Public Realm Guidelines

PART FOUR

PART FOUR

living communities

4.1 Introduction

Part 4 of the Masterplan provides the design guidelines for the public realm. These guidelines instruct and advise on the physical development of the public domain of the area, including streets and parks. The design guidelines presented here build upon the design vision and framework outlined in Parts 1, 2, and 3 of the Masterplan.

4.2 Retained and New Streets

As the Masterplan requires the retention of many existing properties (including privately owned homes) scattered throughout the site and the overall project aims for environmental and economic sustainability, much of the existing street network has been preserved and utilised in the new neighbourhood design. The retained street network has been enhanced and expanded to improve connections within the site and to the surrounding area. The new design also eliminates numerous existing dead-ends that challenge wayfinding, security, and emergency response.

4.3 Street Hierarchy

Streets facilitate more than just car-based movement. Streets assist with the legibility and identity of a place and they provide spaces for daily encounters between residents and neighbours. The Masterplan has a street hierarchy that includes:

Collector Roads

- Road Type 1: Existing 18m road (including shared way);
- Road Type 2: Proposed 18m road (including shared way);
- Road Type 3: Proposed 15.5m road along park
- Road Type 4: Proposed 15m road.

Access Streets

- Road Type 5: Existing 20m (including shared way);
- Road Type 6: Existing 18m (including shared way);
- Road Type 7: Existing 15m access street;
- Road Type 8: Proposed 15m street;
- Road Type 9: Proposed 15m street (including shared way);
- Road Type 10: Proposed 12m street along parks; and
- Road Type 11: Proposed new 10.5m street at parks.

Access Places

- Road Type 12: Existing 15m access place.
- Road Type 13: Proposed 8m access place.

The adaptive reuse of the existing street network creates some challenges, with regard to the irregularities in widths and intersection angles. In general, existing carriageway widths will remain the same.

Collector

TYPE 1
WIDTH 18M
STATUS: EXISTING

TYPE 2
WIDTH 18M
STATUS: PROPOSED

TYPE 3
WIDTH 15.5M
STATUS: PROPOSED

TYPE 4
WIDTH 15M
STATUS: PROPOSED

Access Street

TYPE 5
WIDTH 20M
STATUS: EXISTING

TYPE 6
WIDTH 18M
STATUS: EXISTING

TYPE 7
WIDTH 15M
STATUS: EXISTING

TYPE 8
WIDTH 15M
STATUS: PROPOSED

TYPE 9
WIDTH 15M
STATUS: PROPOSED

TYPE 10
WIDTH 12M
STATUS: PROPOSED

TYPE 11
WIDTH 10.5M
STATUS: PROPOSED

Access Place

TYPE 12
WIDTH 15M
STATUS: EXISTING

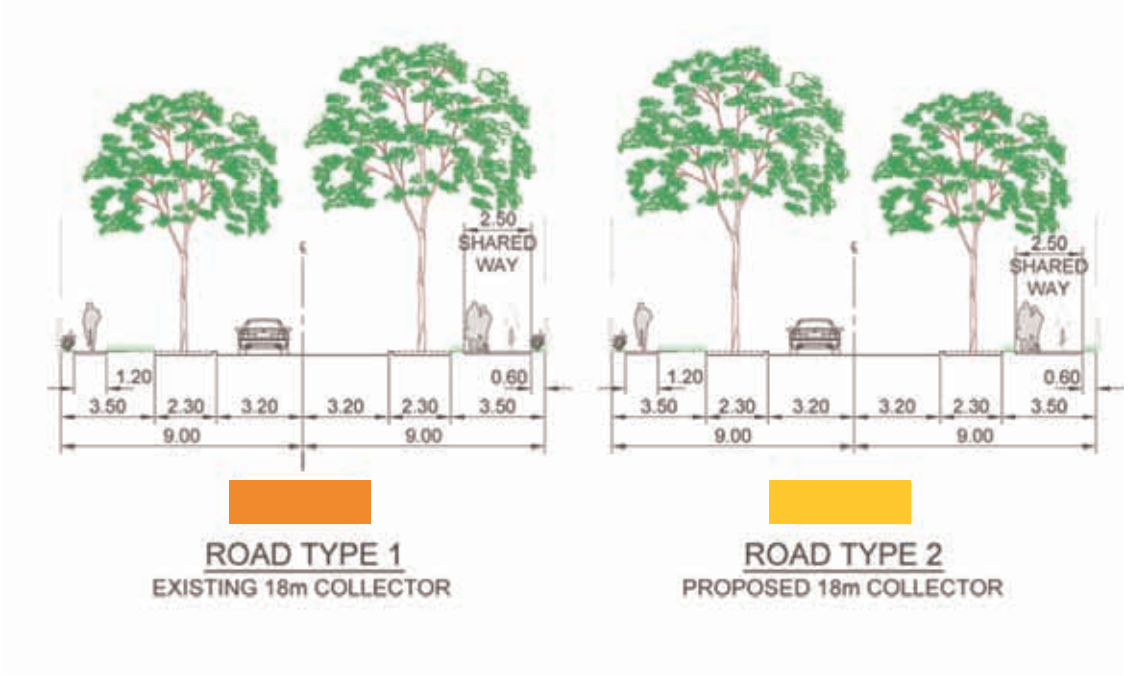
TYPE 13
WIDTH 8M
STATUS: PROPOSED

Collector Roads

Tarlington Parade and Bunker Parade will continue to serve as the collector roads within the neighbourhood, with the substantial redesign of Bunker Parade in sections helping to increase neighbourhood circulation. In addition, a new collector road connecting Tarlington Parade and Bunker Parade will be introduced, joining the two halves of the neighbourhood.

Collector roads will be well lit, with provisions for pedestrian movement. The type of fencing and location and height of planting along these roads will be carefully considered to ensure resident privacy while allowing opportunities for surveillance. Street trees will be placed per the Landscape Guidelines, including based on locations of services, parking bays, and raingardens.

Typical 18m Wide Collector Road



ROAD TYPE 1
EXISTING 18m COLLECTOR

ROAD TYPE 2
PROPOSED 18m COLLECTOR

ROAD TYPE 3
PROPOSED 15.5m COLLECTOR
AT PARK

ROAD TYPE 4
PROPOSED 15m COLLECTOR

Access Streets

A range of different access streets will be introduced with the new Masterplan, substantially increasing circulation within the neighbourhood.

The width of access streets to be introduced ranges from 10.5-15m. Some access streets will front parks, providing residents with additional amenity and increasing surveillance (as well as lighting) of open spaces. Access streets will also provide access to some residents' garages and car courts while serving as part of the pedestrian network.

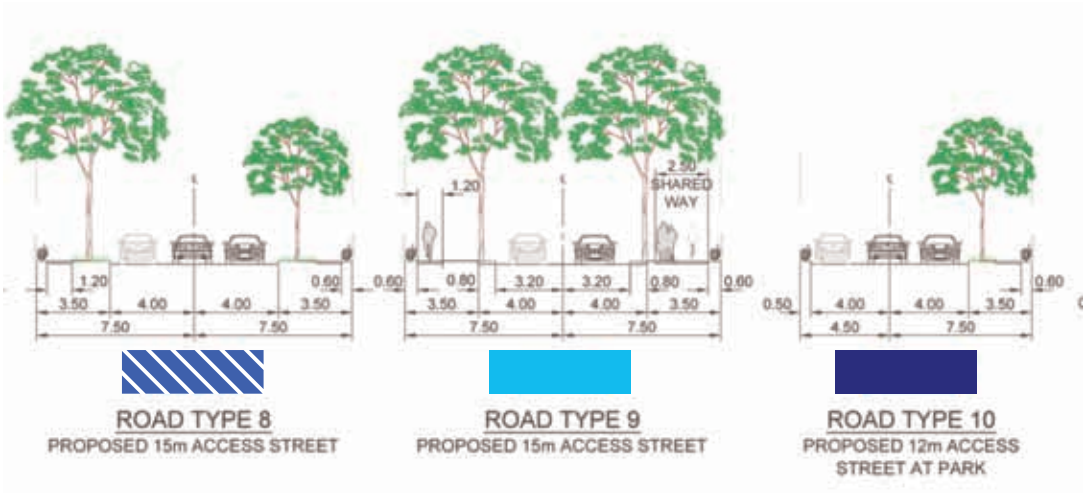
Access streets will be well lit. The type of fencing and location and height of planting along these roads will be carefully considered to ensure resident privacy while allowing opportunities for surveillance. Street trees will be placed per the Landscape Guidelines, including based on locations of services, parking bays, and raingardens.

Typical 15m Wide Access Street

ROAD TYPE 5
EXISTING 20m ACCESS STREET

ROAD TYPE 6
EXISTING 18m ACCESS STREET

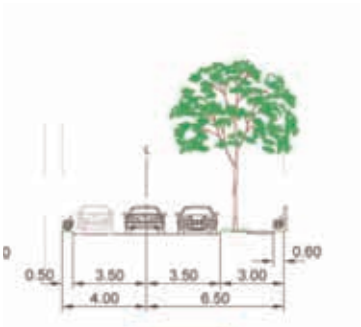
ROAD TYPE 7
EXISTING 15m ACCESS STREET



ROAD TYPE 8
PROPOSED 15m ACCESS STREET

ROAD TYPE 9
PROPOSED 15m ACCESS STREET

ROAD TYPE 10
PROPOSED 12m ACCESS
STREET AT PARK



ROAD TYPE 11
PROPOSED 10.5m ACCESS
STREET AT PARK

Access Places

Access places will serve to provide vehicle access to some residents' garages and car courts. They will also serve an important role within the pedestrian network.

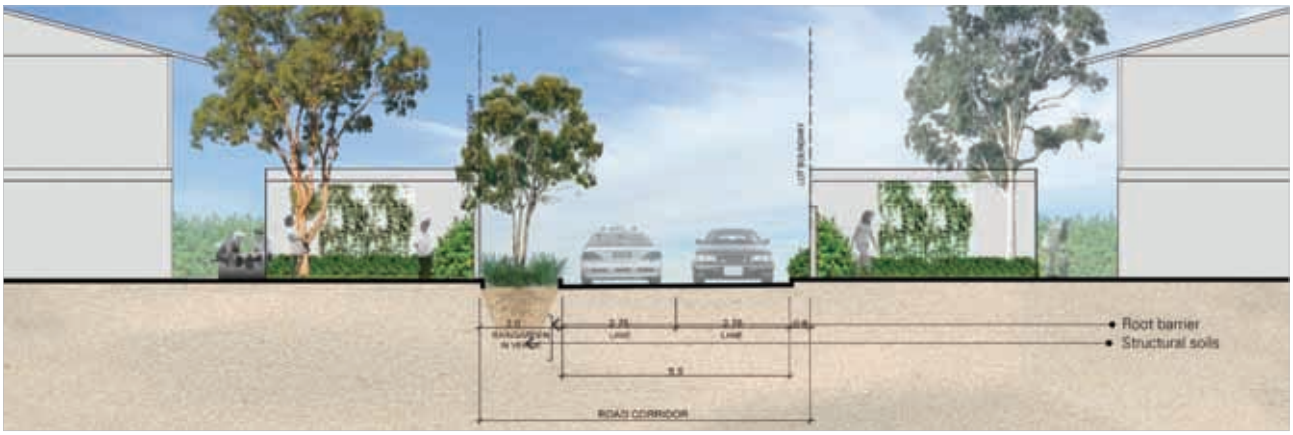
To help ensure a slow speed shareway environment on access places, it will be necessary to vary carriageway widths and provide changes in surface condition, as well as introduce items to the visual field that will slow motorists (such as bollards and planting).

