.70
	Total Zone 3A including pre construction works				\$7,153,323.60

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
4.2 Zone 3B					
4.2.0	Pre construction tasks				
4.2.0.1	Fencing audit – status and recommendations		item		\$4,000.00
4.2.0.2	Detailed heritage review – Agricultural and ADI Landuse		item		\$15,000.00
4.2.0.3	Design documentation (6.5% of capital cost)		item		\$105,094.89
4.2.0.4	Acceleration (5 % total allowance – ongoing implementation)		item		\$80,842.23
	Sub total				\$204,937.12
4.2.1 Services & infrastructure, fencing & barriers					
4.2.1.1	Power connection / control		item		\$20,000.00
4.2.1.2	Power reticulation		lin/m	\$75.00	
4.2.1.3	Sewer connection and reticulation		item		
4.2.1.4	Sewer reticulation (for recycled toilets)	376	lin/m	\$120.00	\$45,120.00
4.2.1.5	Stormwater – Open Swales	650	lin/m	\$40.00	\$26,000.00
4.2.1.6	Stormwater – Piped connections		lin/m	\$85.00	\$0.00
4.2.1.7	Stormwater -headwall / outfall	2	no	\$3,000.00	\$6,000.00
4.2.1.8	Telecommunications connection		item		
4.2.1.9	Telecommunications cabling		lin/m	\$100.00	
4.2.1.10	Fauna proof security fence 2.1m		lin/m	\$140.00	\$0.00
4.2.1.11	General Security fence 1.8m	676	lin/m	\$90.00	\$60,840.00
4.2.1.12	Post & cable vehicular barrier to park perimeter	1,921	lin/m	\$100.00	\$192,100.00
4.2.1.13	Square bollard to park perimeter		no	\$60.00	\$0.00
4.2.1.14	Pedestrian security gate		no	\$500.00	\$0.00
	Sub total				\$350,060.00
4.2.2 Traffic circulation & parking					
4.2.2.1	Asphalt road resheeting (partial allowance say 10%)	500	lin/m	\$25.00	\$12,500.00
4.2.2.2	Gravel road resheeting (partial allowance say 10%)	701	m2	\$45.00	\$31,545.00
4.2.2.3	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	1,000	lin/m	\$50.00	\$50,000.00
4.2.2.4	Vehicular entry security gate	2	no	\$750.00	\$1,500.00
4.2.2.5	Carpark two coat seal	500	m2	\$75.00	\$37,500.00
4.2.2.6	Carpark crushed sandstone surface	1,800	m2	\$40.00	\$72,000.00
4.2.2.7	Wheelstop to parking space (recycled plastic or concrete)	80	no	\$20.00	\$1,600.00
4.2.2.8	Post & cable vehicular barrier to road / carpark edge	750	lin/m	\$100.00	\$75,000.00
4.2.2.9	Square bollard to park perimeter to road / carpark edge	100	lin/m	\$60.00	\$6,000.00
4.2.2.10	Feature entry gate	2	lin/m	\$5,000.00	\$10,000.00
	Sub total				\$297,645.00
4.2.3 Track and path access					
4.2.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	5,748	m2	\$15.00	\$86,212.50
4.2.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		
4.2.3.3	New crushed sandstone path surfacing (2.5m)	6,030	m2	\$45.00	\$271,350.00
4.2.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
4.2.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks	4,600	lin/m	\$6.00	\$27,600.00
4.2.3.6	Steel and timber bridge link (2.5m wide)		lin/m		
4.2.3.7	Steel and timber boardwalk (1.5m wide)		lin/m	\$1,100.00	\$0.00
4.2.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	\$0.00
4.2.3.9	Entry stockades (trail bike proof) at path heads	5	no	\$2,000.00	\$10,000.00
	Sub total				\$395,162.50
4.2.4 Vegetation Management					
4.2.4.3	Selective weed management through general conservation areas	375,220	m2	\$0.10	\$37,522.00
4.2.4.2	Weed management through regeneration areas		m2	\$0.20	\$0.00
4.2.4.3	Revegetation areas	6,099	m2	\$25.00	\$152,475.00
4.2.4.4	Native grassing (15% of cleared areas 13877m2)	2,000	m2	\$12.00	\$24,000.00
4.2.4.5	Pasture Grassing (10% of cleared areas 13877m2)	1,380	m2	\$3.00	\$4,140.00
4.2.4.6	Spot tree planting (15% of cleared areas 13877m2)	2,000	no	\$12.00	\$24,000.00
4.2.4.7	Recreational grassed areas (10% of cleared areas 54107m2)	1,380	m2	\$13.00	\$17,940.00
	Sub total				\$260,077.00
4.2.5 Conservation management, Interpretation & Signage					
4.2.5.1	Major Interpretive totems	2	no	\$4,000.00	\$8,000.00
4.2.5.2	Secondary Interpretive markers	6	no	\$1,000.00	\$6,000.00
4.2.5.3	Skillion signage shelter		no		\$0.00
4.2.5.4	Vehicular wayfinding signage	4	no	\$300.00	\$1,200.00
4.2.5.5	Pedestrian wayfinding signage	12	no	\$500.00	\$6,000.00
4.2.5.6	Place marker signage	2	no	\$750.00	\$1,500.00
4.2.5.7	Conservation and interpretation of ADI and Agricultural history		item		\$130,000.00
	Sub total				\$152,700.00
4.2.6 Facilities					
4.2.6.1	Park single shelters with picnic table	4	no	\$11,000.00	\$44,000.00
4.2.6.2	Park single shelters with BBQ	1	no	\$12,000.00	\$12,000.00
4.2.6.3	Park double shelters with picnic tables	2	no	\$20,000.00	\$40,000.00
4.2.6.4	Park double shelters with BBQ	1	no	\$22,000.00	\$22,000.00
4.2.6.5	Skillion quad toilet block	1	no	\$30,000.00	\$30,000.00
4.2.6.6	Picnic table	4	no	\$1,500.00	\$6,000.00
4.2.6.7	Park seat	4	no	\$1,000.00	\$4,000.00
4.2.6.8	Table seat	4	no	\$800.00	\$3,200.00
	Sub total				\$161,200.00
	Total Zone 3B				\$1,616,844.50
	Total Zone 3B including pre construction works				\$1,821,781.62



7 ACTION PLAN

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
4.3 Zone 3C					
4.3.0	Pre construction tasks				
4.3.0.1	Fencing audit – status and recommendations		item		\$2,000.00
4.3.0.2	Detailed heritage review – ADI Bomb Filling		item		\$15,000.00
4.3.0.3	Design documentation (6.5% of capital cost)		item		\$78,696.28
4.3.0.4	Acceleration (7.5 % total allowance – ongoing implementation)		item		\$90,803.40
	Sub total				\$186,499.68
4.3.1 Services & Infrastructure, fencing & barriers					
4.3.1.1	Power connection / control		item		
4.3.1.2	Power reticulation		lin/m	\$75.00	
4.3.1.3	Sewer connection and reticulation		item		
4.3.1.4	Sewer reticulation (for recycled toilets)	376	lin/m	\$120.00	\$45,120.00
4.3.1.5	Stormwater – Open Swales	650	lin/m	\$40.00	\$26,000.00
4.3.1.6	Stormwater – Piped connections		lin/m	\$85.00	
4.3.1.7	Stormwater -headwall / outfall	2	no	\$3,000.00	\$6,000.00
4.3.1.8	Telecommunications connection		item		
4.3.1.9	Telecommunications cabling		lin/m	\$100.00	
4.3.1.10	Fauna proof security fence 2.1m		lin/m	\$140.00	\$0.00
4.3.1.11	General Security fence 1.8m	2,062	lin/m	\$90.00	\$185,580.00
4.3.1.12	Post & cable vehicular barrier to park perimeter		lin/m	\$100.00	\$0.00
4.3.1.13	Square bollard to park perimeter		no	\$60.00	\$0.00
4.3.1.14	Pedestrian security gate	2	no	\$500.00	\$1,000.00
	Sub total				\$263,700.00
4.3.2 Traffic circulation & parking					
4.3.2.1	Asphalt road resheeting (partial allowance say 10%)	324	m2	\$45.00	\$14,562.00
4.3.2.2	Gravel road resheeting (partial allowance say 10%)	200	lin/m	\$50.00	\$10,000.00
4.3.2.3	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads	500	no	\$50.00	\$25,000.00
4.3.2.4	Vehicular entry security gate	3	m2	\$750.00	\$2,250.00
4.3.2.5	Carpark two coat seal	0	m2	\$40.00	\$0.00
4.3.2.6	Carpark crushed sandstone surface	900	no	\$20.00	\$18,000.00
4.3.2.7	Wheelstop to parking space (recycled plastic or concrete)	40	no	\$20.00	\$800.00
4.3.2.8	Post & cable vehicular barrier to road / carpark edge	100	lin/m	\$100.00	\$10,000.00
4.3.2.9	Square bollard to park perimeter to road / carpark edge	100	lin/m	\$60.00	\$6,000.00
4.3.2.10	Feature entry gate	1	no	\$5,000.00	\$5,000.00
	Sub total				\$91,612.00
4.3.3 Track and path access					
4.3.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	440	m2	\$15.00	\$6,600.00
4.3.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		
4.3.3.3	New crushed sandstone path surfacing (2.5m)	1,598	m2	\$45.00	\$71,887.50
4.3.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
4.3.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks	800	lin/m	\$6.00	\$4,800.00
4.3.3.6	Steel and timber bridge link (2.5m wide)		lin/m		
4.3.3.7	Steel and timber boardwalk (1.5m wide)	100	lin/m	\$1,750.00	\$175,000.00
4.3.3.8	Steel and timber lookout (nom 16m2)	1	no	\$25,000.00	\$25,000.00
4.3.3.9	Entry stockades (trail bike proof) at path heads	2	no	\$2,000.00	\$4,000.00
	Sub total				\$287,287.50
4.3.4 Vegetation Management					
4.3.4.3	Selective weed management through general conservation areas	190,045	m2	\$0.10	\$19,004.50
4.3.4.2	Weed management through regeneration areas		m2	\$0.20	\$0.00
4.3.4.3	Revegetation areas	548	m2	\$25.00	\$13,700.00
4.3.4.4	Native grassing (15% of cleared areas 4180m2)	630	m2	\$12.00	\$7,560.00
4.3.4.5	Pasture Grassing (10% of cleared areas 4180m2)	418	m2	\$3.00	\$1,254.00
4.3.4.6	Spot tree planting (15% of cleared areas 4180m2)	630	no	\$12.00	\$7,560.00
4.3.4.7	Recreational grassed areas (10% of cleared areas 4180m2)	418	m2	\$13.00	\$5,434.00
	Sub total				\$54,512.50
4.3.5 Conservation management, Interpretation & Signage					
4.3.5.1	Major Interpretive totems	1	no	\$4,000.00	\$4,000.00
4.3.5.2	Secondary Interpretive markers	4	no	\$1,000.00	\$4,000.00
4.3.5.3	Skillion signage shelter	1	no	\$8,000.00	\$8,000.00
4.3.5.4	Vehicular wayfinding signage	3	no	\$300.00	\$900.00
4.3.5.5	Pedestrian wayfinding signage	4	no	\$500.00	\$2,000.00
4.3.5.6	Place marker signage	2	no	\$750.00	\$1,500.00
4.2.5.7	Conservation and interpretation of ADI history		item		\$90,000.00
	Sub total				\$110,400.00
4.3.6 Facilities					
4.3.6.1	Park single shelters with picnic table		no	\$11,000.00	\$0.00
4.3.6.2	Park single shelters with BBQ		no	\$12,000.00	\$0.00
4.3.6.3	Park double shelters with picnic tables		no	\$20,000.00	\$0.00
4.3.6.4	Park double shelters with BBQ		no	\$22,000.00	\$0.00
4.3.6.5	Skillion quad toilet block		no	\$30,000.00	\$0.00
4.3.6.6	Picnic table		no	\$1,500.00	\$0.00
4.3.6.7	Park seat		no	\$1,000.00	\$0.00
4.3.6.8	Table seat	4	no	\$800.00	\$3,200.00
4.3.6.9	Nursery establishment	1	item	\$400,000.00	\$400,000.00
	Sub total				\$403,200.00
	Total Zone 3C				\$1,210,712.00
	Total Zone 3C including pre construction works				\$1,397,211.68