Where it is desirable to limit through-vehicular movement by establishing a cul de sac or similar, a pedestrian connection will be provided through the closure.

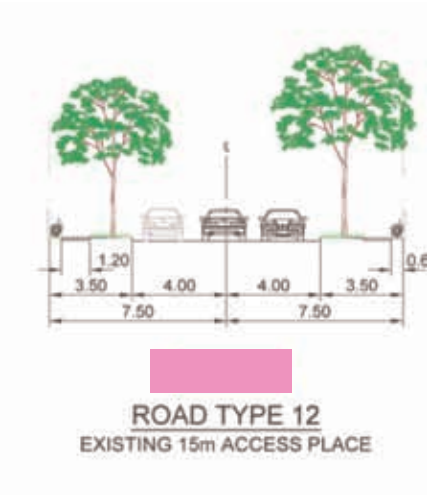
To help improve safety, "dog legs" and other potential hiding places must be avoided in access place design. Access places will be designed to provide clear sightlines from one end to the other, where possible.

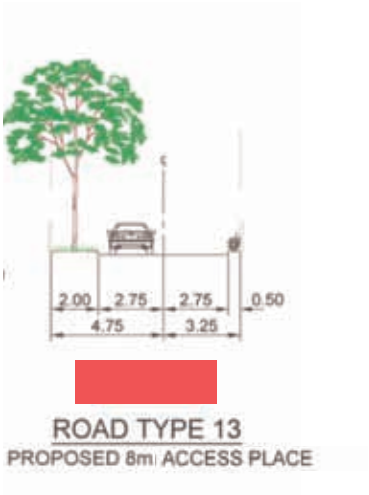
Similarly, splays at car park entrances must not be designed to provide potential hiding places.

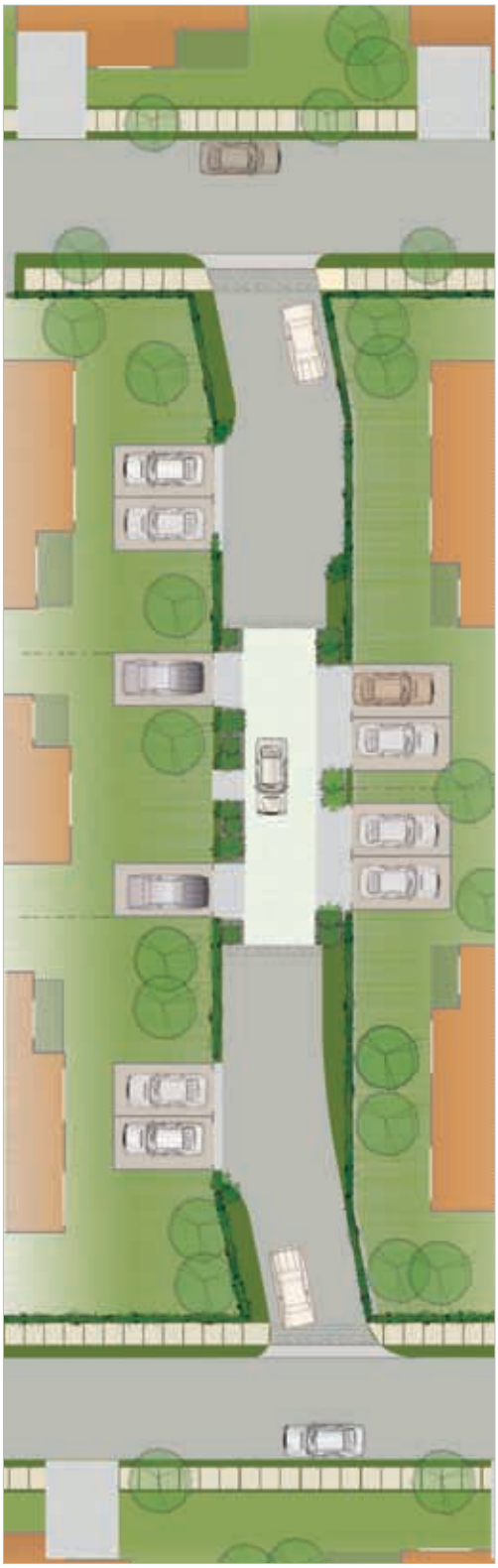
The type of fencing and location and height of planting along access places must be carefully considered to ensure resident's privacy while maintaining opportunity surveillance. Low groundcover should be used with no shrub layer below taller canopy trees.



Typical 8m Wide Access Place







Access Place Example

4.4 Trees

Trees are an important structural element in the landscape of Bonnyrigg. Trees provide both aesthetic and practical amenity, including important ecological and micro-climate functions. The Masterplan envisions the following objectives, principles, and guidelines for tree preservation and planting within the neighbourhood.

Objectives

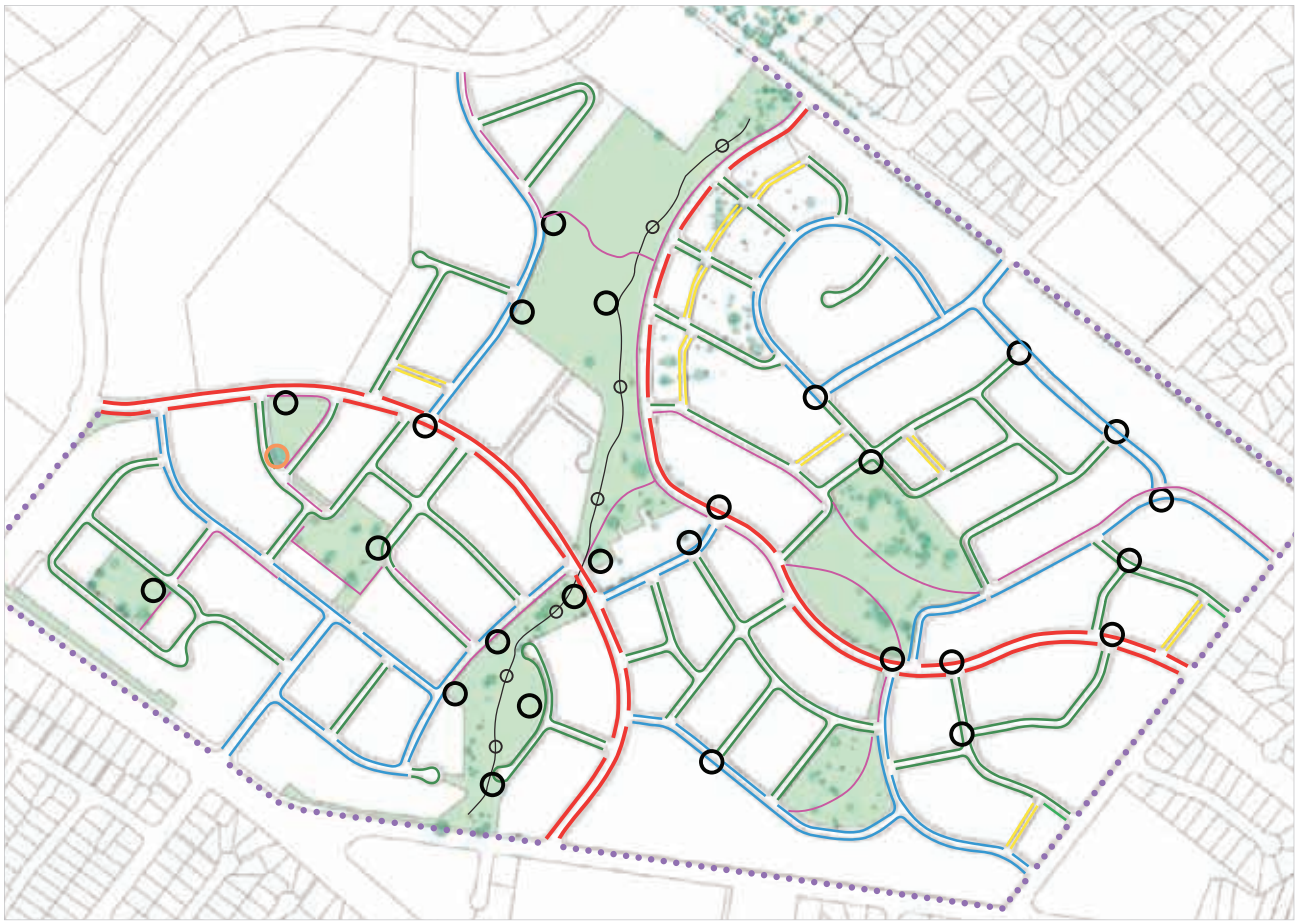
- To establish a vegetation structure within the site that helps reduce 'urban heat island effect' and create a comfortable micro-climates;
- To utilise trees to create an aesthetically pleasing environment and strengthen the visual character of the neighbourhood;
- To enhance the vegetation communities endemic to the site;
- To promote a sense of hierarchy and identity in streets;
- To provide ecological connectivity, function, and biodiversity;
- To promote plantings of cultural relevance to the diverse community;
- To form linkages through the use of 'ribbon' plantings;
- To utilise passive irrigation, where possible; and
- To establish and promote Bonnyrigg as a 'green and leafy' suburb.

Principles

- Use appropriately sized trees to meet the scale requirements of each street;
- Coordinate street tree plantings with the location of underground services, lighting, traffic plan and driveway crossovers;
- Retain existing trees where possible as part of streetscape planting and to help maintain an "established" landscape character;
- Coordinate tree spacing and location with private lot tree planting to avoid large gaps between canopies and to integrate private and public landscape;
- Link open spaces and community meeting points with 'ribbon' planting to form an estate wide orientation and place making identity; and
- Where appropriate use deciduous species to provide winter solar access to the private outdoor open spaces of lots as necessary.

Guidelines

- Street trees must be planted on both sides of all streets except access streets with parks and minor roads;
- Locate 'cultural plantings' in formal groupings or strategic locations as feature trees to provide cultural interest and a sense of place. Cultural plantings are species which relate to community heritage and which can be grown at Bonnyrigg;
- Street tree plantings shall be no closer than 3m apart and no further than 15m apart. Where possible achieve a structured layout or group in twos's and three's;
- Only use formally spaced planting to designated entry points to Bonnyrigg, and along park edges as indicated; and
- Use nominated species as shown in species list and to areas located in the street tree masterplan; and Street trees are to be located in raingardens to obtain passive irrigation from stormwater runoff. One tree per ten 90-degree car spaces and one tree per three parallel car spaces.



Tree Masterplan

Existing Tree to be retained

Existing Trees of Residence significance to be retained

Cultural Plantings:
Brachychiton acerifolius
Lagerstroemia indica 'Natchez'
Ficus macrophylla
Fraxinus grifithii
Jacaranda mimosifolia
Malus x floribunda
Phoenix dactylifera or native equivalent
Prunus serrulata
Pyrus ussuriensis
Sapium sebiferum
Grevillea robusta

Cultural planting trail to incorporate indigenous significant plants

Primary Street Planting:
Eucalyptus crebra
Eucalyptus moluccana
Eucalyptus tereticornis
Corymbia maculata

Secondary Street Planting:
Eucalyptus crebra
Eucalyptus moluccana
Corymbia maculata

Tertiary Street Planting:
Eucalyptus crebra
Eucalyptus fibrosa
Eucalyptus eugenoides

Lane Planting:
Eucalyptus crebra
Melaleuca styphelioides

Ribbon Planting:
Fraxinus oxycarpa 'Raywoodii'

Edge Planting (to be detailed as required)

PART FOUR **PUBLIC REALM GUIDELINES**
Trees


Angophora floribunda


Corymbia maculata


Eucalyptus fibrosa


Eucalyptus tereticornis


Allocasuarina torulosa


Callistemon salignus


Grevillea robusta


Ficus macrophylla


Fraxinus grifithii


Jacaranda mimosifolis


Malus x floribunda


Prunus serrulata

Street Trees

Botanical Name	Common Name	Height
Angophora floribunda	Rough- barked Apple, Boonah	15m
Casuarina glauca	Swamp She- Oak, Grey She- Oak	20m
Corymbia maculata	Spotted Gum	20m
Eucalyptus amplifolia	Cabbage Gum	30m
Eucalyptus crebra	Narrow- leaved Ironbark	15m
Eucalyptus eugenioides	Thin- leaved Stringybark	15 - 25m
Eucalyptus fibrosa	Broad- leaved Ironbark	20m
Eucalyptus moluccana	Grey Box	40m
Eucalyptus tereticornis	Forrest Red Gum, Burringoa	15m
Melaleuca decora	White Feather Honeymyrtle	15m
Melaleuca styphelioides	Prickly- leaved Paperbark	8m
Tristaniopsis laurina	Water Gum	10m

Additional Park Trees

Botanical Name	Common Name	Height
Allocasuarina torulosa	Forest She- Oak	8m
Callistemon salignus	Willow Bottlebrush	3 - 4m

Cultural Trees

Botanical Name	Common Name	Height
Grevillea robusta	Silky Oak	20m
Lagerstroemia indica 'Natchez'	White Creep Myrtle	10m
Ficus macrophylla	Moreton Bay Fig	50m
Fraxinus grifithii	European Ash	15m
Jacaranda mimosifolia	Jacaranda	12m
Malus x floribunda	Japanese Crab Apple	8m
Phoenix dactylifera or Livistona australis	Date Plam	21m
Prunus serrulata	Cherry Blossom	15m
Pyrus ussuriensis	Manchurian Pear	10m
Sapium sebiferum	Chinese Tallowood	8m

Riparian Trees

Botanical Name	Common Name	Height
Casuarina cunninghamiana subsp. cunninghamiana	River She- Oak	30m
Casuarina glauca	Swamp She- Oak, Grey She- Oak	20m
Livistona australis	Cabbage Tree Plam	24m
Melaleuca decora	White Feather Honeymyrtle	15m
Melaleuca linariifolia	Snow in Summer	8m
Melaleuca styphelioides	Prickly- leaved Paperbark	8m
Tristaniopsis laurina	Water Gum	10m

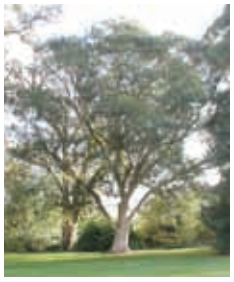

Casuarina glauca


Livistona australis


Melaleuca decora


Melaleuca linariifolia


Melaleuca stypheloides


Tristaniopsis laurina


Brachychiton acerifolia


Acacia implexa


Backhousia myrtifolia


Bursaria spinosa


Daviesia ulicifolia


Doryanthes excelsa

Ribbon Trees

Botanical Name	Common Name	Height
Fraxinus oxycarpa 'Kaywoodii	Claret Ash	12-15m

Shrubs and Accent

Botanical Name	Common Name	Height
Acacia falcata	Hickory Wattle	2.5m
Acacia implexa	Lightwood, Hickory	4.5 -15m
Backhousia myrtifolia	Gray Myrtle, Ironwood	6m
Bursaria spinosa (thorns)	Blackthorn	2.5m
Daviesia ulicifolia (thorns)	Gorse Bitter Pea	1.5m
Doryanthes excelsa	Giant Lily, Illawarra Lily	2.4 - 6m
Grevillea superba		1.8m
Hakea sericea	Needlebush, Silky Hakea	1 - 3m
Kunzea ambigua	Tick- Bush	3.5m
Pultenaea villosa		1.2m
Syzygium australe 'Aussie Southern'	Brush Sherry, Magenta Sherry	8m
Syzygium 'Bush Christmas'	Lillypilly	2m
Syzygium 'Cascade'	Pink Flowering Lillypilly	3m

Groundcovers

Botanical Name	Common Name	Height
Clematis glycinoides	Forest Clematis	15m
Dianella caerulea	Flax Lily	1m
Dianella revoluta	Mauve Flax Lily	1m
Dianella 'Silver Streak'	Silver Flax Lily	0.5m
Eriostemon myoporoides	Long- leaved Waxflower	1.8m
Grevillea 'Royal Mantle'		0.2m
Hardenbergia violacea	Native Sarsaparilla	0.2m
Liriope muscari 'Evergreen Giant'	Evergreen Giant Lilyturf	0.8m
Lomandra longifolia	Spiny- headed Matt Rush	1m
Lomandra longifolia 'tanika'	Spiny- headed Mat Rush	0.7m
Microlaena stipoides var stipoides	Weeping Meadow Grass	1m
Myoporum parvifolium	Creeping Boobialla	0.2m
Themeda australis	Kangaroo Grass	0.5m
Trachelospermum jasminoides	Chinese Star Jasmine	1m
Viola hederaceae	Native Violet	0.3m

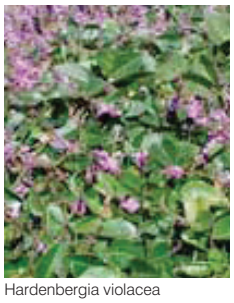
PART FOUR **PUBLIC REALM GUIDELINES**
Trees


Kunzea ambigua


Syzygium australe


Clematis glycinoides


Dianella 'Silver Streak'


Hardenbergia violacea


Liriope muscari


Lomandra tanika


Dianella caerulea


Dianella revoluta


Imperata cylindrica var. major


Lomandra longifolia


Microlaena stipoides var. stipoides

Native Grasses / Meadows

Botanical Name	Common Name	Height
Aristida ramosa	Purple Wiregrass	1.2m
Aristida vagans	Three- awn Speargrass	0.4m
Austrodanthonia linkii	Wallaby Grass	
Bothriochloa macra	Red Grass	0.3-0.8m
Dianella caerulea	Flax Lily	1m
Dianella revoluta	Blueberry Lily	1m
Dichelachne micrantha	Shorthair Plume Grass	1.2m
Imperata cylindrica var.major	Blady Grass	1.2m
Lomandra longifolia	Spiny- headed Matt Rush	1m
Microlaena stipoides var. stipoides	Weeping Meadow Grass	1m
Themeda australis	Kangaroo Grass	0.5m
Wahlenbergia gracilis	Native Blue Bell	0.2m

WSUD Raingardens

Botanical Name	Common Name	Height
Carex appressa	Tall Sedge	0.8m
Carex inversa	Knob Sedge	0.5m
Carex longebrachiata	Drooping Sedge	
Juncus usitatus	Common Rush, Pin Rush	0.6m
Lepidosperma laterale	Variable Sword Sedge	1m

Swales

Botanical Name	Common Name	Height
Carex appressa	Tall Sedge	0.8m
Carex inversa	Knob Sedge	0.5m
Carex longebrachiata	Drooping Sedge	
Juncus usitatus	Common Rush	0.8m


Themeda australis


Wahlenbergia gracilis


Carex appressa


Carex inversa


Alisma plantago-aquatica


Baumea juncea


Eleocharis acuta


Gahnia aspera


Juncus usitatus


Lepidosperma laterale


Schoenoplectus validus


Villarsia exaltata

Macrophytes

Botanical Name	Common Name	Height
Alisma plantago-aquatica	Water Plantain	0.3m
Baumea juncea	Sedge, tussock swamp twig rush	1m
Carex appressa	Tall Flat Sedge	0.7m
Carex inversa	Knob Sedge	0.5m
Carex longebrachiata	Drooping Sedge	
Eleocharis acuta	Common Spike Rush	1m
Gahnia aspera	Rough Saw- Sedge	1m
Juncus kraussii ssp.australiensis	Sea Rush	
Juncus usitatus	Common Rush	0.8m
Lepidosperma laterale	Variable Sword Sedge	1m
Schoenoplectus validus	River Clubrush, Great Bulrush	3m
Villarsia exaltata	Erect Marsh Flower	1m

4.5 Pedestrian and Bicycle Connections

Key elements to the future success of Bonnyrigg include the permeability of the site and the potential for safe pedestrian access and movement. The masterplan will facilitate the increased use of the existing and proposed walking and cycling networks.

Objectives

- To create a safe pedestrian and bicycle network to promote active transport and a healthy community;
- To provide a network of connected shareways to promote walking and bicycle use and safety. Network to connect to site features and broader destinations and networks;
- To encourage 'street life' through provision of meeting points in parks readily accessible through the pedestrian and bicycle network;
- To strive for equal access to the public domain, as well as to private lots; and
- To improve the health and well being of residents through increased daily and incidental activity.

Principles

- Locate shareways to enhance connectivity to parks and other destinations, where possible and practical;
- Locate shareways to minimise road crossings;
- Locate shareways on one side of road only; and
- Integrate the pedestrian and bicycle network with the road network to promote the mutual surveillance of these networks.

Guidelines.

- Shareways to be 2.4m wide brushed concrete; and
- Standard path to be 1.2m wide brushed concrete.

Pedestrian & Bicycle Connections Plan

- *Shared pedestrian / cycleway path in road reserve*
- *Pedestrian pathway in road reserve*
- *Shared pedestrian / cycleway path in park*
- *Pedestrian pathway in park*
- *Existing pedestrain path*
- *Existing RTA cycle path*
- *Existing off-road cycle path*
- *Proposed bike parking*

4.6 Public Transport

The new Masterplan offers a significant opportunity to strengthen the role of public transport in the neighbourhood. The Masterplan will help improve existing public transit linkages and provide incentive for increasing service to the community.