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
4.4 Zone 3D					
4.4.0	Pre construction tasks				
4.4.0.1	Fencing audit – status and recommendations		item		\$2,000.00
4.4.0.2	Detailed heritage review – Elizabeth King Farmlands		item		\$15,000.00
4.4.0.3	Design documentation (6.5% of capital cost)		item		\$34,040.21
4.4.0.4	Acceleration (10 % total allowance – ongoing implementation)		item		\$52,369.56
	Sub total				\$103,409.77
4.4.1 Services & Infrastructure, fencing & barriers					
4.4.1.1	Power connection / control		item		
4.4.1.2	Power reticulation		lin/m	\$75.00	
4.4.1.3	Sewer connection and reticulation		item		
4.4.1.4	Sewer reticulation (for recycled toilets)		lin/m	\$120.00	
4.4.1.5	Stormwater – Open Swales	300	lin/m	\$40.00	\$12,000.00
4.4.1.6	Stormwater – Piped connections		lin/m	\$85.00	
4.4.1.7	Stormwater -headwall / outfall		no	\$1,500.00	
4.4.1.8	Telecommunications connection		item		
4.4.1.9	Telecommunications cabling		lin/m	\$100.00	
4.4.1.10	Fauna proof security fence 2.1m		lin/m	\$140.00	\$0.00
4.4.1.11	General Security fence 1.8m		lin/m	\$90.00	\$0.00
4.4.1.12	Post & cable vehicular barrier to park perimeter	2,084	lin/m	\$100.00	\$208,400.00
4.4.1.13	Square bollard to park perimeter		no	\$60.00	\$0.00
4.4.1.14	Pedestrian security gate	2	no	\$750.00	\$1,500.00
	Sub total				\$221,900.00
4.4.2 Traffic circulation & parking					
4.4.2.1	Asphalt road resheeting (partial allowance say 10%)		lin/m	\$25.00	\$0.00
4.4.2.2	Gravel road resheeting (partial allowance say 10%)	13	m2	\$45.00	\$576.00
4.4.2.3	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads		lin/m		
4.4.2.4	Vehicular entry security gate	1	no	\$2,000.00	\$2,000.00
4.4.2.5	Carpark two coat seal		m2	\$75.00	
4.4.2.6	Carpark crushed sandstone surface		m2	\$40.00	
4.4.2.7	Wheelstop to parking space (recycled plastic or concrete)		no	\$20.00	
4.4.2.8	Post & cable vehicular barrier to road / carpark edge		lin/m	\$100.00	
4.4.2.9	Square bollard to park perimeter to road / carpark edge		lin/m	\$60.00	
4.4.2.10	Feature entry gate	2	lin/m	\$5,000.00	\$10,000.00
	Sub total				\$12,576.00
4.4.3 Track and path access					
4.4.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	810	m2	\$15.00	\$12,150.00
4.4.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		
4.4.3.3	New crushed sandstone path surfacing (2.5m)	2,200	m2	\$45.00	\$99,000.00
4.4.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
4.4.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks	1,100	lin/m	\$20.00	\$22,000.00
4.4.3.6	Steel and timber bridge link (2.5m wide)		lin/m		
4.4.3.7	Steel and timber boardwalk (1.5m wide)		lin/m	\$1,100.00	\$0.00
4.4.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	\$0.00
4.4.3.9	Entry stockades (trail bike proof) at path heads	3	no	\$2,000.00	\$6,000.00
	Sub total				\$139,150.00
4.4.4 Vegetation Management					
4.4.4.3	Selective weed management through general conservation areas	135,296	m2	\$0.10	\$13,529.60
4.4.4.2	Weed management through regeneration areas		m2	\$0.20	\$0.00
4.4.4.3	Revegetation areas	548	m2	\$25.00	\$13,700.00
4.4.4.4	Native grassing (15% of cleared areas 83500m2)	1,245	m2	\$12.00	\$14,940.00
4.4.4.5	Pasture Grassing (10% of cleared areas 83500m2)	8,300	m2	\$3.00	\$24,900.00
4.4.4.6	Spot tree planting (15% of cleared areas 83500m2)	630	no	\$12.00	\$7,560.00
4.4.4.7	Recreational grassed areas (10% of cleared areas 83500m2)	830	m2	\$13.00	\$10,790.00
	Sub total				\$85,419.60
4.4.5 Conservation management, Interpretation & Signage					
4.4.5.1	Major Interpretive totems	1	no	\$4,000.00	\$4,000.00
4.4.5.2	Secondary Interpretive markers	2	no	\$1,000.00	\$2,000.00
4.4.5.3	Skillion signage shelter		no		\$0.00
4.4.5.4	Vehicular wayfinding signage		no	\$300.00	\$0.00
4.4.5.5	Pedestrian wayfinding signage	3	no	\$500.00	\$1,500.00
4.4.5.6	Place marker signage	1	no	\$750.00	\$750.00
4.4.5.7	Conservation and interpretation of Elizabeth King farmlands		item		\$20,000.00
	Sub total				\$28,250.00
4.4.6 Facilities					
4.4.6.1	Park single shelters with picnic table	2	no	\$11,000.00	\$22,000.00
4.4.6.2	Park single shelters with BBQ	1	no	\$12,000.00	\$12,000.00
4.4.6.3	Park double shelters with picnic tables		no	\$20,000.00	\$0.00
4.4.6.4	Park double shelters with BBQ		no	\$22,000.00	\$0.00
4.4.6.5	Skillion quad toilet block		no	\$30,000.00	\$0.00
4.4.6.6	Picnic table		no	\$1,500.00	\$0.00
4.4.6.7	Park seat		no	\$1,000.00	\$0.00
4.4.6.8	Table seat	3	no	\$800.00	\$2,400.00
	Sub total				\$36,400.00
	Total Zone 3D				\$523,695.60
	Total Zone 3D including pre construction works				\$627,105.37

7 ACTION PLAN

7.3 Masterplan Costings

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
4.5 Zone 3E					
4.5.0	Pre construction tasks				
4.5.0.1	Fencing audit – status and recommendations		item		\$1,000.00
4.5.0.2	Detailed heritage review – Dunheved		item		\$40,000.00
4.5.0.3	Design documentation (6.5% of capital cost)		item		\$70,415.54
4.5.0.4	Acceleration (12.5 % total allowance – ongoing implementation)		item		\$135,414.50
	Sub total				\$246,830.04
4.5.1 Services & infrastructure, fencing & barriers					
4.5.1.1	Power connection / control		item		\$20,000.00
4.5.1.2	Power reticulation	100	lin/m	\$75.00	\$7,500.00
4.5.1.3	Sewer connection and reticulation		item		
4.5.1.4	Sewer reticulation	20	lin/m	\$120.00	\$2,400.00
4.5.1.5	Stormwater – Open Swales	300	lin/m	\$40.00	\$12,000.00
4.5.1.6	Stormwater – Piped connections		lin/m	\$85.00	
4.5.1.7	Stormwater -headwall / outfall	2	no	\$1,500.00	\$3,000.00
4.5.1.8	Telecommunications connection		item		
4.5.1.9	Telecommunications cabling		lin/m	\$100.00	
4.5.1.10	Fauna proof security fence 2.1m		lin/m	\$140.00	\$0.00
4.5.1.11	General Security fence 1.8m		lin/m	\$90.00	\$0.00
4.5.1.12	Post & cable vehicular barrier to park perimeter	2,084	lin/m	\$100.00	\$208,400.00
4.5.1.13	Square bollard to park perimeter		no	\$60.00	\$0.00
4.5.1.14	Pedestrian security gate	2	no	\$750.00	\$1,500.00
	Sub total				\$254,800.00
4.5.2 Traffic circulation & parking					
4.5.2.1	Asphalt road resheeting (partial allowance say 10%)		lin/m	\$25.00	\$0.00
4.5.2.2	Gravel road resheeting (partial allowance say 10%)	13	m2	\$45.00	\$576.00
4.5.2.3	Upgrade general road drainage (crossovers / swales etc) – allowance for all roads		lin/m		
4.5.2.4	Vehicular entry security gate	1	no	\$2,000.00	\$2,000.00
4.5.2.5	Carpark asphalt seal	195	m2	\$50.00	\$9,750.00
4.5.2.6	Carpark crushed sandstone surface		m2	\$40.00	
4.5.2.7	Wheelstop to parking space (recycled plastic or concrete)	12	no	\$450.00	\$5,400.00
4.5.2.8	Post & cable vehicular barrier to road / carpark edge	120	lin/m	\$100.00	\$12,000.00
4.5.2.9	Square bollard to park perimeter to road / carpark edge	50	lin/m	\$60.00	\$3,000.00
4.5.2.10	Feature entry gate	1	lin/m	\$5,000.00	\$5,000.00
	Sub total				\$37,726.00
4.5.3 Track and path access					
4.5.3.1	Crushed sandstone resurfacing / refurbishment (2.5m)	810	m2	\$15.00	\$12,150.00
4.5.3.2	Crushed sandstone resurfacing / refurbishment (1.2m)		lin/m		
4.5.3.3	New crushed sandstone path surfacing (2.5m)	2,200	m2	\$45.00	\$99,000.00
4.5.3.4	New crushed sandstone path surfacing 1.2m)		lin/m		
4.5.3.5	Upgrade general path drainage (crossovers etc) – allowance for all tracks	1,100	lin/m	\$20.00	\$22,000.00
4.5.3.6	Steel and timber bridge link (2.5m wide)	120	lin/m	\$2,000.00	\$240,000.00
4.5.3.7	Steel and timber boardwalk (1.5m wide)	50	lin/m	\$1,750.00	\$87,500.00
4.5.3.8	Steel and timber lookout (nom 16m2)		no	\$25,000.00	\$0.00
4.5.3.9	Entry stockades (trail bike proof) at path heads	3	no	\$2,000.00	\$6,000.00
	Sub total				\$466,650.00
4.5.4 Vegetation Management					
4.5.4.3	Selective weed management through general conservation areas (Riparian Zone)	20,000	m2	\$0.50	\$10,000.00
4.5.4.2	Weed management through regeneration areas		m2	\$0.20	\$0.00
4.5.4.3	Revegetation areas	548	m2	\$25.00	\$13,700.00
4.5.4.4	Native grassing (15% of cleared areas 83500m2)	1,245	m2	\$12.00	\$14,940.00
4.5.4.5	Pasture Grassing (10% of cleared areas 83500m2)	8,300	m2	\$3.00	\$24,900.00
4.5.4.6	Spot tree planting (15% of cleared areas 83500m2)	630	no	\$12.00	\$7,560.00
4.5.4.7	Recreational grassed areas (10% of cleared areas 83500m2)	830	m2	\$13.00	\$10,790.00
	Sub total				\$81,890.00
4.5.5 Conservation management, Interpretation & Signage					
4.5.5.1	Major Interpretive totems	1	no	\$4,000.00	\$4,000.00
4.5.5.2	Secondary Interpretive markers	4	no	\$1,000.00	\$4,000.00
4.5.5.3	Skillion signage shelter	1	no	\$11,000.00	\$11,000.00
4.5.5.4	Vehicular wayfinding signage	1	no	\$300.00	\$300.00
4.5.5.5	Pedestrian wayfinding signage	4	no	\$500.00	\$2,000.00
4.5.5.6	Place marker signage	1	no	\$750.00	\$750.00
4.5.5.7	Conservation and interpretation of Elizabeth King farmlands		item		\$150,000.00
	Sub total				\$172,050.00
4.5.6 Facilities					
4.5.6.1	Park single shelters with picnic table	2	no	\$11,000.00	\$22,000.00
4.5.6.2	Park single shelters with BBQ	1	no	\$12,000.00	\$12,000.00
4.5.6.3	Park double shelters with picnic tables		no	\$20,000.00	\$0.00
4.5.6.4	Park double shelters with BBQ		no	\$22,000.00	\$0.00
4.5.6.5	Skillion quad toilet block	1	no	\$30,000.00	\$30,000.00
4.5.6.6	Picnic table	2	no	\$1,500.00	\$3,000.00
4.5.6.7	Park seat		no	\$1,000.00	\$0.00
4.5.6.8	Table seat	4	no	\$800.00	\$3,200.00
4.5.6.9	Sub total				\$70,200.00
	Total Zone 3E				\$1,083,316.00
	Total Zone 3E including pre construction works				\$1,330,146.04

ITEM	DESCRIPTION	QUANTITY	UNIT	RATE	TOTAL
	TOTAL Preliminaries & General Pre Construction items				\$278,000.00
	TOTAL ZONE 1				\$6,406,455.14
	TOTAL ZONE 2				\$2,875,449.68
	TOTAL ZONE 3				\$12,329,568.31
	OVERALL TOTAL ZONE 1,2,3				\$21,889,473.13



8.0 BIBLIOGRAPHY

8 BIBLIOGRAPHY

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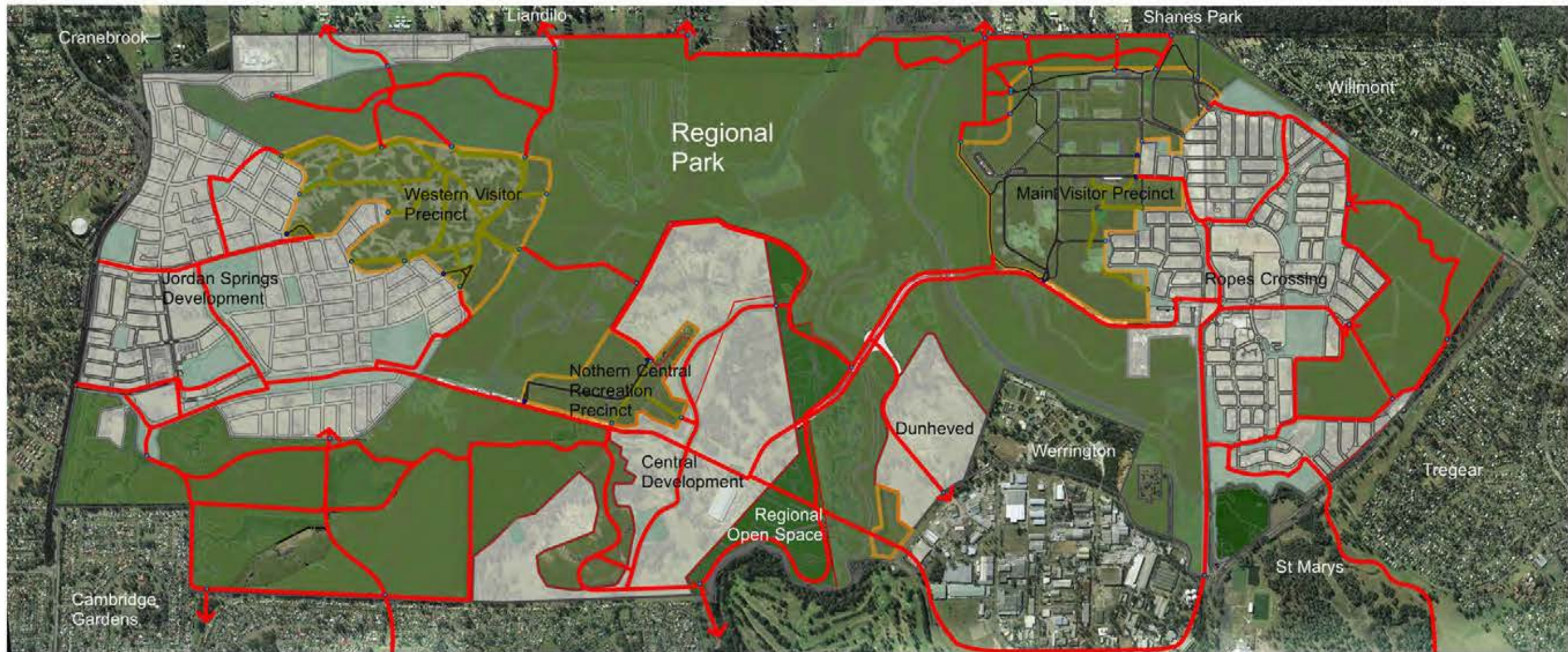


9.0 APPENDICES

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- APPENDIX 1. LANDSCAPE MASTERPLAN
- APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION





LEGEND

Boundary recreation zone 3

Zone 1 : Habitat Focus
- restricted access

Zone 2 : Secondary Habitat Focus
- controlled access

Adjoining Development

Open Space in Development

Regional Open Space

Existing Vegetation Habitat

Proposed Regeneration Areas

Existing Fence

Short Term Fence

Long Term Fence

Vehicular Access

Interpretation Walks Access Existing

Interpretation Walks Access Proposed

Shared Sealed Access

Shared Unsealed Access

Adjoining Access Routes

Recreation Interpretation Experience

Recreation Kick about Open Space

Recreation Picnic Areas

Nursery

Visitor Centre and Event Hall

National Park Work Shop

Multifunction Heritage Space

Pedestrian / Cycle Entry Access

Vehicular Entry Access

Parking - Event Carpark

Parking - To Building

Parking - Daily

Note: All development areas are subject to change and represent indicative design for roads/ open space etc at the time of the Landscape Masterplan report being written.