Objectives

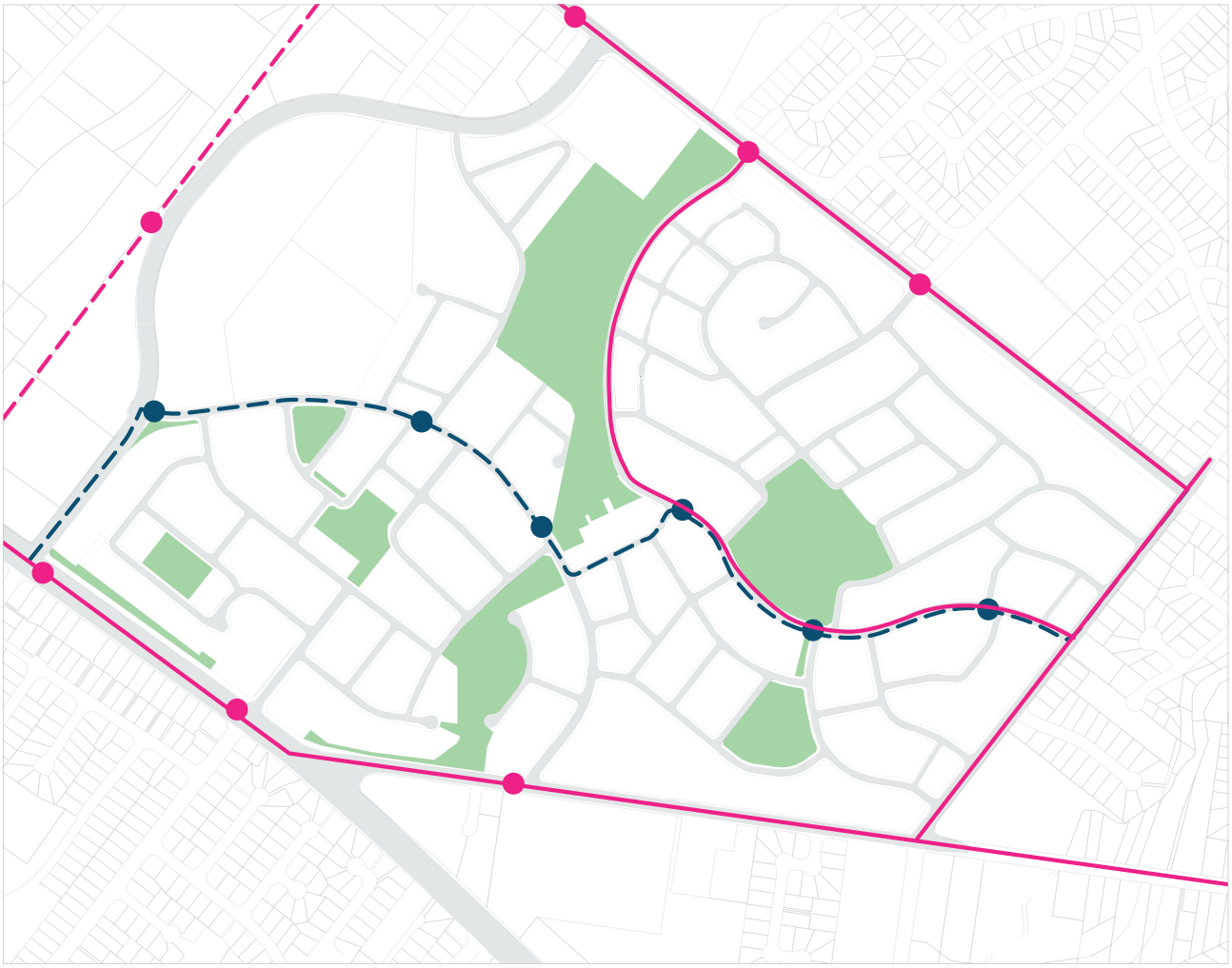
- To provide opportunity for the extension of existing public transport services;
- To improve access to public transport services; and
- To improve passive surveillance of public transport stops and connections to encourage more public transport use.

Principles

- Develop a street network that accommodates bus movement in key areas.

Guidelines

- Develop a movement network that links residents to activity nodes, including via public transport;
- Tarlington Parade and Bunker Parade and the thoroughfare connecting these collector road must be designed to accommodate bus movement; and
- Provide bus stops in locations that will provide for good access to public transport services for the majority of residents.



Public Transport Plan

Proposed deviation bus route

Current bus route

T-Way

Proposed deviation bus stop

Proposed future bus stop

Note:
- Refer to SKM Traffic and Transport Study for further transport information
- Bus stops as per Tmap

4.7 WSUD and Water Management

Water cycle management in the urban environment is a critical element of more sustainable development. Water sensitive urban design (WSUD) addresses the entire water cycle. WSUD techniques incorporated into the Masterplan will ensure that the new Bonnyrigg will make better use of vital resources.

Objectives

- To preserve existing topographic and natural features, including watercourses and basins;
- To utilise the water sensitive urban design (WSUD) techniques of retention and bio-filtration to improve quality of storm water run off;
- To protect surface water and groundwater sources;
- To integrate public open space with stormwater drainage corridors, maximising public access; and
- To increase passive recreation opportunities and visual amenity.

Principles

- Adopt passive irrigation for vegetation - especially street trees;
- Minimise impervious area;
- Minimise use of formal drainage systems (e.g. pipes);
- Encourage infiltration, where appropriate;
- Minimise potable water use for non-potable purposes by designing dwellings to provide non-mains water supply to supply all washing machines, toilets, and on-site irrigation; and
- Make urban water re-use and recycling a visible part of site design.

Guidelines

- Establish roadside tree bays to form raingardens to collect road runoff prior to discharge to a piped system;
- Piped systems must drain through a gross pollutant trap (GPT) prior to discharge to secondary treatment facilities;
- Piped outlets to Tarlington Reserve must discharge above ground to raingardens or linear creek line;
- Reduce potable water demand via rainwater, reuse or recycled water supply;
- Detain stormwater on-site to limit stormwater discharge to pre-development levels;
- Street kerblines on parks may be broken to allow infiltration into turfed buffer zones; and
- Establish raingardens along the creekline to encourage bio-retention.

WSUD and Water Cycle Management Plan

Proposed raingardens on existing roads

Proposed raingardens on new roads

Passive Irrigation (Raingardens merge)

Proposed swale on park edge

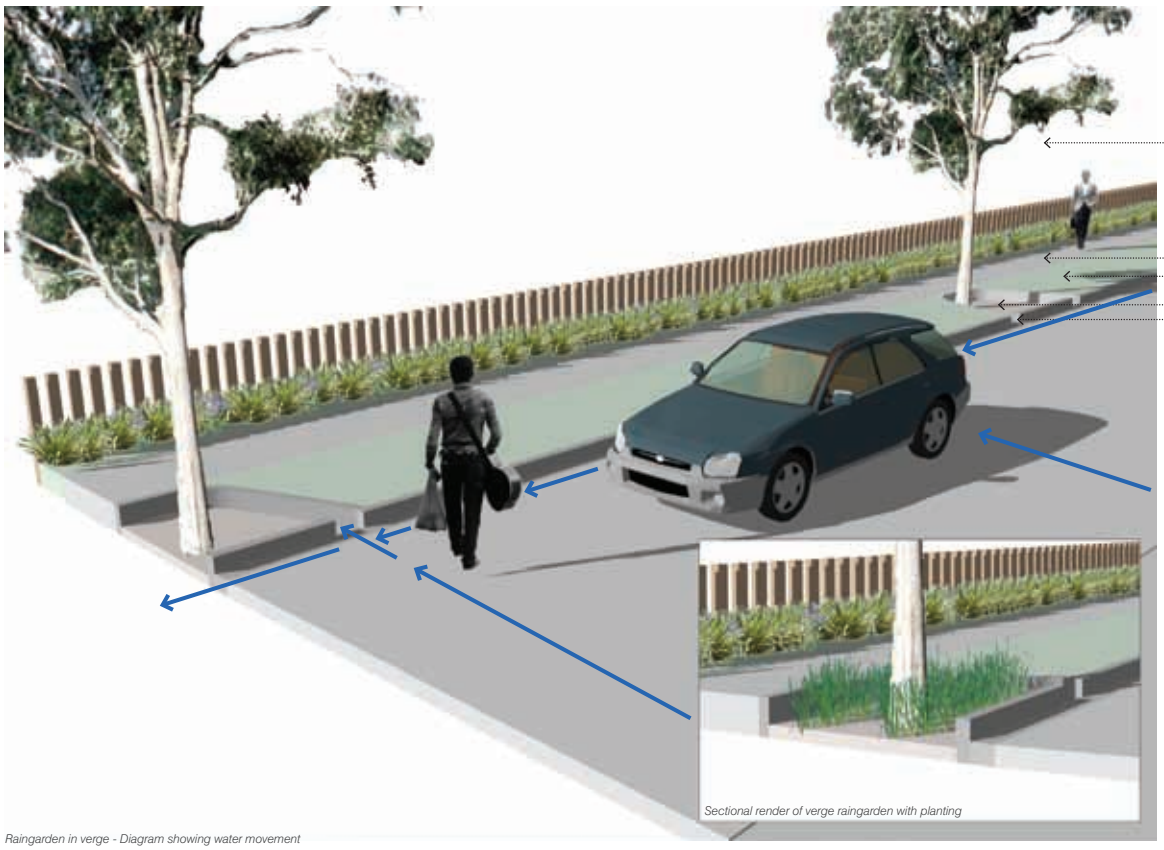
Existing drainage (offsite) overland flow

Catchment boundary

GPT *GPT – Proposed Gross Traps (refer to Engineer's drawings*

Example Raingardens

Raingarden between formal parking - Diagram showing water movement



Raingarden in verge - Diagram showing water movement

Example Raingardens

Macrophyte Planting
Bioretention medium
Minimum 300 x 300 boulders
Boulder footing
Spade edge to vegetation buffer zone

Spade edge to vegetation buffer zone
Native buffer macrophyte mix
Minimum 300 x 300 boulders
Native macrophyte mix in creek line
Bioretention medium

4.8 Parks

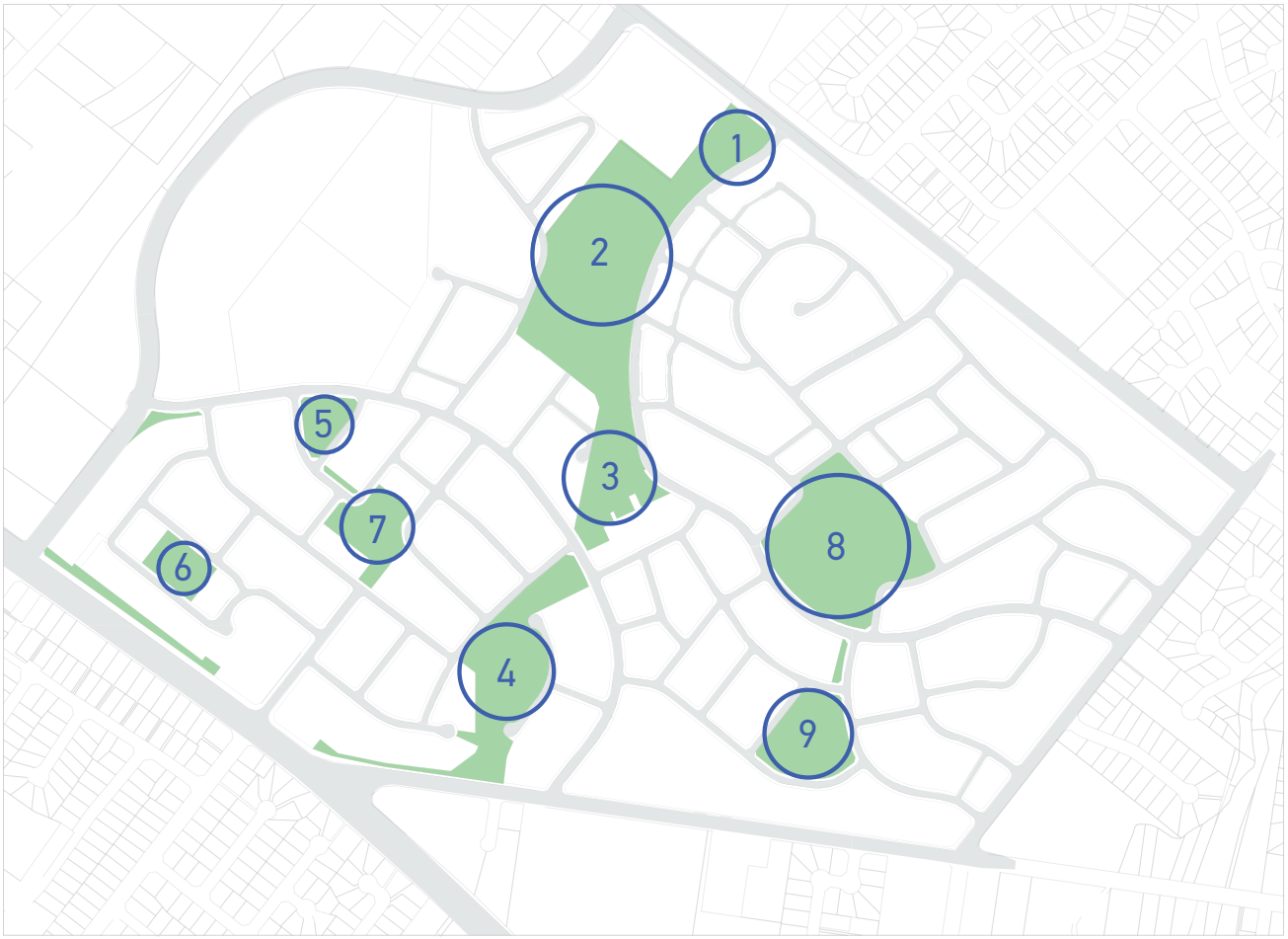
Parks and open space are part of the formative elements of community building. They form major destinations and links to the walking and cycling network.

Objectives

- To create safe public open spaces with much opportunity for surveillance;
- To build upon the existing qualities of each park setting;
- To provide a balance of park uses across the neighbourhood;
- To provide passive green space to enhance the aesthetics and identity of the neighbourhood;
- To provide for a variety of recreational and sporting opportunities in close proximity to all residents;
- To enhance ecological function of the neighbourhood through provision of native fauna habitat;
- To provide spaces for community expression and engagement;
- To integrate pedestrian and bicycle networks with park design;
- To retain existing trees and key vegetation, where possible;
- To create micro-climates, where possible, for the comfort of residents; and
- To name parks in consultation with the community.

Principles

- Locate park amenities to enhance the visual character of the neighbourhood, promote surveillance, and limit vandalism;
- Utilise open space for integrated stormwater management;
- Locate parks on main roads or provide perimeter road address for standard roads;
- Orient parks central to residential areas;
- Encourage greater visibility across parks, avoiding shrub planting or other objects that inhibit site line;
- Use unobtrusive physical barriers to discourage undesired vehicular access to parks;
- Locate pedestrian paths across parks according to established desire lines;
- Provide shade trees and structures to seating and play area;
- Provide detail grading and retaining systems to allow for levels associated with existing trees to be retained;
- Design all lighting to conform to relevant Australian standards;
- Plant trees in mulched garden beds, where possible;
- Select trees with a clear trunk to 2m;
- Select plant species that are indigenous except for ‘cultural plantings’ as indicated; and
- Source seed stock locally, and use this stock for the generation of all plant material.



Park Location Plan

1 Entry Park - Stage One - Passive
2 Lower Valley Creek Sports Park - Active
3 Valley Creek Community Centre Park - Active
4 Upper Valley Creek Park - Passive
5 Bonnyrigg Avenue Entry Park - Passive
6 Village Park - Passive
7 Forest Park - Active
8 Hilltop Park - Active
9 Junior Play Park - Passive

Note
Naming of parks to be developed in consultation with the community

Program Analysis Plan

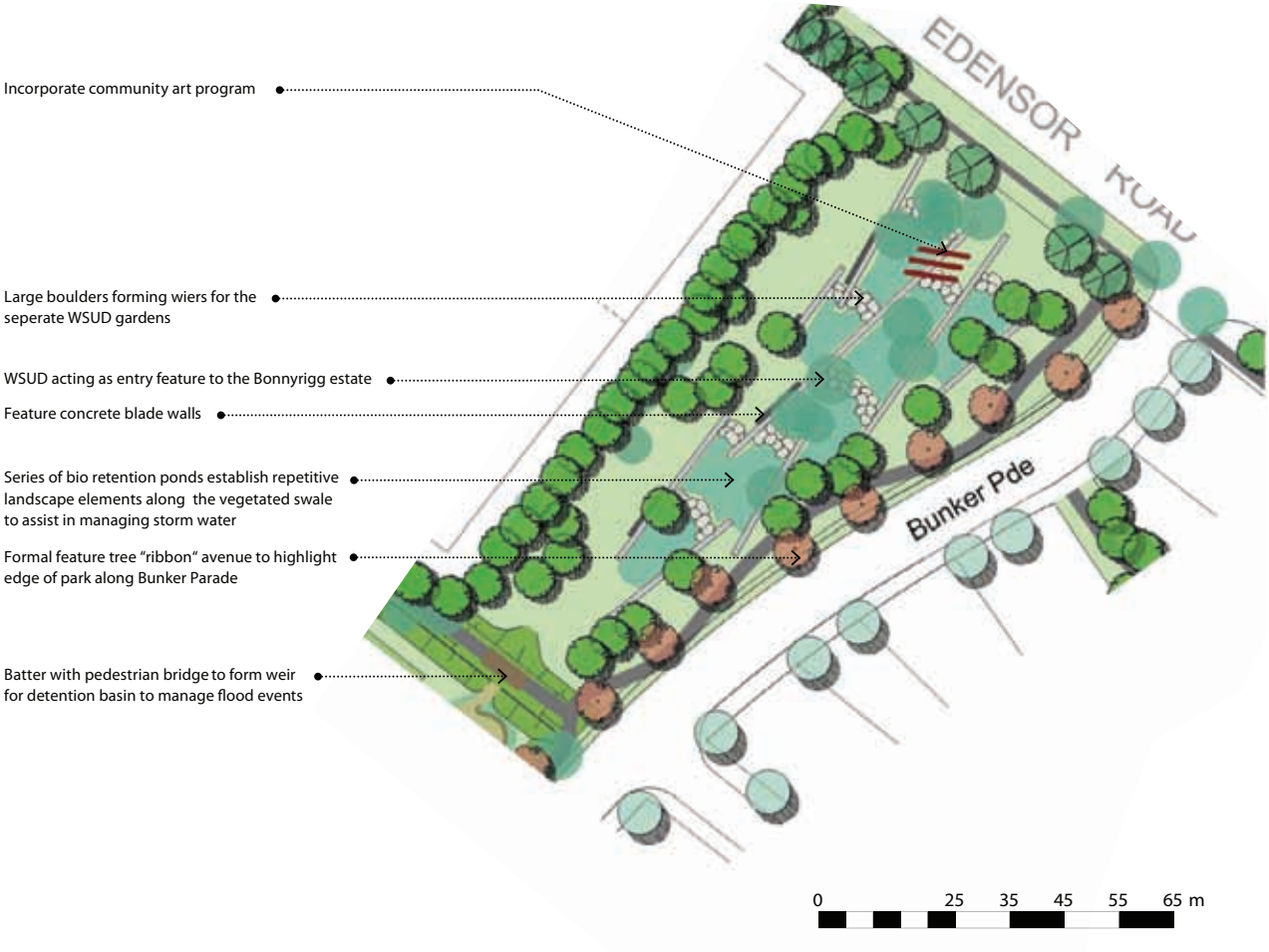
- Existing Trees to be retained
- Street Trees
- Cultural Tree Planting
- Feature Tree Planting
- Canopy Trees
- Shrubs, Grasses & Groundcover Planting
- Open Playing Field
- Turf
- Creek line & Rain Gardens
- Bridge
- 2.5m Shareway
- 1.2m Pedestrian Path
- Gravel
- Small Shelters
- Parking
- Community Gardens
- Amenities Building
- Playgrounds
- Retaining Wall
- Soccer Field
- Basketball Court
- Public Seating
- Turf Mounds / Batters

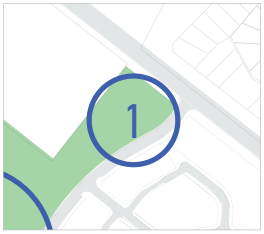
Park 1 - Entry Park

Controls

Park 1 at the entry to stage 1 provides an engaging entry landscape and bioretention raingardens to manage storm water. The Park includes:

- Raingardens and dry creek bed to collect and treat stormwater runoff (seasonally inundated);
- 1.2m pedestrian pathways as shown;
- 2.5 m shareways as shown;
- Bridges at strategic crossings to facilitate park access and integrate pedestrian and cycle movement across the neighbourhood;
- WSUD at Bunker/Edensor Road entry, creating a unique visual feature and managing water quality;
- Feature concrete blade walls protruding from WSUD gardens creating entry interest;
- Series of cultural tree plantings to highlight view and pedestrian links;
- Individual trees to be kept to a minimum in park areas. Promote tree copses in mulched garden beds;
- Ribbon planting to highlight connections through the neighbourhood;
- Public park seating along paths; and
- Macrophyte planting to designated wet zones associated with creekline.