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APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Shale Gravel Transition Forest

Tree stratum

Acacia parramattensis
Eucalyptus fibrosa
Eucalyptus moluccana
Eucalyptus tereticornis
Melaleuca decora

Shrub stratum

Acacia falcata
Bursaria spinosa
Daviesia ulicifolia
Dillwynia sieberi
Lissanthe strigosa
Pultenaea villosa

Ground stratum

Agrostis avenacea var. avenacea
Aristida vagans
Austrodanthonia tenuior
Brunoniella australis
Calotis cuneifolia
Cheilanthes sieberi subsp. sieberi
Chorizema parviflorum
Desmodium varians
Dianella longifolia
Dianella revoluta var. revoluta
Dichelachne micrantha
Dichondra repens
Echinopogon caespitosus var. caespitosus
Echinopogon ovatus
Entolasia stricta
Euchiton sphaericus
Fimbristylis dichotoma
Goodenia hederacea subsp. hederacea
Hydrocotyle peduncularis

Ground stratum cont

Hypericum gramineum
Lagenifera stipitata
Laxmannia gracilis
Lepidosperma laterale
Lomandra filiformis subsp. filiformis
Lomandra multiflora subsp. multiflora
Microlaena stipoides var. stipoides
Opercularia diphylla
Oxalis perennans
Panicum simile
Paspalidium distans
Pomax umbellata
Poranthera microphylla
Pratia purpurascens
Themeda australis
Thysanotus tuberosus subsp. tuberosus
Tricoryne elatior
Vernonia cinerea var. cinerea
Wahlenbergia gracilis

Climbers

Glycine clandestina
Hardenbergia violacea
Polymeria calycina



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APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Cooks River / Castlereagh Ironbark Forest

Tree stratum

Eucalyptus fibrosa
Eucalyptus longifolia
Melaleuca decora

Shrub stratum

Acacia elongata
Acacia falcata
Acacia pubescens
Bursaria spinosa
Daviesia ulicifolia
Dillwynia tenuifolia
Dodonaea falcata
Lissanthe strigosa
Melaleuca nodosa
Olearia microphylla
Ozothamnus diosmifolius
Pultenaea parviflora

Ground stratum

Aristida vagans
Austrodanthonia tenuior
Calotis cuneifolia
Cheilanthes sieberi subsp. sieberi
Dianella revoluta var. revoluta
Dichelachne micrantha
Entolasia stricta
Eragrostis brownii
Goodenia hederacea subsp. hederacea
Lagenifera stipitata
Laxmannia gracilis
Lepidosperma laterale
Lomandra multiflora subsp. multiflora

Ground stratum cont

Microlaena stipoides var. stipoides
Opercularia diphylla
Panicum simile
Paspalidium distans
Pomax umbellata
Pratia purpurascens
Themeda australis
Thysanotus tuberosus subsp. tuberosus
Vernonia cinerea var. cinerea

Climbers

Cassytha glabella f. glabella
Glycine clandestina

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APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Castlereagh Scribbly Gum Woodland

Tree stratum

Angophora bakeri

Eucalyptus parramattensis subsp. parramattensis

Eucalyptus sclerophylla

Melaleuca decora

Shrub stratum

Acacia brownii

Acacia elongata

Banksia oblongifolia

Banksia spinulosa var. spinulosa

Bossiaea rhombifolia subsp. rhombifolia

Callistemon pinifolius

Cryptandra amara var. amara

Daviesia squarrosa

Daviesia ulicifolia

Dillwynia tenuifolia

Gompholobium pinnatum

Grevillea mucronulata

Hakea dactyloides

Hakea sericea

Isopogon anemonifolius

Leptospermum polygalifolium subsp. polygalifolium

Leptospermum trinervium

Lissanthe strigosa

Melaleuca erubescens

Melaleuca nodosa

Melaleuca thymifolia

Micromyrtus ciliata

Micromyrtus minutiflora

Persoonia nutans

Pimelea linifolia subsp. linifolia

Pultenaea elliptica

Ground stratum

Aristida ramosa

Aristida vagans

Aristida warburgii

Boronia polygalifolia

Burchardia umbellata

Cheilanthes sieberi subsp. sieberi

Cyathochaeta diandra

Dampiera stricta

Dianella revoluta var. revoluta

Entolasia stricta

Eragrostis brownii

Gonocarpus tetragynus

Goodenia bellidifolia subsp. bellidifolia

Goodenia paniculata

Haemodorum planifolium

Hypericum gramineum

Laxmannia gracilis

Lepyrodia scariosa

Lomandra glauca

Lomandra multiflora subsp. multiflora

Microlaena stipoides var. stipoides

Mitrasacme polymorpha

Opercularia diphylla

Panicum effusum

Panicum simile

Patersonia sericea

Platysace ericoides

Pomax umbellata

Ptilothrix deusta

Stylidium graminifolium

Themeda australis

Thysanotus tuberosus subsp. tuberosus

Xanthorrhoea minor subsp. minor

Climbers

Cassytha glabella f. glabella



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APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Alluvial Woodland

Tree stratum

Acacia parramattensis
Angophora floribunda
Casuarina glauca
Eucalyptus amplifolia
Eucalyptus tereticornis

Shrub stratum

Acacia floribunda
Bursaria spinosa
Phyllanthus similis
Sigesbeckia orientalis subsp. orientalis

Ground stratum

Adiantum aethiopicum
Agrostis avenacea var. avenacea
Brunoniella australis
Centella asiatica
Cheilanthes sieberi subsp. sieberi
Commelina cyanea
Desmodium varians
Dichondra repens
Echinopogon ovatus
Einadia hastata
Entolasia marginata
Galium propinquum
Juncus usitatus
Lomandra longifolia
Microlaena stipoides var. stipoides
Oplismenus aemulus
Oxalis perennans
Plectranthus parviflorus

Ground stratum cont

Poranthera microphylla
Pratia purpurascens
Solanum prinophyllum
Wahlenbergia gracilis

Climbers

Clematis glycinoides var. glycinoides
Geitonoplesium cymosum
Glycine clandestina
Glycine tabacina
Polymeria calycina
Rubus parvifolius

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APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Shale Plains Woodland

Tree stratum

Eucalyptus crebra
Eucalyptus eugenioides
Eucalyptus moluccana
Eucalyptus tereticornis
Exocarpos cupressiformis

Shrub stratum

Bossiaea prostrata
Bursaria spinosa
Daviesia ulicifolia
Dillwynia sieberi
Dodonaea viscosa subsp. cuneata
Indigofera australis
Phyllanthus virgatus
Pultenaea microphylla

Ground stratum

Agrostis avenacea var. avenacea
Ajuga australis
Aristida ramosa
Aristida vagans
Arthropodium milleflorum
Arthropodium minus
Asperula conferta
Austrodanthonia racemosa var. racemosa
Austrodanthonia tenuior
Bothriochloa decipiens
Bothriochloa macra
Brunoniella australis
Centaurium spicatum
Centella asiatica
Cheilanthes sieberi subsp. sieberi
Chloris ventricosa
Chorizema parviflorum

Ground stratum cont

Chrysocephalum apiculatum
Commelina cyanea
Cymbonotus lawsonianus
Cymbopogon refractus
Daucus glochidiatus
Desmodium varians
Dianella longifolia
Dichelachne micrantha
Dichelachne parva
Dichondra repens
Dichopogon fimbriatus
Dichopogon strictus
Digitaria diffusa
Echinopogon caespitosus var. caespitosus
Einadia hastata
Eragrostis leptostachya
Eremophila debilis
Eriochloa pseudoacrotricha
Euchiton sphaericus
Fimbristylis dichotoma
Glossogyne tannensis
Goodenia hederacea subsp. hederacea
Hypericum gramineum
Hypoxis hygrometrica
Hypoxis pratensis var. pratensis
Juncus usitatus
Lomandra filiformis subsp. filiformis
Lomandra multiflora subsp. multiflora
Mentha diemenica
Microlaena stipoides var. stipoides
Opercularia diphylla
Oxalis perennans
Panicum effusum
Paspalidium distans
Plantago debilis

Ground stratum cont

Plantago gaudichaudii
Pratia purpurascens
Sporobolus creber
Sporobolus elongatus
Stackhousia viminea
Themeda australis
Tricoryne elatior
Vernonia cinerea var. cinerea
Veronica plebeia
Wahlenbergia gracilis
Wurmbea dioica subsp. dioica
Zornia dyctiocarpa var. dyctiocarpa

Climbers

Glycine clandestina
Glycine microphylla
Glycine tabacina



9 APPENDICES

APPENDIX 2. PLANT SPECIES LIST FOR REVEGETATION

Freshwater Wetlands

Tree stratum

- Casuarina glauca
- Melaleuca linariifolia
- Melaleuca styphelioides

Ground stratum

- Eleocharis sphacelata
- Juncus usitatus
- Ludwigia peploides subsp. montevidensis
- Hardenbergia violacea
- Persicaria spp
- Philydrum lanuginosum
- Triglochin procera



TransGrid Easement Guide



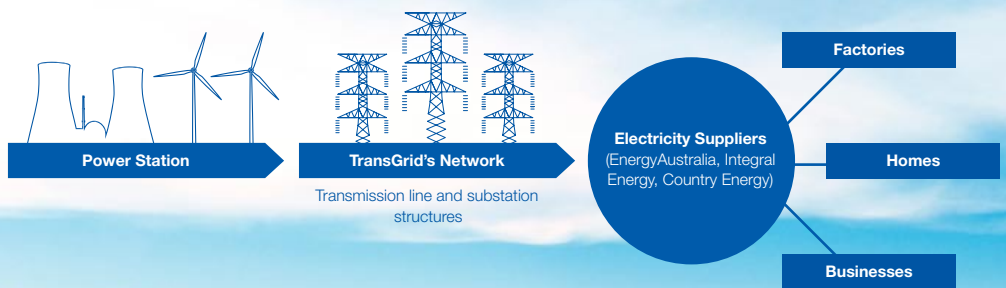
Who is TransGrid?

TransGrid is the owner, operator and manager of the largest high voltage transmission network in Australia, connecting generators, distributors and major end users in New South Wales.

The transmission network is connected to Queensland and Victoria providing a robust electricity system that enables interstate energy trading.

TransGrid is committed to providing a safe, reliable, efficient and environmentally responsible high voltage electricity service to our customers and the community.

Electricity is transported by TransGrid across the state via 12,500 kilometres of high voltage transmission lines. These power lines are supported by around 36,000 structures made from concrete, wood or steel.



Purpose of this brochure

Most of TransGrid's transmission lines cross private property, which TransGrid requires access to in order to conduct routine maintenance both on and around the transmission lines.

TransGrid establishes easements immediately below and on either side of the lines to ensure we can access the area for routine line inspections and repairs, as well as in the case of an emergency.

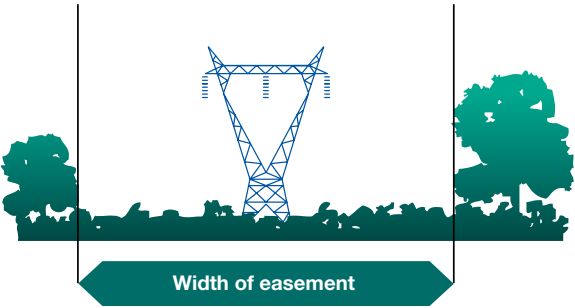
This brochure has been produced to provide general information to landholders, community members and the general public living near transmission line easements.

This brochure provides details on the activities that may or may not be permitted within an easement.



What is an easement?

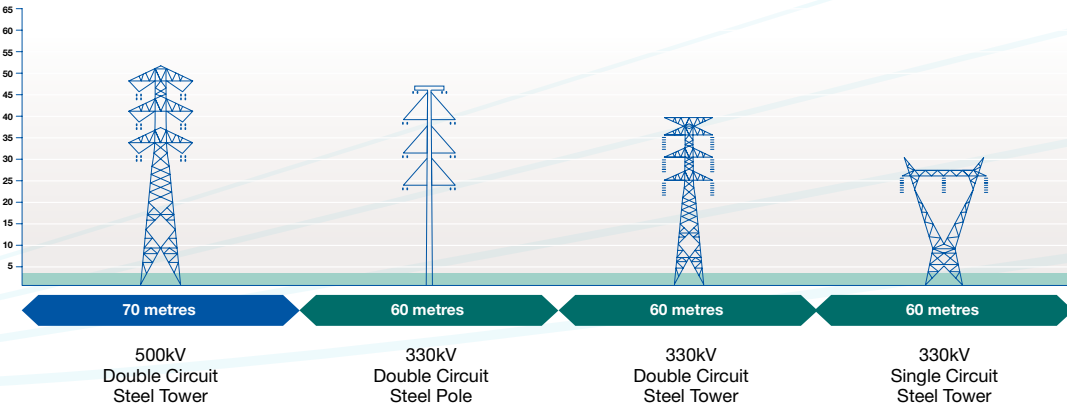
An easement is a ‘right of way’ along the route of a transmission line. Easements vary in width depending upon the operating voltage and design of the transmission line. Generally speaking the higher the voltage, the larger the easement required. Some typical easement widths and structure designs are shown in the diagram at the bottom of this page.



Easements are acquired for two essential reasons. The first is so that TransGrid can construct, reconstruct, operate and maintain its lines. The second is to ensure protection of the public by controlling activities under or near the line that may create an unsafe situation.



Some of the structure types used by TransGrid and typical easement widths



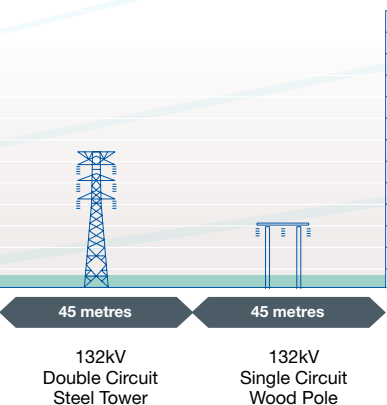
Transmission line easements and your safety

We seek assistance from both landholders and members of the public to report any unusual or unsafe activities they may observe taking place near a transmission lines or its easement.

TransGrid requires clear access to its easements and associated structures at all times.

Employee and public safety is of the utmost importance to us. Should you observe any unusual or suspicious activity, or if you have any concerns regarding the safe operation of our transmission line assets, please don't hesitate to contact TransGrid directly using the details on the back of this brochure.

- > TransGrid's approval of controlled activities within easements is assessed on a case by case basis. Landowners should contact us if they have any queries regarding easement activities.
- > Landowners are encouraged to seek advice directly from TransGrid on any activities not explicitly described within this brochure.



What activities are allowed within easements?

PERMITTED



These activities are **PERMITTED** in easements provided TransGrid's structures remain accessible at all times.

No obstructions are to be placed within 15m of a structure or their supporting ropes, wires or chains.

If in any doubt about the safety of any activity, please contact TransGrid directly.

MAY BE PERMITTED



The following activities **MAY BE PERMITTED** within easements, subject to prior written approval from TransGrid.

Advice should always be sought from TransGrid in instances when transmission line conductors (wires) are higher above the ground than usual, such as over gullies or gorges.

NOT PERMITTED



Some activities are **NOT PERMITTED** in an easement for the safety of both the community and operation of the transmission lines. Here is a list of examples of these activities:

Note: *It is extremely important to keep trees, machinery and other structures well away from transmission lines, as they can sag in extreme weather conditions.*

1. Agricultural activities, subject to restrictions in machinery height of under 4.3m
2. Most domestic recreational activities (excluding the flying of kites and model aircraft)
3. Gardening, provided that mature plant height is under 4m
4. Vehicle parking, provided vehicle height is under 4.3m
5. Storage of non-flammable materials, under 2.5m
6. Minor structures under 2.5m such as washing lines or barbecues (provided that metallic parts are earthed)

1. Operation of machinery exceeding 4.3m
2. Building of fencing and yards
3. Landscaping
4. Use of irrigation equipment
5. Installation of utilities such as electricity, telephone and water
6. Outbuildings such as sheds, stables, garages and carports
7. Additions of unroofed verandas and pergolas to residences
8. Sporting and recreational facilities (including tennis courts)
9. Swimming pools, if the pool is not within 30m of a transmission line structure
10. The development of subdivisions (including the constructions of roads)
11. Excavation
12. Quarrying activities, earthworks and dam construction

1. The construction of houses, buildings or other substantial structures
2. The installation of fixed plant or equipment
3. The storage of flammable materials or explosives
4. The storage of garbage materials or fallen timber
5. Planting vegetation with a mature height which exceeds 4m
6. Any obstructions placed within 15m of a transmission line structure or supporting ropes, wires or chains
7. Flying of kites or model aircraft

When planting trees within the easement area choose a tree whose mature height does not exceed 4m. Do not plant trees that could eventually touch or fall across the high voltage lines.

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TransGrid

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JORDAN SPRINGS CENTRAL PRECINCT & REGIONAL OPEN SPACE



HERITAGE INTERPRETATION STRATEGY 2015

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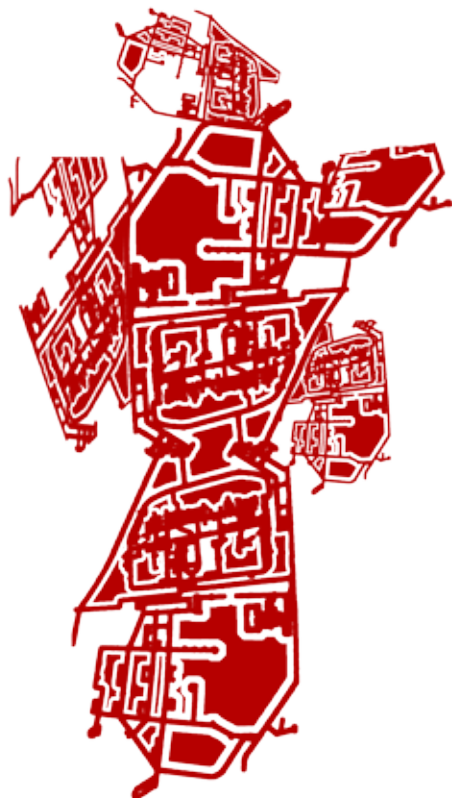


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Purpose



The Heritage Interpretation Strategy responds to many stories overlaying Jordan Springs, Central Precinct and Regional Open Space. The integration of these stories into the hard drive of the suburb educates communities, reinforces character building and placemaking, and gives the locale a distinctive and unique voice.

Heritage combines histories, cultural stories, environmental influences and social collection as binding glue for communities and nations. How we tell these stories in a contemporary way to give them life and still acknowledge alternative contexts is the challenge. Heritage interpretation takes a longer view of the character of a place and anchors a contemporary community within its past stories.

The Regional Open Space and parks have already and will impact upon visitors and neighbouring residents hence the audience for the strategy extends beyond Jordan Springs.

Where possible the stories are not told. They can be subtle, they remind, jolt and project so that the community becomes the story tellers, the interpreters, the actors and the educators.

For those who want to delve deeper, the instruments already submitted frame the histories in maps, surveys and archaeological data. These specialist reports open up the stories, provide the links and offer contexts for this community now. This strategy weaves these stories as vivid triggers for design and searches for a contemporary exposure, a contemporary translation.

The three residential precincts will become two with Jordan Springs encompassing Central Development Precinct as part of its suburban boundary. The heritage interpretation joins these disparate precincts. This strategy is envisaged as a working document to enable the integration of interpretative elements into a number of planned spaces for Central Precinct and as retrofitted elements for Jordan Springs. The design of community hubs, bridges, parks, meeting places, playgrounds, shelters, signs, colour palettes can consider these stories as scaffolding for the scope of design briefs and works.

Furthermore, this strategy works in concert with the Conservation Master Plan for the surrounding Wianamatta Regional Park. When read together and applied, the story of the St Marys site will be revealed.

This strategy identifies where the stories may be overlaid or integrated and charts a cohesive framework.



Outcomes



The outcomes of this report for the Jordan Springs community are:

- An increased profile for the place as a cross generational locale
- An ownership with a sense of belonging for locals and visitors
- A desire to protect and welcome
- A sense of location in a multi layered suburb with a shared past
- A knowledge of why we live here
- An articulation of individual voice as part of the community
- An appreciation of value as a subjective experience
-

The outcomes for the design development of Central Precinct are:

- A cross suburban consolidation of heritage interpretation
- A consideration of these stories integrated as design elements in streetscapes, parks and infrastructure like bridges hubs and shelters
- A reinforcement of identity for the precinct
- A cohesive design language and palette
- A strong connection with Wianamatta Regional Park and Regional Open Space
- A longer view of the suburb as a collective place inhabited by locals, enjoyed by all.

The outcomes for the design development of the Regional Open Space are:

- A consideration of these stories integrated as design elements in the active and passive areas
- A reinforcement of identity for the open space precinct
- A cohesive design language and palette
- A strong connection with the Regional Park and Central Precinct
- A longer view of the ROS as a diversity of collective place inhabited by locals, enjoyed by all.

The integration outcomes with Wianamatta Regional Park are:

- An overlapping perspective for the park's location alongside suburban development and Regional Open Space
- A reinforcement of the vision for the regional park.
- A softer interface between areas to encourage interactive opportunities
- A promotion of the character of the regional park by locals and therefore a kind of custodial relationship.
- A change in understanding of domestic plants, weed control and water quality which impacts the regional park.



Project Overview

This project considers and suggests a thread of stories to be incorporated into Central Precinct and the Regional Open Space as a conceptual framework for further designs. To give a unique character to Jordan Springs and its neighbouring suburb, the rich existing heritage layers articulated in a number of previous reports are gathered together and envisaged as tangible potentials in the landscape.

The Indigenous layers, the ADI stories and the environment are the apparent overlays on the site with a more natural amenity protected by the open space and parklands. These stories will open up to reveal others like the important role for women as a workforce in the ADI. The silcrete deposits are a physical evidence of Aboriginal fabrication and yet the stories of Aboriginal response to the seasonal changes in the Cumberland Plain are an important cultural layer.

While the Wianamatta Regional Park develops its own branding and interactions, the interface with open spaces and residential areas should be a threshold for the regional park with some of its stories bleeding into the streetscapes, riparian corridors and water management spaces.

The discovery of these stories should be encouraged as an active interaction rather than a passive reading. The manifestation of these stories can be alluded to or suggested in the strategy. Consideration is given to the design of parks, open spaces, streetscapes as the front stage for the incorporation and insertion of these layers as connecting threads and open doors to further exploration. It also considers small scale injections like post card projects and ephemeral events.

The sustainable scaffolding, which underpins water flows, filters and storage as lakes is manifest even in the street swales. This riparian South Creek path cutting through the precincts was not only a significant place for Aboriginal stories but also a water thread connecting the precinct. Water is a story for the ADI industry, the farmers and as a sign for future preservation, sustainability and protection.

The use of kangaroos as lawn mowers for the ADI site because of the spark danger is a strange cooperation of industry with macrofauna. The intertwining of these narratives are a fascinating overlay and exemplify the potential links between stories and their multiple overlays.

Interpretive elements as artworks

These artworks respond directly to the interpretive themes and can be sculptural interventions or integrated artworks where they are included within the design of infrastructure. They can be ephemeral works combining performance and community activity as a part of their brief and can be an annual event.

Interpretive elements as designs

The stories can be integrated into infrastructure utilising colour palettes and expanding their language as organic elements, interactive elements using multimedia and both physical sites and virtual places.

Interpretive elements as ephemera

A program of small and regular events, workshops and gatherings will consolidate the interpretation of these stories.

While the preoccupations will resonate with visitors and outsiders, the unique histories of Jordan Springs attract and unite the locale.

Interpretive elements as Signage

An innovative interpretive signage palette uses both text, patterns and visuals to tell the stories.

Process - consultation

Stakeholders

A number of stakeholders were interviewed about the interpretation strategy and asked how they would like to see their focus projected within the development as stories.

Aboriginal Stories

Leanne Watson from the Darug Custodial Aboriginal Corporation stressed the connections between families, animals and plants connected by a seasonal calendar and strict rules rather than artificial time measurement.

She felt that the inclusion of local Aboriginal language was an important layer and that the 40,000 year habitation of this place needed to be interpreted in the context of the short time of western colonisation.

Des Dyer from the Aboriginal Landcare Inc. was interested in the design of landscapes based upon Aboriginal principles and inclusion. He was open to the incorporation of tools found on site being reinterpreted but he had reservations about security. He did not want site details revealed.

The Deerubbin Local Land Council believed that the inclusion of Aboriginal art would unlock the emotional attachment to the landscape. They were less interested in the integration of art on infrastructure like bridges because of its tacit approval of colonisation. They felt that the use of light, suspended walkways near sites would be a sensitive interpretation.

The Land Council was positive about all of the post colonial and munitions stories as inclusive layers. One representative was happy with the Regional Open Space and regional park envisaged as an immersion in the landscape away from the houses gave him peace and a stronger attachment to the land.

After a walk to South Creek with Land Council representatives, they suggested a number of sites and ideas for interpretation. They had previously found a site for orange red ochre which like the silcrete was an important raw material for cultural and food production. Interpretive ideas included capturing the process of bush foods and their Aboriginal application for bread and sweets. There was resistance to any traditional

signage with a preference for natural frames like scarred trees carved from a weathered log with relief or incised markings.

NPWS

Jonathan Sanders from NSW National Parks and Wildlife proposed a number of stories to be included in Central Precinct and the Regional Open Space overlapping with the philosophies for Wianamatta Regional Park.

An overarching idea was the promotion of a green network where the residents and local visitors to the regional park consider their role as custodians of these precious resources.

This idea reinforces cross generational changes in attitudes and engagement. He also saw the value in placing the Cumberland Plain environment as an ancient geological adaptation so that residents glimpsed their momentary time within a longer view of recovery and natural cycles. The return and recovery of mammals into the creek and the park becomes a kind of mysterious narrative to be carefully woven into the community's investment in the park.

Community

Post Colonial Stories St Marys Historical Society

Norma Thorburn and Carole Volkiene were focused upon the links between the ADI site and the St Marys community. This began with the King family and their status and investment in the church. The letters written by Harriet Lethbridge to her husband Philip Parker King revealed not only an intimacy of rural life on the farm, but a formal application of language to the letter style.

Norma and Carole felt that an interesting overlay of the original land grants and subsequent subdivisions would give insight into the size of the first farms. They saw that the new development was linked with St Marys, the church and the Duration cottages built for the workers.

David Trist

David who is an active member for the Dunheved Business Park Committee has a long connection with the Business Park and the ADI facilities. At one stage this organisation proposed a sculpture to respond to the shell cases as an interpretation.

Reference Material

Current Report References

Central Precinct Landscape Master Plan February 2015

by James Mather Delaney Design Pty Ltd

This plan was referenced for its overarching visions, its circulation and links, its interpretive framework and its reference to brick making as a responsive material in entries and parks.

Wianamatta Regional Park Volume 2: Conservation Management Plan March 2011

by Godden mackay Logan

This plan was referenced for its historical outlines, its key objectives, themes and messages.

St Marys Property - Western Precinct Biodiversity Assessment August 2008 *by Cumberland Ecology*

This report was used to identify threatened flora and fauna species.

St Marys Property - Central Precinct Biodiversity Assessment April 2009 *by Cumberland Ecology*

This report was used to identify threatened flora and fauna species.

Archaeological Assessment Central Precinct St Marys NSW July 2008 *by Casey & Lowe Pty Ltd*

Archaeological Assessment Western Precinct St Marys NSW September 2008 *by Casey & Lowe Pty Ltd*

This assessment was referenced for its historical summary of the Dunheved Estate and its wider influences.

Archaeological Assessment of Indigenous Heritage values in the Western Precinct of St Marys site, St Marys April 2009 *by Jo McDonald Cultural Heritage Management*

This assessment was used to identify the type of artefacts uncovered.