Incorporate community art program
Large boulders forming wiers for the seperate WSUD gardens
WSUD acting as entry feature to the Bonnyrigg estate
Feature concrete blade walls
Series of bio retention ponds establish repetitive landscape elements along the vegetated swale to assist in managing storm water
Formal feature tree "ribbon" avenue to highlight edge of park along Bunker Parade
Batter with pedestrian bridge to form weir for detention basin to manage flood events
EDENSOR
KUAU
Bunker Pde
0
25
35
45
55
65 m


1

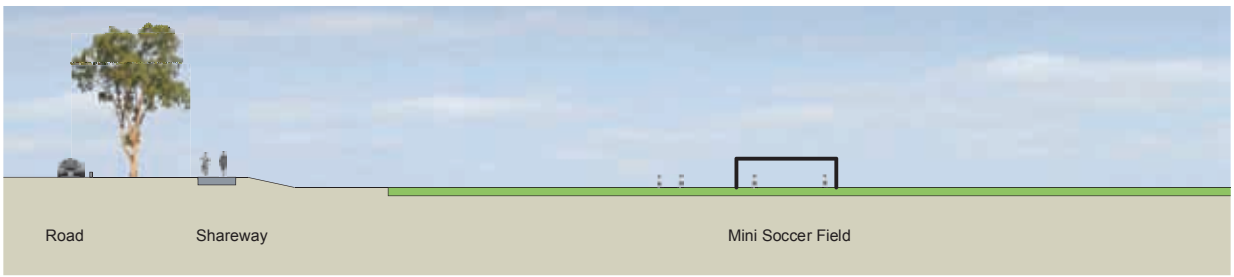
Park 1 Plan

Park 2 - Sports Park

Controls

Park 2 retains and improves the existing sports facilities. As part of the entire Valley Park system, it provides various recreational facilities and ecological function. The Park includes:

- Raingardens and dry creek bed to collect and treat stormwater runoff (seasonally inundated);
- 1.2m pedestrian pathways as shown;
- 2.5 m shareways as shown;
- Bridges at strategic crossings to facilitate park access and integrate pedestrian and cycle movement across the neighbourhood;
- Series of cultural tree plantings to highlight view and pedestrian links;
- Individual trees to be kept to a minimum in park areas. Promote tree copses in mulched garden beds;
- Ribbon planting to highlight connections through the neighbourhood;
- Childrens play equipment (0-4yrs old);
- Well-lit shelters for shade and seating in locations of high surveillance;
- Civic area related to the retirement village offering shelter, formal gardens, seating, retaining walls, and viewing platform over sports areas;
- Public seating along paths;
- Macrophyte planting to designated wet zones associated with creekline;
- Full-size and junior soccer field upgrade;
- Batters surrounding sport fields act as viewing platforms;
- Open turf area for active play;
- Amenities building to provide toilets, changerooms, sports storage room, and canteen(subject to detailed brief); and
- Carpark / overflow car park for proposed soccer fields and general park activities.

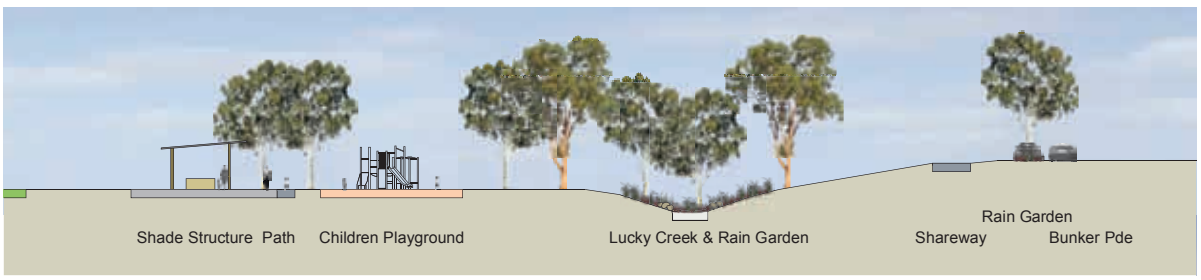


Section A


Full size soccer field to be retained and upgraded
Series of bioretention ponds establish repetitive landscape elements along creek line to assist in managing storm water
Civic space located on major cross site link to provide seating and shade areas for residents of the retirement precinct near by
Overland swale channels surface stormwater to vegetated swale
Pedestrian bridges located at desired pedestrian crossings connected to shopping centre and public transport
Junior Soccer Field
Shrub, groundcover and grass planting areas to have wide radius for easy maintenance.
Trees to be strategically positioned around playground to provide shade.
Children's play equipment and Shade structure
Cultural tree plantings positioned on axis of bisecting street network (refer tree planting strategy.
Location of proposed Amenities Building associated car parking
0 10 20 30 50 70m

Park 2 Plan


2

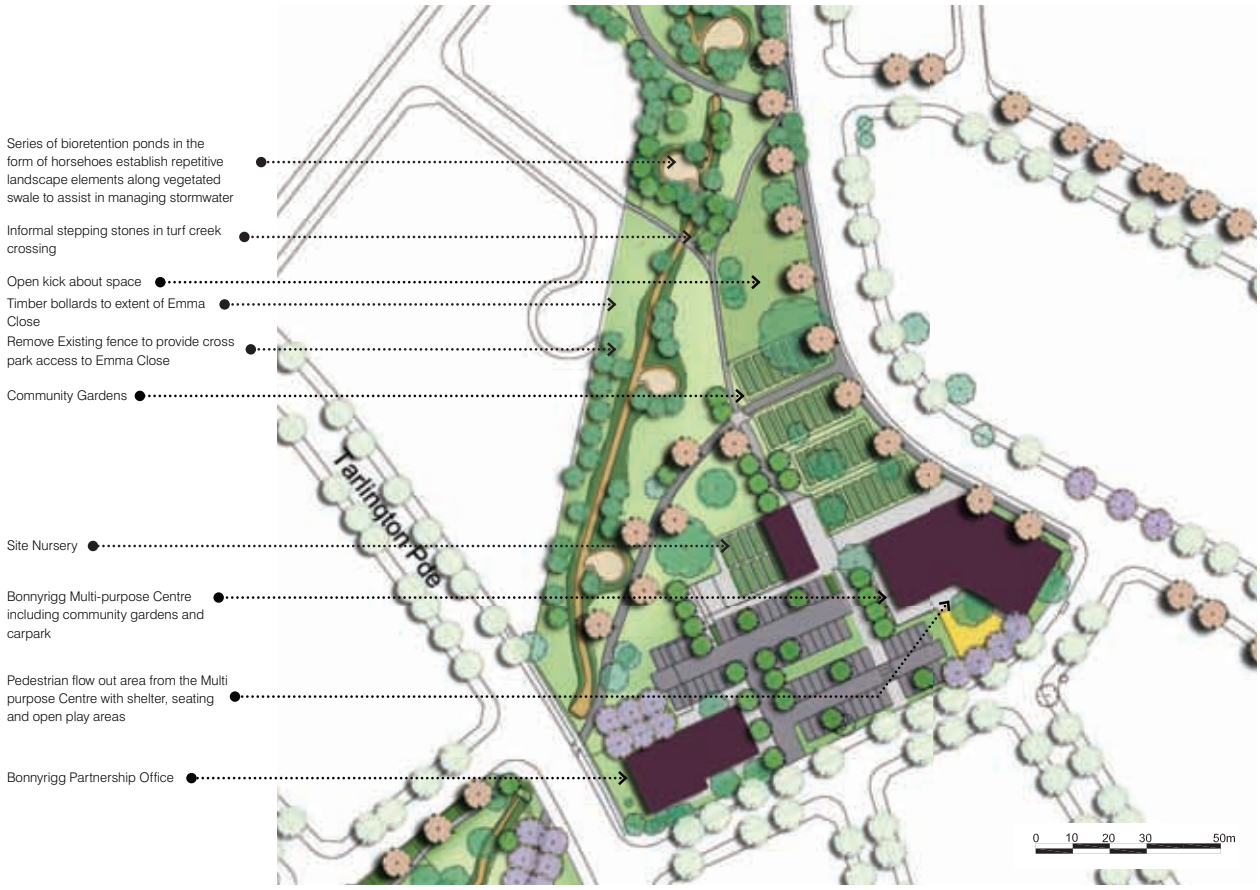

Shade Structure
Path
Children Playground
Lucky Creek & Rain Garden
Rain Garden
Shareway
Bunker Pde

Park 3 - Middle Valley Creek Community Centre Park

Controls

Park 3 aims to provide a spill out space and setting for the Bonnyrigg Neighbourhood Centre. The Park includes:

- Raingardens and dry creek line to collect and treat storm water runoff;
- 2m wide x 0.5m deep (on average) bioswale to form creekline;
- 1.2m pedestrian pathways as shown;
- 2.5m shareways integrating with Bonnyrigg Neighbourhood Centre's path system as shown;
- Pedestrian bridges to provide cross park access;
- Spill out turf area and shelter associated with Bonnyrigg Neighbourhood Centre;
- Series of cultural tree plantings to terminate key views;
- Individual trees to be kept to a minimum. Promote tree copses in mulched beds;
- Ribbon planting to highlight connections through the neighbourhood;
- Public seating along pathways;
- Macrophyte planting to designated wet zones associated with creekline; and
- Open turf area for active play.


Series of bioretention ponds in the form of horsehoes establish repetitive landscape elements along vegetated swale to assist in managing stormwater
Informal stepping stones in turf creek crossing
Open kick about space
Timber bollards to extent of Emma Close
Remove Existing fence to provide cross park access to Emma Close
Community Gardens
Site Nursery
Bonnyrigg Multi-purpose Centre including community gardens and carpark
Pedestrian flow out area from the Multi purpose Centre with shelter, seating and open play areas
Bonnyrigg Partnership Office
Tarlington Pde
0 10 20 30 50m