Archaeological Assessment of Indigenous Heritage values in the Central Precinct of St Marys site, St Marys April 2009 *by Jo McDonald Cultural Heritage Management*

This assessment was used to identify the type of artefacts uncovered .

Western Precinct Landscape Masterplan Strategy Report September 2009

by Environmental Partnership Pty Ltd

This strategy was used to consider recreational strategies.





The Precincts

Precinct Links

This strategy is intended to tell a number of stories identifying the unique character of the whole area as well as consider the ingredients of collective spaces within each precinct.

While Ropes Crossing is mostly completed, its rail and munitions stories are an integral part of the total precinct and give outsiders a good access to the historic and current layers.



The Precincts

Central Precinct

This precinct borders the Regional Park and the Regional Open Space. It is connected to Jordan Springs to the west by a connector road and potentially to Ropes Crossing to the east.

Including the designated open space of the Transmission Easement, the residential development benefits by having close access to these natural assets.

The Heritage Interpretation Strategy for this precinct:

- Links with Jordan Springs
- Reinforces a soft edge to the parks and open spaces
- Projects stories to the Regional Park and reflects the qualities of the park into the design of the development
- Balances iconic stories with the fluid nature of heritage with changing demographics

While the strategy suggests potential stories and their overlay, the cohesion of these layers will be resolved as the development is rolled out.



Jordan Springs

This precinct has been developed for the most part with some of the more elevated areas still in construction. The riparian corridor from the village centre east leading to the next lake is work in progress.

The Heritage Interpretation Strategy for this precinct:

- Forges a stronger identity for Jordan Springs
- Retrofits elements to parks and open spaces in response to community usage and to consolidate character
- Projects stories to the Regional Park and reflects the qualities of the park into Jordan Springs, such as stories about the narrative of water which is such an integral element in the WSUD principles for the suburb.
- Balances iconic stories with the fluid nature of heritage within an existing community.
- While the map on Page 32 suggests potential stories and their overlay, the cohesion of these layers will be resolved in the context of the characters of Jordan Springs and Central Precinct.



Broad Themes and Stories

The stories outlined here cross over areas, linking sites and histories. They make reference to the Aboriginal habitation of the area especially in the context of the creeks and silcrete deposits for tool making.

The stories of the first colonial farms allude to the alternative land use, land division and agricultural production. This farming community also pursued more civic projects, concerned about spiritual devotion and the poor. These were the first post colonial examples of capable women managing farms, contributing to the external economy as well as juggling parental responsibilities.

During the war years when the Filling factories were in production, it was women who made up a considerable section of the workforce. This altered the family dynamic as the employment for women extended well after the war.

This utilisation of site for defence had lasting impact upon the landscape. Berms were constructed to mitigate any explosions, kangaroos and emus were seconded as lawn mowers, security protocols established and accidents kept to a minimum.

While the landscape from Indigenous communities to farming families was managed differently with vegetation removal and silting the obvious effects, the construction of defence and industrial infrastructure markedly altered the topography.

The flow of water across the site was vital to the First Peoples and farmers and a problem for the munitions era. Hence small tributaries were diverted, creeks canalised and land raised to manage the inundations which regularly occurred. This story of water has a strong currency in the management of flooding for the new residential developments. WSUD design for parks and water storage is integrated so the inclusion of this story has powerful connectors through the past and into the future.

The physical landscape as remnant and regrowth Cumberland Plain woodland is an important story to pick up, not only in the Regional Park but in the parks within residential communities.

The colours, textures and myriad of tiny insect, bird, small mammal and macropod movement needs to be explored. The apparent kangaroo and emu populations, which are such an iconic symbol of the area reflect the local appetite for the more subtle, the nocturnal, and the hidden.

Another story crossing cultural and environmental threads is a sense of time. The Aboriginal inhabitants defined their strict mores within flowering and breeding seasons. This alternative preoccupation to the European sense of order can be juxtaposed to show time scale as well as Indigenous focus on flora and fauna.

The fuses for the bombs had precise times. The production schedules for delivery were strictly adhered to according to combat needs and trains ran on time.

The colours infusing the precinct range from the grey green and brown of the bark and mulch with the camouflage of the pale blue building markers contrast with the bright colours of flowers, insect wings and bird feathers as well as the pyrotechnic hue of smoke bombs.

These stories are suggested as projections into the yet to be built parks, bridges, signage and artworks. With the Regional Park having such a significant role for the area, the opportunity to integrate these stories within the neighbouring streets and parks creates a cohesive language and locates the suburb as an interface with both Wianamatta Regional Park and the Regional Open Space.

All of the cultural layers explore these thematic directions differently yet their perspectives reveal common preoccupations. All have responded to the unique character of the area and this shared focus makes a powerful story retold with different voices.

The interpretations from these stories are ideas suggested as stimulus.



First Landscape



Artwork by Chris Edwards

The artefacts found on various sites indicate settlement by the First Peoples for thousands of years. Their strict oral traditions were passed from generation to generation and enabled a sophisticated sustainable culture which utilised local produce and materials for industrial production and economic exchange. The abundance of silcrete and ochre deposits allowed a good source material for cultural ritual and a range of tools for working with furs, hunting, fishing and digging while the secondary production of plants like flax and xanthorrhoea manipulated weaving and glues for affixing disparate materials. The seed dispersal by macropods such as emus sustained endangered species like the *Persoonia Nutens*.

It was the fences that first inhibited Aboriginal pathways, the land division for farming that bounded imaginary lines along grids that constrained their passage and introduced the survey peg to the community.

The first landscape was about the streams, the seasons and the connections across the land.

The language among hundreds of Australian languages gave them identity and mores.

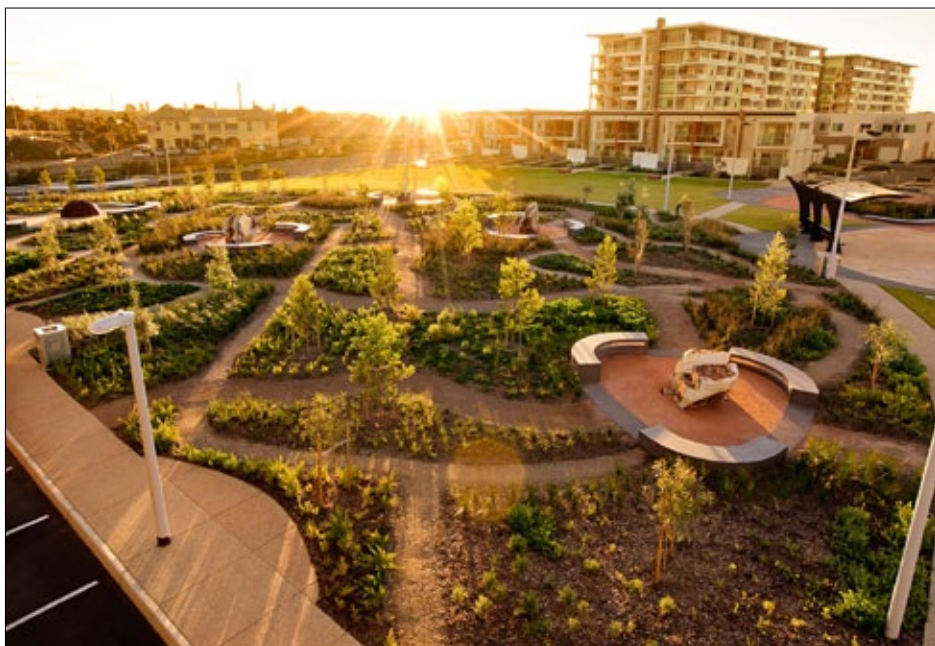
Interpretation

Aboriginal oral stories function within strict rules like non Aboriginal customs. These can be interpreted by

- Stories of creek and seasonal food cycles
- Aboriginal industry using silcrete as a quarry
- Performance and events to celebrate country connection such as tree painting, collecting bush foods and local crafts.
- Parks designed from Aboriginal principles of collective shelter, gathering and ritual. Aboriginals prefer the exploration of important plants as discovery rather than a designed space however if the Regional Open Space replaces native plants with grasses functioning as sporting turf, a deliberate concentration of Aboriginal plants may be necessary.

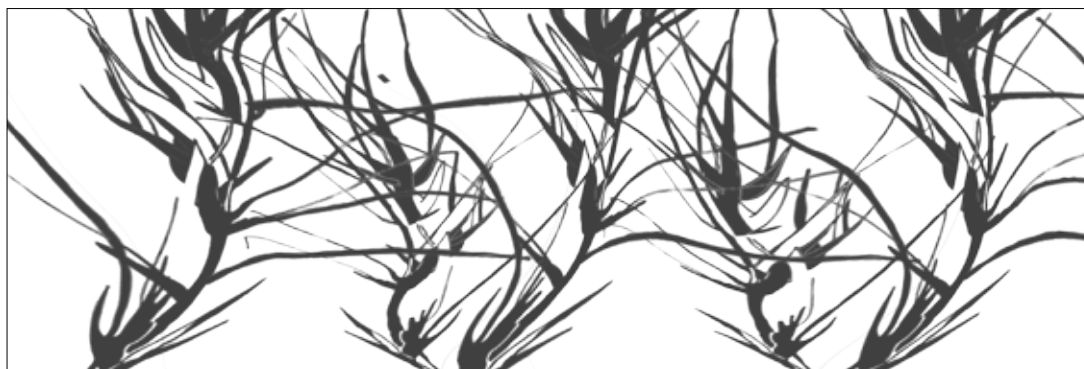
This Aboriginal significant space could include shelters and protective spaces as well as sacred earth works, standing stones, grinding stones, and astronomical maps.

It is important that Indigenous spaces are inclusive and can be designed merely as a sanctuary from roofs and the bustle of mechanical noise.



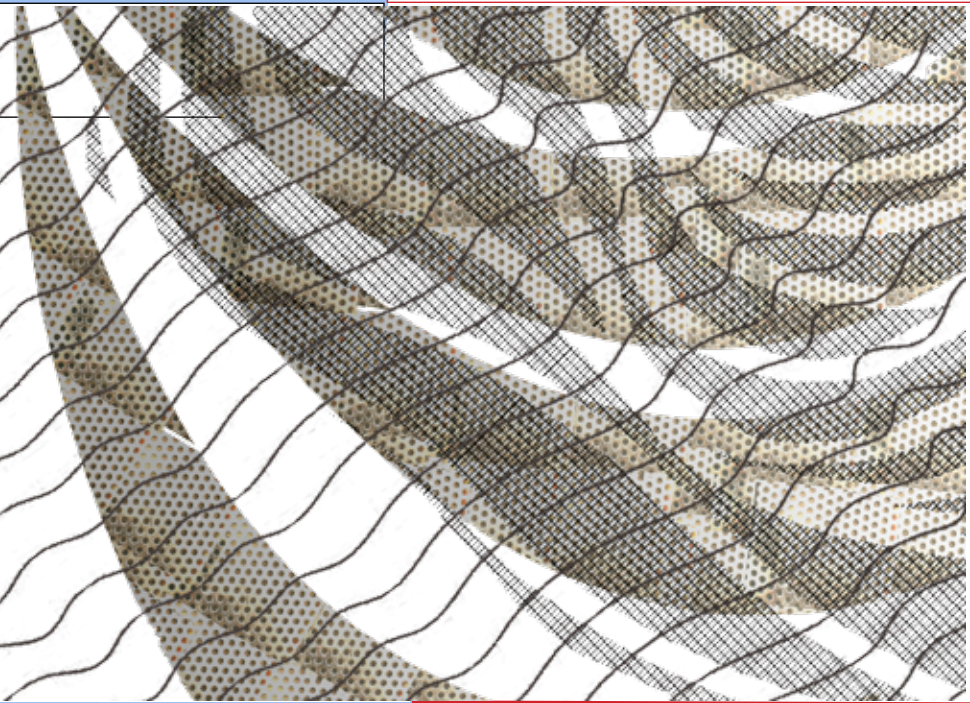
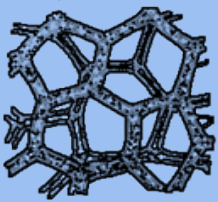
*Lartelare Aboriginal Heritage Park Port
Adelaide SA
TCL Landscape Architects*

Artwork by Chris Edwards

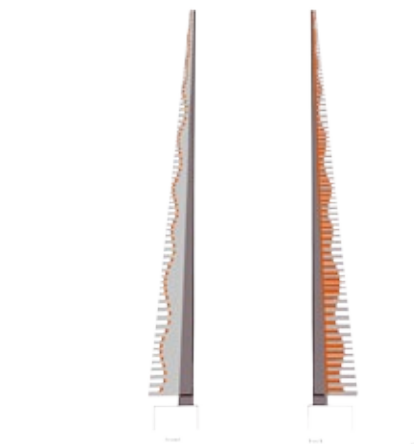


Themeda Australis as repeated pattern. Kangaroo Grass is used to make damper.





Small water creatures magnified.



Water height flood markers.

H20

Water is a vital element for the development. It assumes many personalities as a source, resource, hydraulic agent, life giver, flood, flotsam, reflector, storage and compound. It was a pristine source and resource for the First People and the farmers.

These stories have already been told in the development using WSUD principles however more elemental flourishes can be woven into the parks.