3

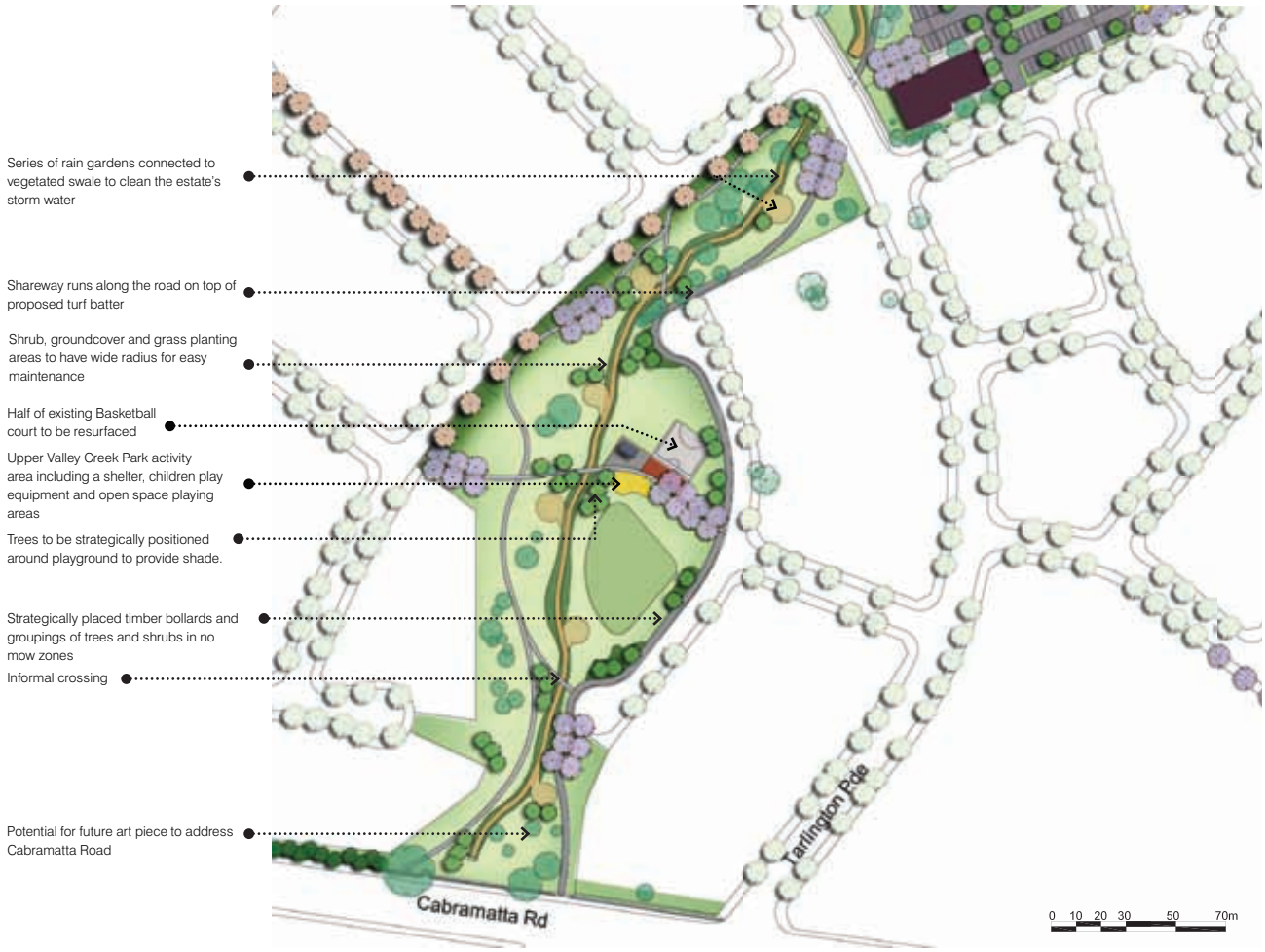
Park 3 Plan

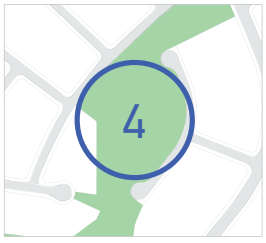
Park 4 - Upper Valley Creek Park

Controls

Park 4 builds from the Valley Creek Park system's various recreational opportunities. The Park includes:

- Raingardens and dry creek line to collect and treat stormwater runoff;
- Macrophyte planting to designated wet zones associated with creekline;
- 2m wide x 0.5m deep (on average) bioswale to form creekline;
- 1.2m concrete pedestrian pathways as shown;
- 2.5 m shareways as shown;
- Pedestrian bridges to provide cross park access;
- Part removal of existing basketball court and upgrade with new half court;
- Shelter and seating structure on intersection of view lines from Axon and Harricks Place;
- Series of cultural tree plantings to terminate key views and celebrate specific intersections;
- Individual trees in park areas to be kept to a minimum. Promote tree copses in mulched beds;
- Childrens play equipment (5-10 year old);
- Public park seating on path ways;
- Open turf areas for active play; and
- Retain existing trees where possible.


Series of rain gardens connected to vegetated swale to clean the estate's storm water
Shareway runs along the road on top of proposed turf batter
Shrub, groundcover and grass planting areas to have wide radius for easy maintenance
Half of existing Basketball court to be resurfaced
Upper Valley Creek Park activity area including a shelter, children play equipment and open space playing areas
Trees to be strategically positioned around playground to provide shade.
Strategically placed timber bollards and groupings of trees and shrubs in no mow zones
Informal crossing
Potential for future art piece to address Cabramatta Road
Tarlington Pde
Cabramatta Rd
0 10 20 30 50 70m


4

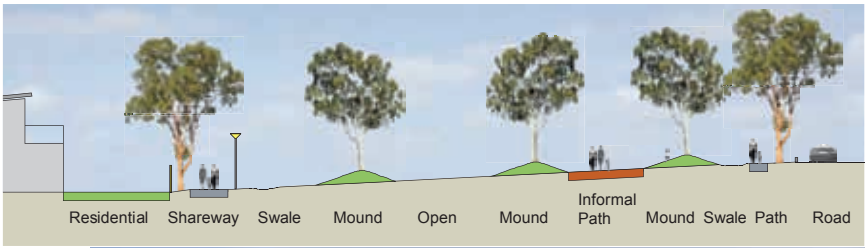
Park 4 Plan

Parks 5 & 6 - Bonnyrigg Avenue Entry & Village Park

Controls

Park 5 creates a pedestrian corridor and entry park while Park 6 provides additional amenity for toddlers and young children. The Parks include:

- Raingarden and swales to collect and treat stormwater runoff;
- 1.2 m concrete pedestrian pathway to provide perimeter access as shown;
- 2.5 m shareways to provide cross site connection as shown. Pedestrian lighting to be provided;
- Informal gravel path to visually connect across the parks;
- Formalised gravel entry square with seating;
- Turf mounds (max. 1m high) to form wave-like pattern in ground plane as shown. Trees planted to ridgeline as shown;
- Feature tree avenue to highlight main shareway;
- Childrens play equipment (0-4 years old);
- Well-lit shelter for overviewing, seating family and picnics;
- Public park seating to locations shown;
- Macrophyte planting to swales;
- Open turf area for active play; and
- Significant existing tree to be retained as shown.



Section A - Bonnyrigg Entry Park

PARK 5

Potential for future art piece to address Tarlington Road Entrance

Cultural tree plantings positioned on axis of cross park path

WSUD measures potentially incorporating into the park

Continuing feature tree 'ribbon' to highlight connection to other parks.

Feature Mounding

Large existing tree to be retained act as a feature to the park

Informal path between mounds connects parks visually

PARK 6

Passive open turfed areas amongst existing trees

Shelter and seating located to obtain views of open space

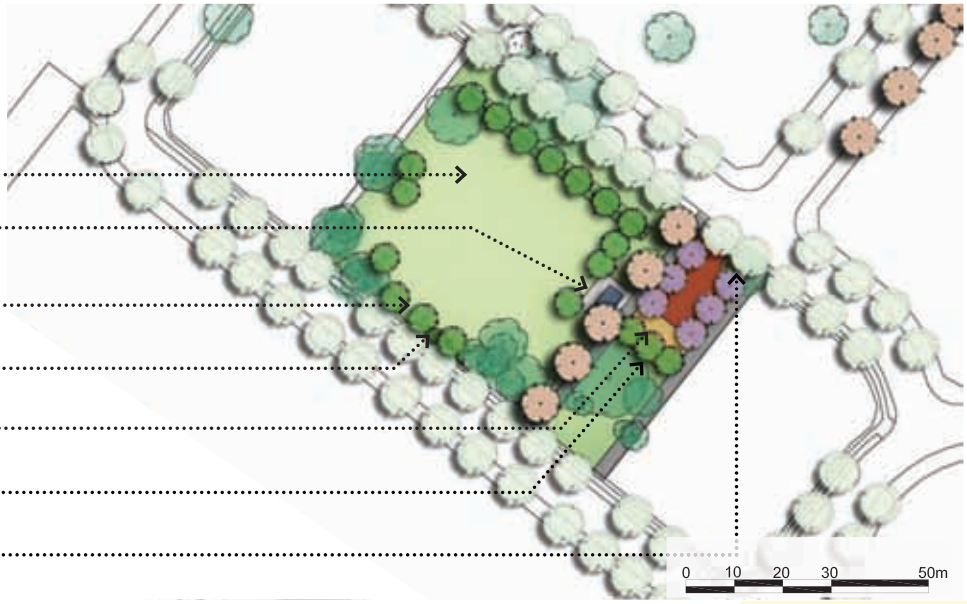
WSUD measures potentially incorporating into the park

Groupings of trees and shrubs in no mow zones

0-4 years play area

Trees to be strategically positioned around playground to provide shade

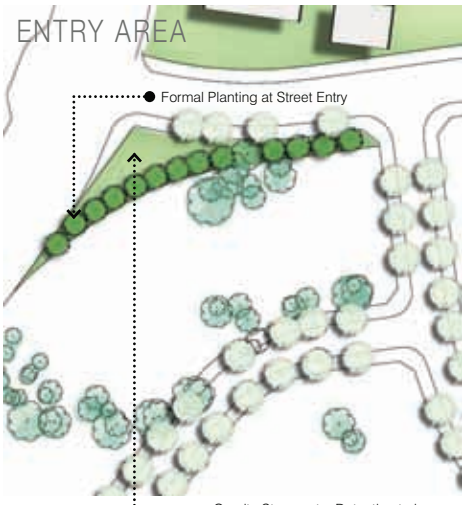
Feature tree planting at entry to park



Parks 5 & 6 Plans

ENTRY AREA

Formal Planting at Street Entry



On-site Stormwater Detention to be provided and potentially incorporating WSUD measures

Park 7- Forest Park

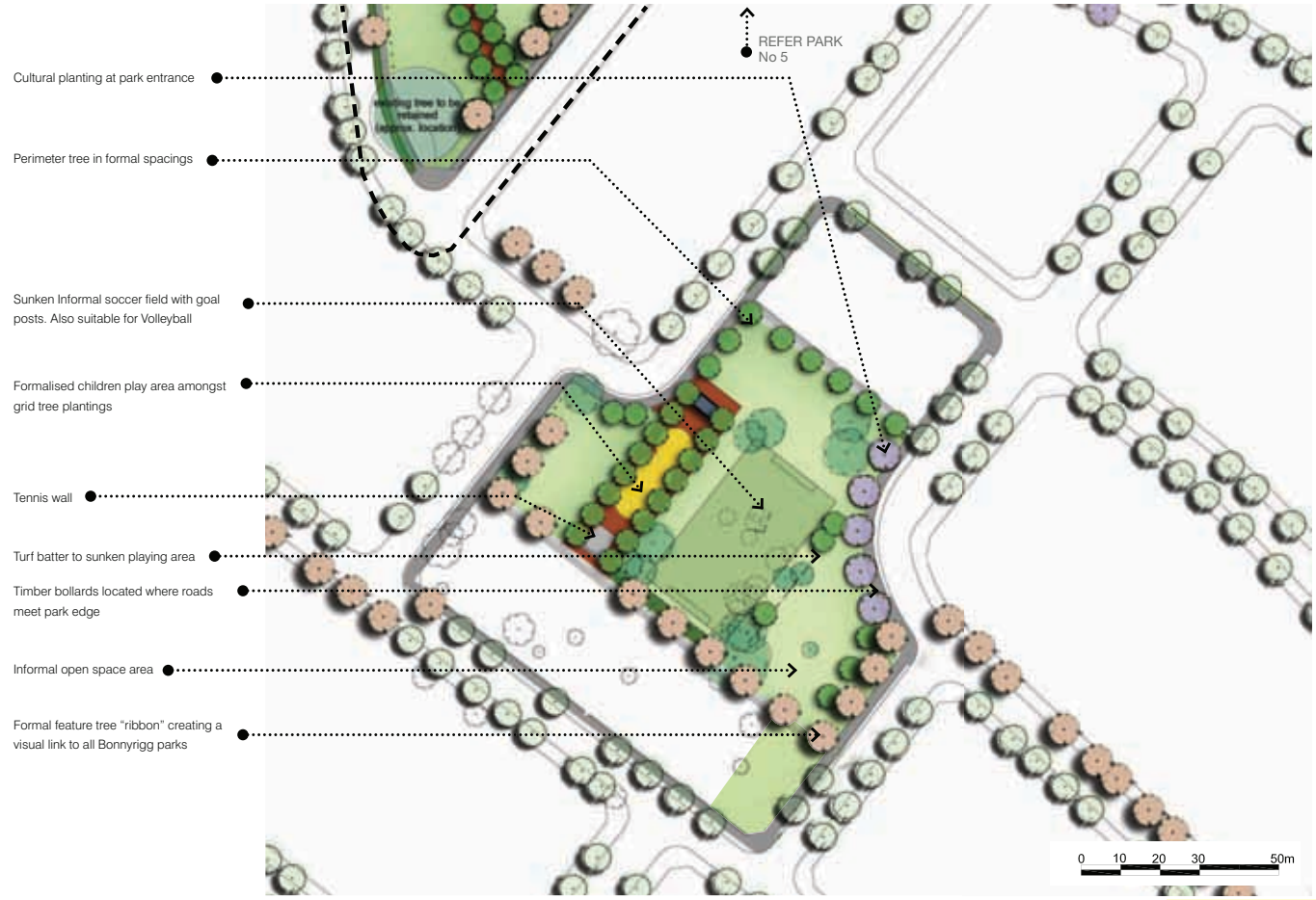
Controls

Park 7 caters for older children through to parents and the aged - with provision of informal green open spaces, formalised sports areas, and children's play equipment all in a structured arrangement.