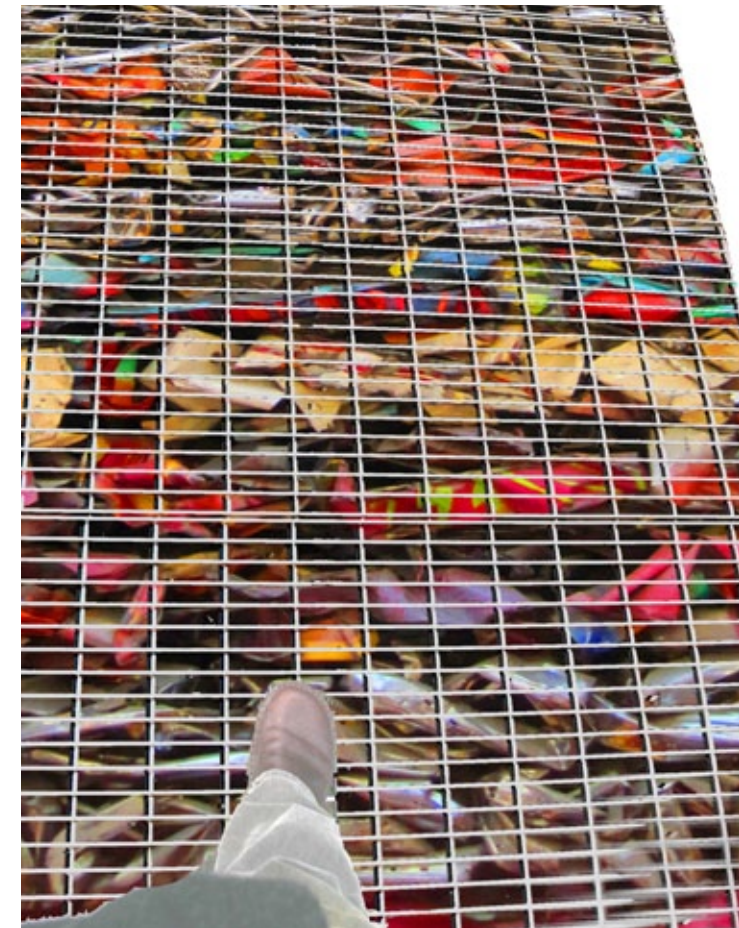
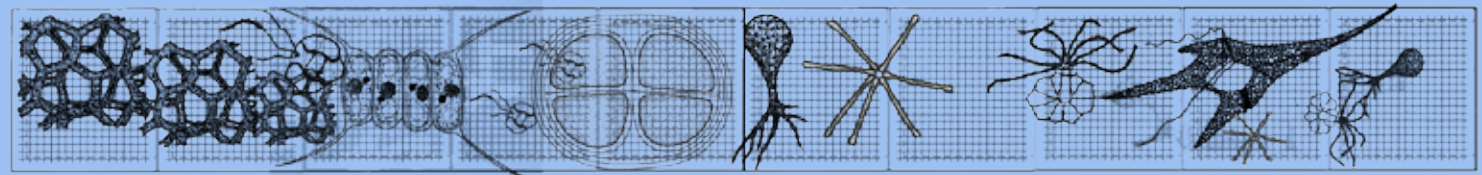


Interpretations

- Boardwalks and cantilevered decks
- Patterns of wind across surface
- Flood flotsam showing flood levels.
- Water based plant life
- Water level measurement devices
- The creek stories from origins to Windsor
- The microscopic world magnified
- The symbiotic movement of water and wind expressed in flags or kinetic designs



Sound sculptures capturing the underground creek flow.



Various ideas for interpreting water including filling walkway decking with coloured plastic, designing seating with responsive elements, wrapping flotsam around infrastructure and reminding residents of the underground rivers.



Signals

Both the natural and defence environments use these mimetic and repulsive programs to hide or warn predators. For the ADI site, this translated into the use of matt coloured small scaled signs to orient workers without broadcasting the defence structure layout.

For the natural world this translates into a mimetic strategy to blend into the background or an iridescent structural colour produced as a warning.

This signalling communicates between individual species as an honest projection. For the ADI facility this signal deliberately communicates with workers and is unclear to the outsider. In the natural world the use of colour functions to warn, to disappear or as a triumph of power.

These links between the ADI function and the Cumberland Plain flora and fauna makes for a powerful interpretive potential.

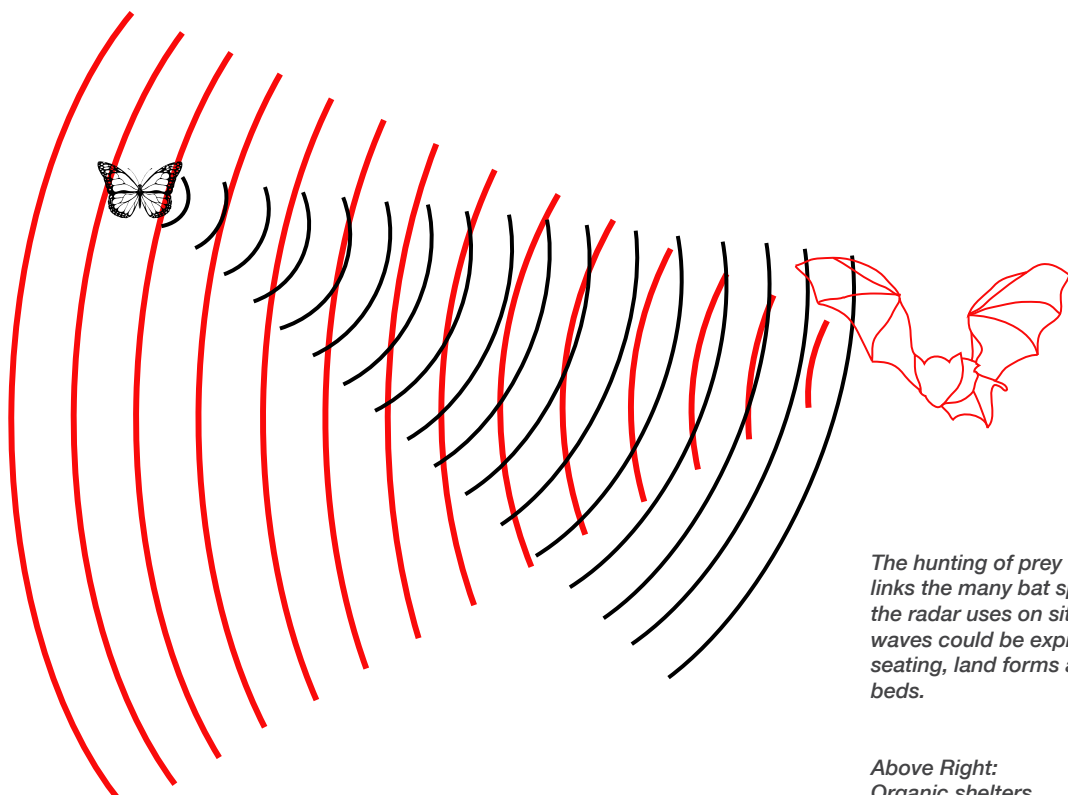
Interpretation

Industrial technology is juxtaposed with nature's technology. Echolocation by bats to identify prey is similar to the calibration of naval ships used by electromagnetic waves. An interpretation can produce waves as physical landforms or seating which bounce off objects.

Endangered species are celebrated for colour, shape, and pattern in a playground palette. These colour and pattern palettes can refer to the small jewel beetle vivid patterns, or refer to the bright colours of the smoke bombs.

Berms can act as frames for shelters with shelter roofs as organic winged membranes or exploded architectural forms.





The hunting of prey using echoes links the many bat species with the radar uses on sites. The waves could be expressed as seating, land forms and planting beds.

*Above Right:
Organic shelters
Right:
Landscaping with mounding*



The remarkable jewel beetles have a vivid colour and pattern to be used potentially.

Camouflage

Both the natural and defence environments use these mimetic programs to hide from-predators. For the ADI site, this translated into the use of matt coloured small scaled signs to orient workers without broadcasting the defence structure layout.

The idea of camouflage is to confuse the foreground with the background. The buildings used subtle small signs to prevent surveillance. The Cumberland Plain species blend into the background well utilising the soft hues of the trees and plants.

Interpretation

Industrial technology is juxtaposed with nature's technology.

Parks can contain camouflage as a perceptive illusion. Endangered species are celebrated for colour, shape, and pattern in a playground palette. These colour and pattern palettes can refer to the bullet shell casings as tactile patterns and can play with the sheep and kangaroos as defence recruits concealed in the environment.

Berms can act as frames for shelters with shelter roofs as organic winged membranes or exploded architectural forms.

The kangaroo population introduced by service officers and the munitions to mow the grass. This idea places mobs of kangaroos in full military camouflage. Casting two or three kangaroos, these can be rolled out as needed and the colours adjusted to the background.

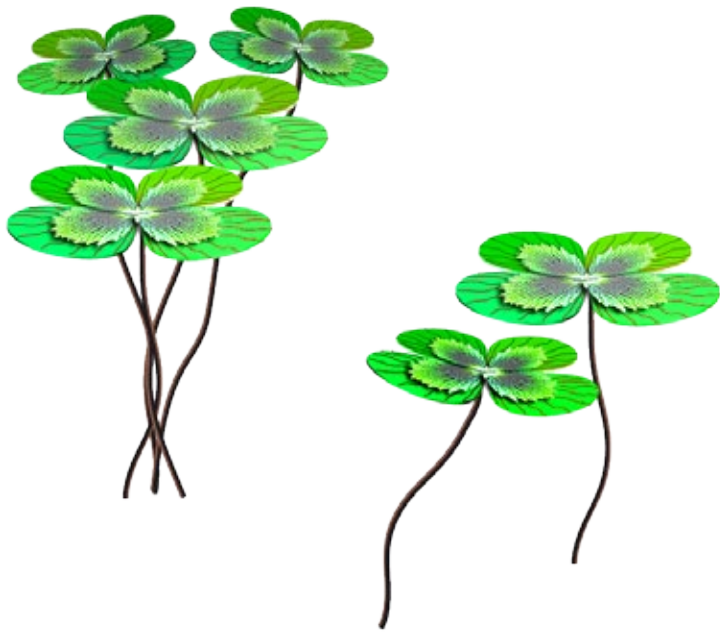
yellow penguins Prague by The Cracking Art Group made from recycled water bottles from landfill sites.



The CSIRO kept sheep at Jordan Springs and they were the first lawn mowers.



Camouflaging the unusual puts the rural alongside the munitions stories.



Secret Garden

Coined by a local journalist, this term alludes to the dam in Jordan Springs. This story has much more general associations with the hidden relationships of the park and its micro systems.

The Cumberland Plain is an ancient woodland adapted from gondwanaland rainforests and harsher dryer climates and soils. The very nature of this woodland plays its part with its small, concealed flora and fauna, nocturnal, tiny, vivid and vibrant flushes in a subtle colour palette of woodland and scrub. Its recovery takes generations and needs a sensitive approach by its neighbours. The notion of a secret garden is the idea of the hidden jewel, that which is confided.

Many vulnerable and endangered species survive in the park and their very existence relies upon a local knowledge and protection. The more locals identify with the treasures existent in their backyard, the more likely they value and preserve their habitat and number.

Often their survival has been assisted by their nocturnal lives, their nondescript appearance or prickly texture.

Interpretation

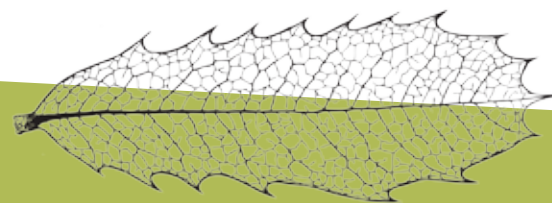
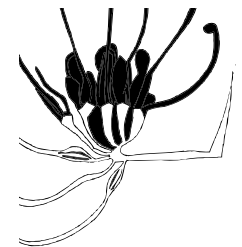
A number of activities interact with the stories. The making of purpose built habitat boxes for bats, possums and birds can be an artist led activity.

A consideration is given for a bush play space that utilises the bush materials for making such as an ephemeral art making workshop.

An event program includes candle light picnics in the bush, music and stories in the garden.

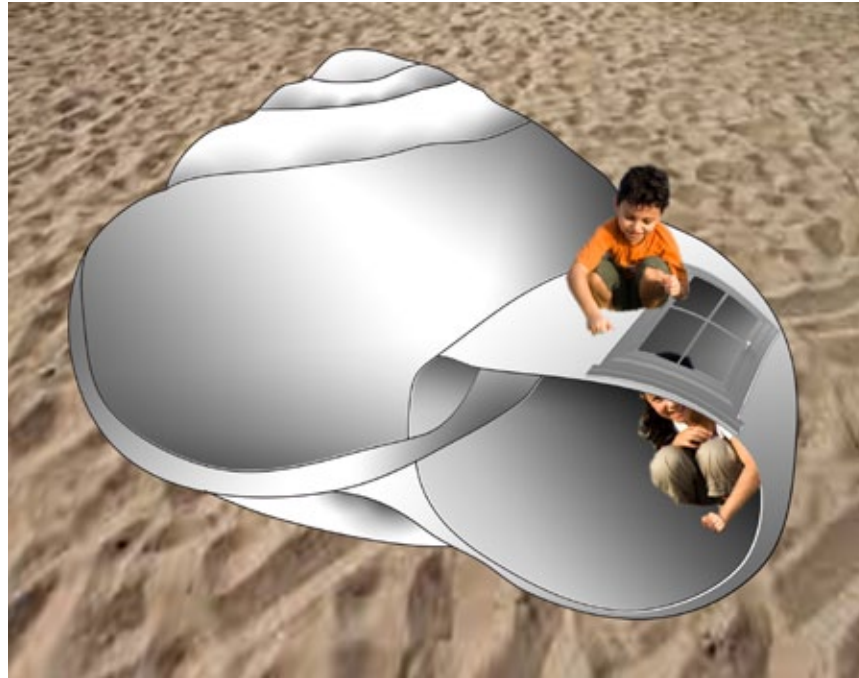
Wetland planting will attract birds - nesting, bird watching, flight paths, migratory flight paths which could increase cross cultural understanding.

Scaling up the tiny, magnifies their presence and gives the audience a microscopic glimpse into the alternative world.





*Bird Boxes made by the local community to activate a park in Russia.
Kendal Henry art curator*



Cumberland Snails enlarged and adapted as play equipment



Duration

Time has become a critical element in cultural form and projection. As the language is compressed in social media expression, hours are broken into bytes and data is downloaded to emphasise its weight. The long view is becoming important, and a slowing down of time is fashionable.

Named for the prefabricated housing placed temporarily in St Marys to house local workers for the duration of the war, the rows still exist, the houses now distinguished by individual flourishes like awnings, different skins and colours.

Before the imposition of the Gregorian calendar, the First People interacted more responsively to the seasonal changes. They marked the time by flowering and breeding cycles, which in turn prescribed a cultural calendar, practical taboos and a sustainable relationship with a living environment.

The munitions factory was preoccupied by time, the schedules, timers and lost labour.

Interpretation

Geological layering is integrated into building forms inside the earth mounds or ground plane so you can look down on them. These layers can contrast the shales and alluvium, the recovery of the trees from the 1940's to the present.

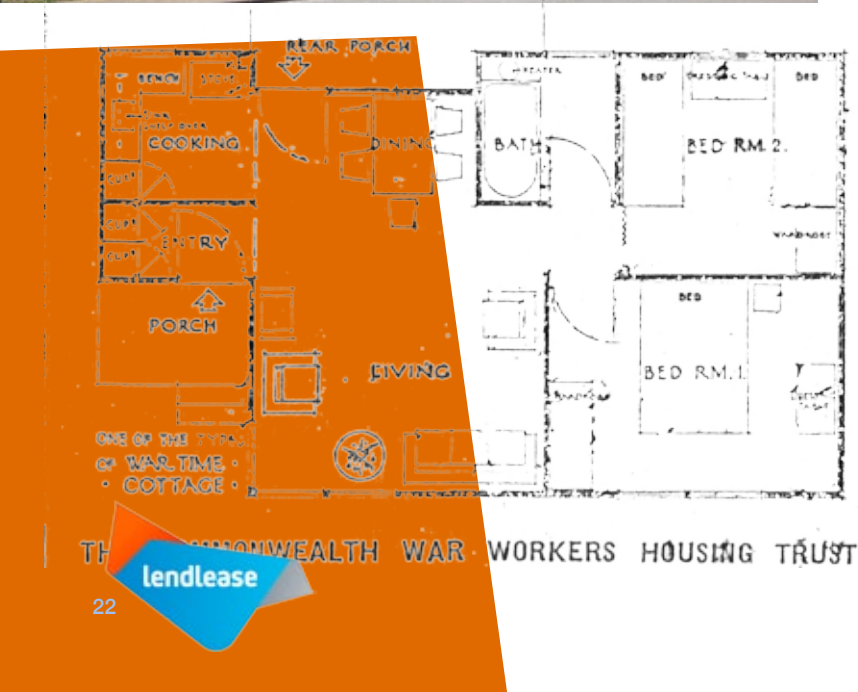
The berms could be manipulated into stratified layers.

Time lines projecting 40,000 years of Aboriginal habitation in the context of 225 or so years of Western influence indicate forcefully the time scale.

The speed of bullets, the fuse times and bomb data accelerate time.

Calm places along the creek allow contemplation and immersion in the bush.

Markers can indicate the anticipated heights of old trees in another fifty years.



Cycle way markers measure distance, time and position.





The seasons from an Aboriginal perspective.



The bundy clocks measured working hours.



Women in Uniform

In early colonial Dunheved, the women were vital managers, civic leaders, the glue for families and community.

During the war years when the Filling factories were in production, it was women who made up a considerable section of the workforce. This altered the family dynamic as the employment for women extended well after the war.

Interpretation

The conflict between women contributing to the war time labour force as well as juggling the family responsibilities affected an irreversible change to the status of women and the family dynamics after the war.

An interpretive thread is in the old forties and fifties interior decorations drawn from the Duration and local house.

The community hubs can be used to explore these stories.





The bullets are suggested as a remarkable pattern or can spell messages.

The postcard series open up old albums and tell ephemeral stories within an old fashioned format.



The Long Drought Ends

Dunheved,
Novr 3rd, 1828.

My dearest Phillip

I do not know whether an opportunity is likely soon to occur of sending it to you, but I am anxious having a leisure hour to devote it to you. I think you and dear *Philip* are seldom absent from my thoughts, and very anxious do I feel to get some tidings of you. Your Winter must be over and I suppose you are again Surveying, pray God all may be well with you, I have not yet had the satisfaction of hearing if any of my letters have reached you, but I am led to hope one I forwarded by Doctor Evans, and which he gave in charge to a Mr Mitchell who he met at Rio and about to join you has reached you safely. I am happy to say we are all well here—and our prospects much more cheering than they were, for the long drought has at last ended, and we are blessed with rains. We had a flood about 6 weeks since which did a vast deal of good, in fact saved the Colony from famine, and came in time to save the wheat on our farm and on the Nepean settlements, but tho all on the Hawkesbury was lost we refused to sell wheat, till we saw how this years was like to turn out, but now we are selling at the rate of 18^s. currency a bushel, we could part with 40 or 50 bushels and most likely shall, as there will be some weeks to Harvest and no one in the neighbour hood, has any but ourselves. We do not take it into the market, being more handy to sell at home, & our horses and bullocks have been so reduced, we endeavour to use them as

On the Farm

The influence of the King family was profound not only for St Marys but for the colony at the time. Various governors would stay at Dunheved on their way west to the foothills. The land grants were given to King's children as a standard colonial procedure and the farms were productive through the nineteenth century grazing sheep and beef as well as maize and wheat.

The family's sense of civic responsibility was reflected in their donation of land and materials for the church at St Marys.

Brick making was undertaken and the fired yellow bricks transported the short journey to the church.



TLC maze playground in Carlton Victoria

Interpretation

The brick site has been interpreted already in the heritage park using the materials and the geometry of the kiln site in play equipment and as an entry artwork into the precinct.

The overlay of old maps and survey posts indicate former land areas and sizes.

The domestic interiors including the lino floors, hangings and wall papers show the home decor as a connection with European and exotic fashions and the putting down of roots.

The formal language used by letter writers such as Harriet Lethbridge to her husband Phillip reveal the intimacy of relationships as well as the long separations caused by slow transport and commissions. A sense of duty underlies the letters as they reveal the vagaries of climate and farming production.

An intricate maze which echoes the yards for mustering and separation of livestock can become an active play space.



*JMD entry design for Central Precinct
lifting the archaeological brick site plan as
a repeated vertical structure.*

Jordan Springs

These stories are suggested in conjunction
with the Western Precinct
Landscape Masterplan Strategy Report
September 2009
by Environmental Partnership Pty Ltd



Central Precinct

These stories are suggested in conjunction with the Central Precinct Landscape Master Plan February 2015

by James Mather Delaney Design Pty Ltd

1

The First Landscape

2

H2O

3

Signals

4

Camouflage

5

Secret Garden

6

Duration

7

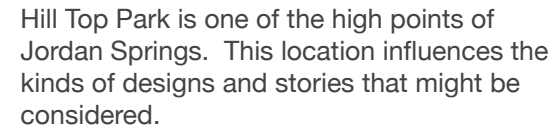
Women in Uniform

8

On the Farm



Hill Top Park



The stories considered for this park are the signals where the elements of wind create a kinetic artwork. Whether a wind vane where the sculpture turns into the prevailing wind or a more kinetic response, this elevated work reinforces the park's ability to capture longer views and accept the breezes.





Boronia Village Park 4

The village park is located between the Regional Park and the riparian corridor in the Boronia precinct. As a small park, it is surrounded on three sides by residences.

With such a proximity to local residences, a co-creative process would be suited to include further design elements into the park.

Interpretation

The stories considered for this park are the 'Secret Garden,' the First Landscape,' and 'On the Farm.'

These stories are envisaged as integrated elements or art play sculptures.



*The integration of innovative shelter and play items which refer to nature.
Artists from left to right: Graham Chalcroft and Fiona Foley*



Central Precinct Location Examples

Riparian Corridor



The Riparian Corridor is a long green belt that provides a WSUD resolution as well. While its planting scheme grows, an opportunity exists for an ephemeral response to reinforce its function and create a sense of rhythm along its length.

Interpretation

The careful navigation of varying audiences and protagonists is the challenging design issue facing the incorporation of interpretive elements or activities.

To overlap these stories so that parents and children respond differently allows an element of surprise and memory recall.

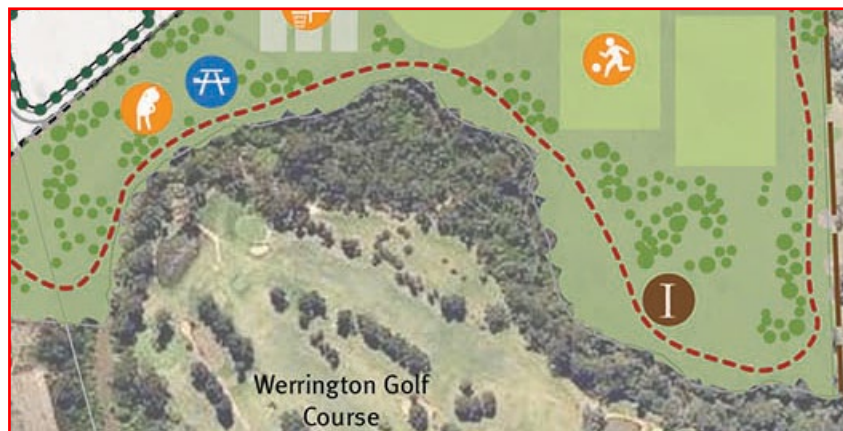
The experiences can be of permanent open spaces and to ephemeral, virtual projects.



The use of reinforced steel nests to play with natural and human construction.



The use of repeated elements to create rhythm.



South Creek Edge

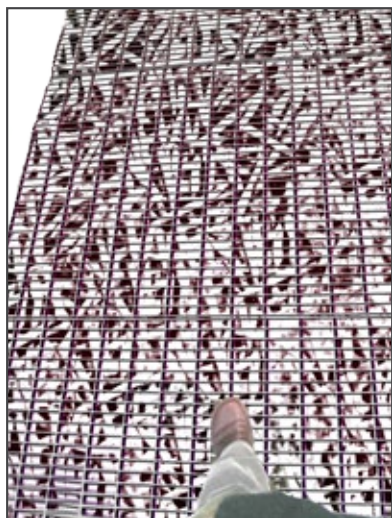
The edge of South Creek and the Regional Open Space allows a number of varying engagements to discover its character and natural movement. The transition between creek and the potential activities of this space is a careful interface and should encourage contemplation, perspectives in flow heights and immersion in a natural setting.

Interpretation

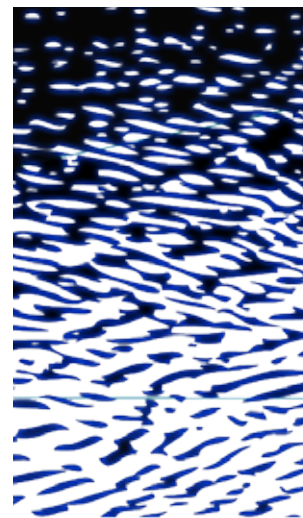
The stories to activate this edge are 'The First Landscape' and 'H₂O.'

The way these stories are told is through a robust integration with existing infrastructure to withstand any flooding. The existence of an Aboriginal ochre site nearby and the proximity to their valuable food source provides the stimulus for this story.

The water story can be told interpretively about pollution in a positive way and measure the varying flow heights of the creek as creative marks.



The use of found objects as texture and unity, organic seats and the ripple of water as a surface texture .





Village Centre & Regional Open Space

The Village Centre, bordering the Regional Open Space and is elevated allowing good views towards South Creek.

It is an urban village with an excellent breathing space nearby.

Interpretation

The stories considered for this centre are 'Women in Uniform,' 'First Landscape' and 'Duration.'

These stories are envisaged as integration within community hubs and design elements. The reinforcement of the viewing platform across the open space is a powerful opportunity to integrate design elements in the decking or structure.



Chris Edwards artwork on a community hub at the Ponds

Bridges & Easement

The proposed bridges function in different ways, for cars and pedestrians. The bridges have the ability to pick up a number of stories on their abutments or engineering such as the cabling from the radar calibration station and the struts used in the buildings.

The power easement, in spite of its formidable structures, increases the open space for residents and allows movement through and across its territory. The approach to the easement is to acknowledge its presence and encourage an enjoyment of its corridor.

Interpretation

The stories considered for these structures vary. For the power easement, the potential for a more organic planting form underneath occupies the space and its openness. Even an annual program, such as the installation of fluorescent tubes which are lit up by the electric field above, will celebrate its supply and necessity for powering homes.

For the bridges, an integration of design elements for balustrades, abutments and approaches will anticipate the crossings.



The architectural details can be echoed in the design of the bridges.



Fluorescent lights are illuminated by the powerful current above.



Interpretive Process

To consider these stories as an important building block in the formation of local flavour and identity requires a deliberate approach. This approach realises the development of these stories in the infrastructure, the parks, the streetscape, the riparian corridors, the programmed events, the signage, and the town centre.

The processes to include interpretation include

- Co-creation
- Ephemeral Projects
- Integration of elements
- Art and design
- Signage

The planning for construction and community activities should overlay these stories as initial concept parameters.

Co-creation

The planning of neighbourhood parks like Jordan Springs Village Park 4 are enhanced by consultations with the local community.

This co-creative process empowers local communities to assist in the design of spaces that reflect their needs and desires.

The interpretive heritage stories gives them a scaffold from which to consider and frames their voice within a cohesive plan.

Each co-creative approach will depend upon the character of the space, the expertise of local representatives and real budgets.

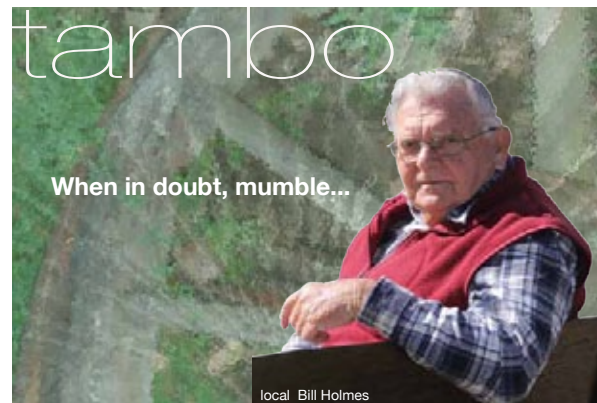
Interpretation

As a community grows, its interactions in the collective spaces may change.

Often the desires are concrete physical designs and the document folds these in a thematic view.



This post card project partnered local photographers with local identities and their witty sayings.





Primary School students designed the patterns for the horses.



Local community members constructed bird boxes for a local park in Russia.

Ephemeral Projects

The interpretation strategy encourages a suite of temporary projects to galvanise the community's awareness of these stories.

They may include:

- Aboriginal Traditional Cultural days to utilise site specific recipes and materials and ochre painting.
- Temporal art classes using found material
- Gardens
- Picnics in the park

Interpretation

These events and projects are not precious and can allow for an organic growth from year to year. This encourages new members of the community to participate.

Some of the projects like the postcards encourage old photos, old stories and connect communities from disparate backgrounds.





Integration of Elements

The integration of elements within designs invests local stories into the fabric of places.

This allows for:

- Cost savings borne by the infrastructure overall costs
- Stories to blend into the form of the development
- An absorption of heritage in the every-day lives of communities

Interpretation

These elements can be included as colour, patterns and texture.

They can be rescaled, inverted, reshaped and repeated so as to surprise, decorate and interact.

Gradually their flourish, skin and poetry becomes ingrained within the psyche of the locale and the heritage is a new stratum.





Art and Design



The intervention of art and design with a distinctive heritage value gives an imaginative response to the stories. It can still function as part of a structure such as a playground sculpture, seat, shelter or cantilevered deck.

Aboriginal artists will tell Indigenous stories in their artworks while other artworks will respond to other heritage layers.

Interpretation

As part of the briefs given to artists, they will respond to the heritage interpretation as a parameter for their concept.

The scale of artworks will be important. While artworks at Hilltop Park will interact with the wind, other artworks will be scaled for a tactile interaction and a human scale.





Signage

Signage can be functional however many of the signs allow innovative designs within a utilitarian purpose.

They may include old fonts, differing materials and imaginative projections. They can be impressed, etched and blasted.

They may choose the colour of the old munitions site typologies and they may be visual signs. The use of signs to orient such as along cycle and walking paths is a powerful opportunity.

Issues for consideration are

- An existing sign hierarchy
- Legibility
- Intention

Interpretation

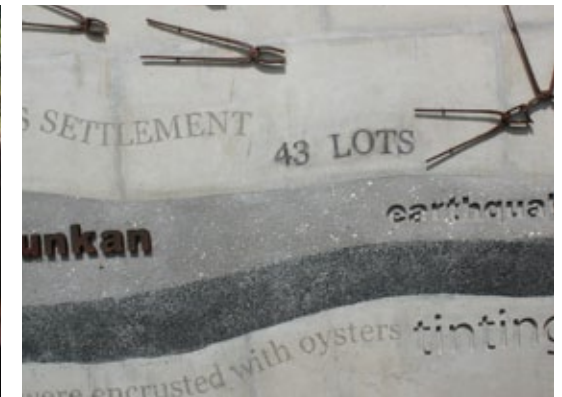
The munitions site used a secure and safety conscious hierarchy of signs to orient, warn and identify.

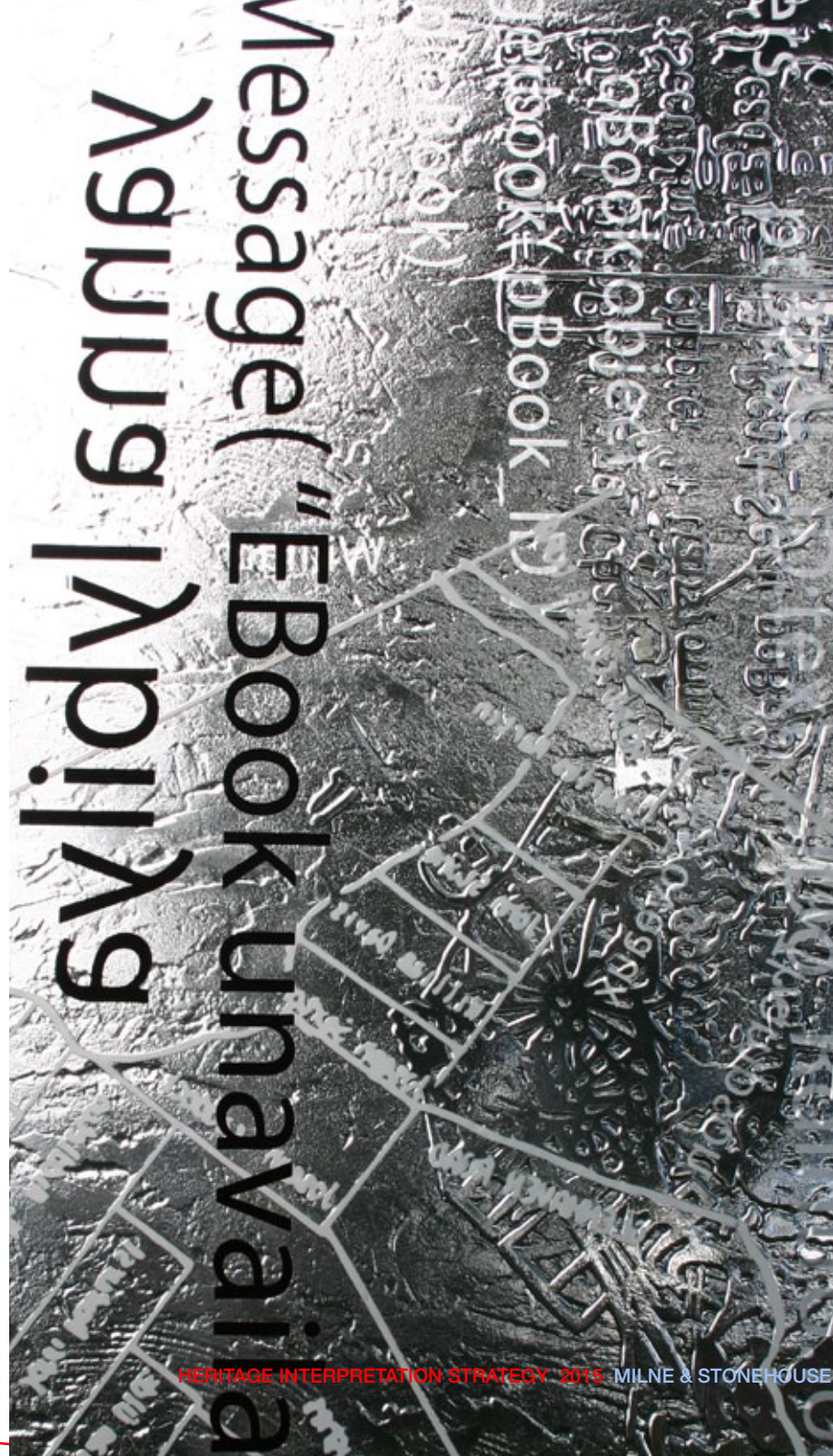
The farms used fences to define and separate.

The inclusion of Aboriginal stories with text should consider both the intent and the use of natural materials where possible.

The letters from the early colonial period express the language in a dramatically different way to the modern vernacular.

Signs should explore rather than merely illustrate or inform.







Experiences

A range of experiences intended for diverse audiences across gender, age and culture determines the success of collective places

Often these experiences are universal such as play, celebrations and meetings.

That these experiential places may inform and educate is a worthwhile result. This range of interactions include tactile responses, passive and active play, light and shadow play, illumination, exploration, discovery and orientation.

Interpretation

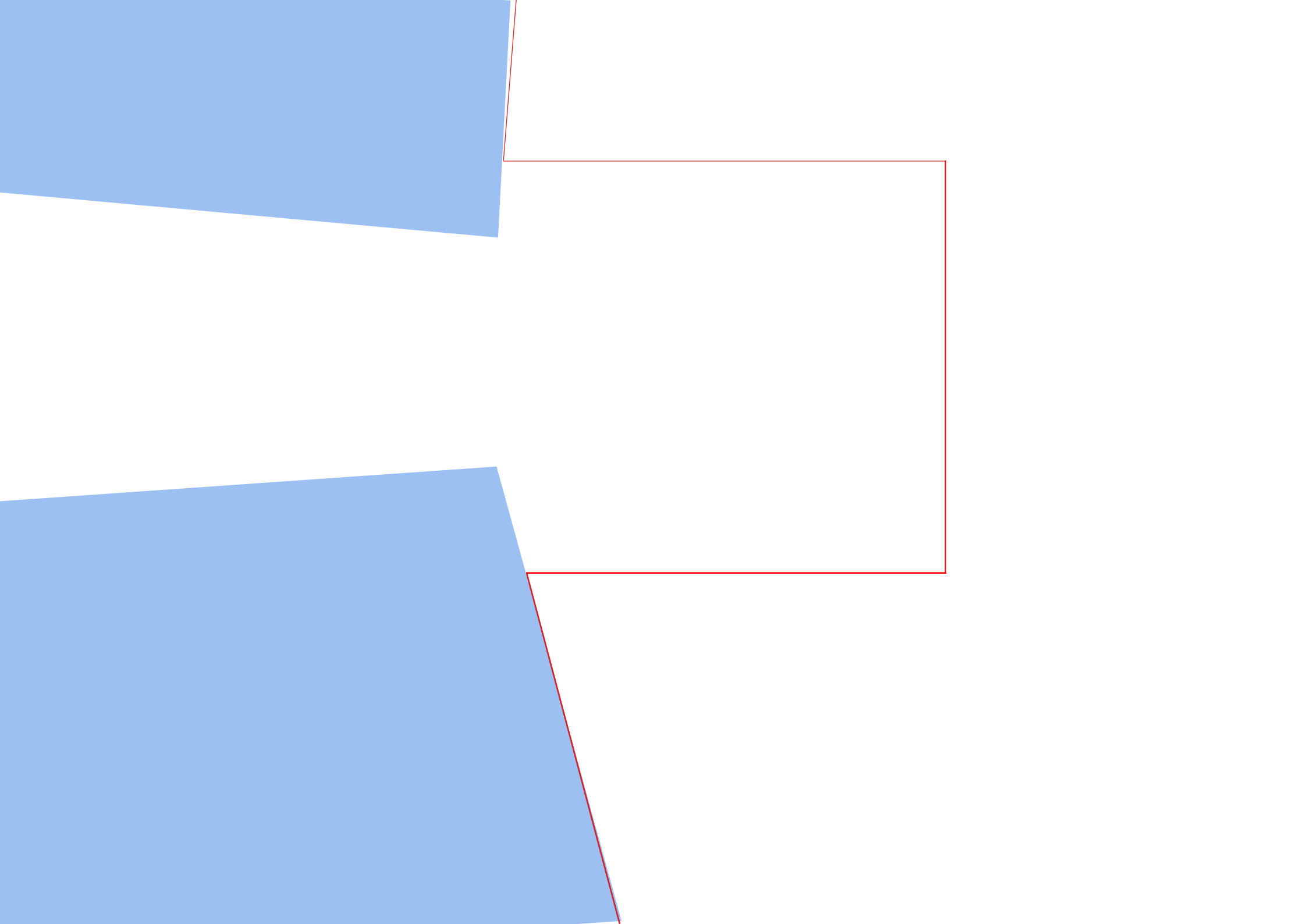
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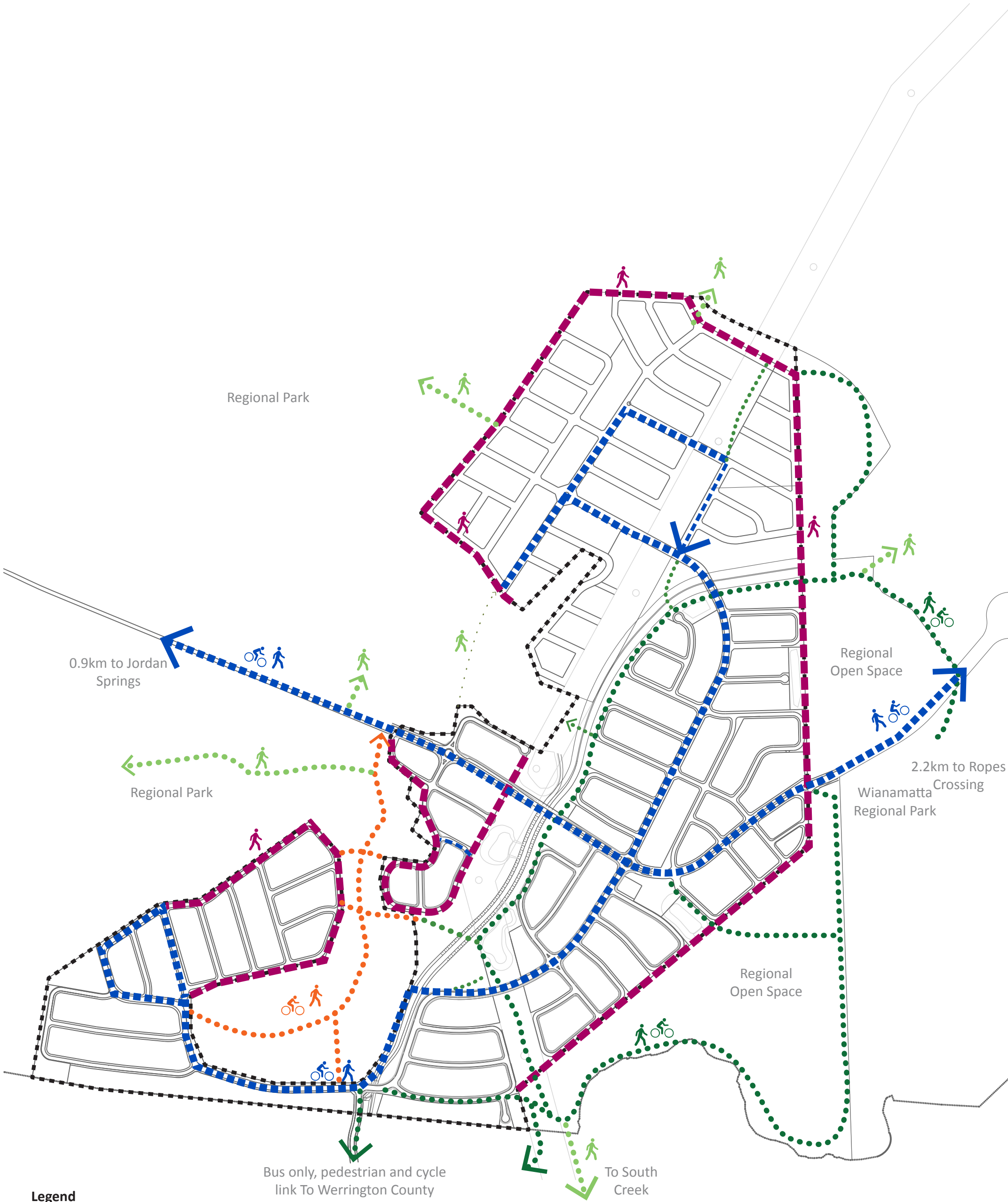
To overlap these stories so that parents and children respond differently allows an element of surprise and memory recall.

The experiences can be of permanent open spaces and to ephemeral, virtual projects.









Legend

- | | |
|---------------------------------|--|
| ----- Precinct Boundary | Secondary Pedestrian Path - 1.8m edge link |
| Shared Path - 2.5m Road Reserve | Connection to Regional Park Network (Indicative) |
| Shared Path - 2.5m Off Road | Regional Park Shared Path |