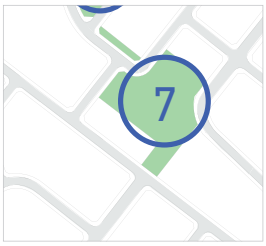
A strong cross site pedestrian link is also featured.

The Park includes:

- Open turf areas creating a variety of active play opportunities;
- Sunken junior soccer field with goal posts;
- 2.5m shareways as shown;
- 1.2m pedestrian path ways as shown;
- Children's play equipment;
- Well-lit shelter/meeting point located axially with Monash Place;
- Tennis / footballer bound wall;
- Public park seating to locations shown;
- Trees to conform to a grid spacing across entire park; and
- Low retaining wall to assist in retaining level junior soccer field and serving as informal seating.



Park 7 Plan



Section A - Forest Park

Park 8- Hilltop Park

Controls

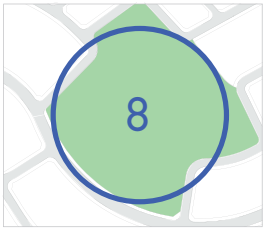
Park 8 is a reconfiguration of the existing park at Bonnyrigg's highest point. It will now provide a variety of recreational activities for all ages. The Park includes:

- The majority of existing trees retained;
- 2.5m shareways as shown;
- Lighting to paths and structures as shown;
- 1.2m pedestrian path ways as shown;
- Children and toddlers playground;
- Well-lit, large shelter with seating for parent viewing and family picnics;
- BBQ;
- Tennis wall and hard surfaced area for games such as handball and hop scotch;
- Existing basketball court upgraded;
- Informal soccer field with goal posts;
- Feature tree ribbon to highlight connections through the neighbourhood;
- Open space playing areas for active childrens play;
- Informal spaces created between existing trees which allow for passive recreation opportunities; and
- Public seating.

Section A - Hilltop Park


Landscape retaining walls to maintain levels for existing trees
Passive open turfed areas amongst existing trees
Trees to be strategically positioned around playground to provide shade
Centralised activity area including: Children play equipment, tennis wall/handball, multi use hard stand, shelter and BBQ area.
Informal soccer field/active play area with goal posts
Existing basketball court to be upgraded
Strategically placed timber bollards and groupings of trees and shrubs in no mow zones
Feature tree 'ribbon'forming connections through the estate
Bunker Hill
0 10 20 30 50 70m

Park 8 Plan


8

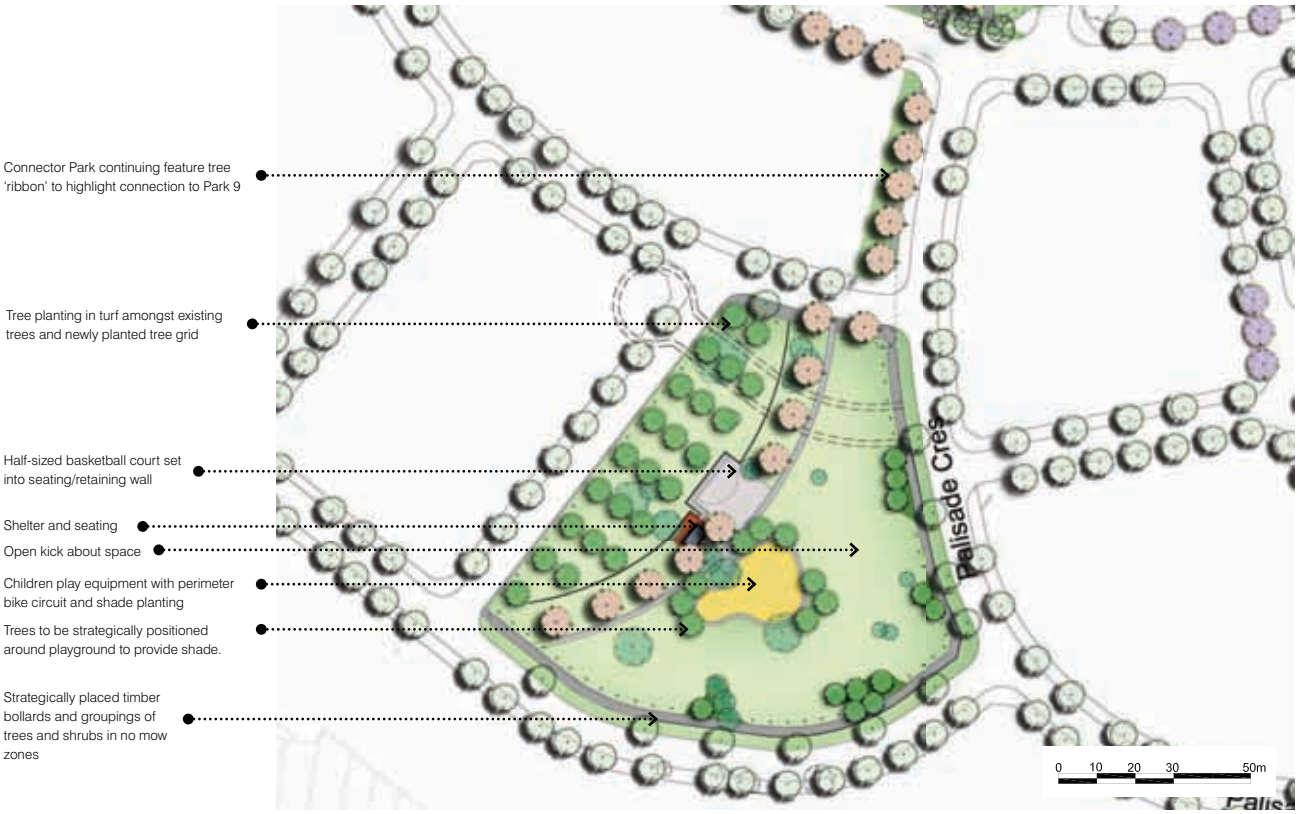

Shade Structure and BBQ
Path
Passive Open Space

Park 9 - Junior Play Park

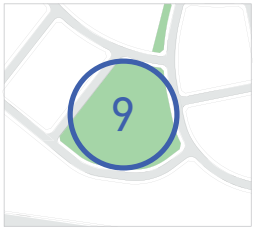
Controls

Park 9 is designed to facilitate the play of younger children through its open space and recreational facilities. The park also creates a green link to Park 8. The Park includes:

- The retention and expansion of existing tree groves;
- 1.2m pedestrian path ways as shown;
- 2.5m shareways as shown;
- A feature tree avenue to encourage pedestrian movement and visual connection to Hilltop Park;
- Children's play equipment and bike circuit (0-6 years old);
- Shelter for gathering and seating;
- Public park seating to locations shown;
- Basketball half court;
- Low retaining wall to manage level change in the park and strengthen feature tree 'ribbon.' Also acts as seating wall; and
- Open turf area for active play.



Park 9 Plan



Section A - Junior Park

4.9 Vegetation Management

Adequate vegetation management is critical to the success of the new Masterplan.

Objectives

- To provide a clear strategy for the establishment and on going management of various landscape zones in order to ensure both an ecologically productive and high quality landscape finish in perpetuity;
- To establish landscapes that are readily maintainable, provide high quality aesthetic amenity and recreational / interpretive facilities; and
- To establish a low maintenance landscape areas capable of enduring periods of minimal maintenance and anti-social behaviour.
- Note: a full Vegetation Management Plan (VMP) is not required under the DNR 3A permit regulations, however a VMP has been prepared in support of the VPA.

Principles

- Design and implement formal Water Sensitive Urban Design (WSUD) infrastructure components to perform a variety of functions, including stormwater treatment and erosion and sediment control;
- Restore and enhance bushland and riparian environments using local provenance seed to increase habitat and biodiversity, as well as enhance aesthetic and recreational amenity;
- Plan and maintain a diversity of sporting and recreational opportunities, including multi-use public open space facilities that meet community expectations;
- Design quality streetscape environments that encourage street activity, promote transitional spaces between the private and public domain and improve visual amenity by retaining and increasing streetscape vegetation; and
- Ensure that the design and management of landscape zones considers local environmental constraints, water use minimisation, management of stormwater processes, social equity, and economic viability.

Vegetation Management Plan

4.10 Shade Structures and Amenities

Objectives

- To provide places of shelter and rest at locations in the public domain that reinforces surveillance, are highly accessible and provide a visual character and identity for the estate;
- To build upon the character of the estate through repeated use of sympathetic materials and designs (line, colour, texture and form) that form a consistent visual language across various site objects e.g. furniture, shade structures, bridges and the like;
- To provide a variety of shelters suited to various uses;
- To provide structures in the public domain that support the functioning of sporting and general recreational use; and
- To provide community meeting places.

Principles

- Shade and seating structures are to be located in highly visible locations and provide good surveillance of that park in which it is located;
- Structures are to maintain an open character unless incorporated into a retaining wall system; and
- Structures are to be constructed from resilient and hard wearing materials and provide easy to clean surfaces to minimise vandalism.

Guidelines

- Each park is to feature at least one shade and seating structure to provide architectural focus for that park;
- Structures are to meet the ground with no raised foundation;
- Structured are to be simple steel framed skillion roofed structures with vertical or near vertical uprights; and
- BBQs to generally be located with shade structures and formal picnic seating.

1. JAMBOREE SHELTER

Jamboree shelters are designated to the prime estate gathering points. Located at the civic area of Park 2 and Park 8. The design maximises pedestrian flow and external views. The Open space will allow use by multiple families for picnics and watching children from closely related recreational facilities.

2. FEATURE SHELTER

The feature shelter is designed for smaller scale locations such as Junior, Village and Forest park. The inclusion of retaining walls provides a sense of enclosure and extended seating areas. This shelter helps create spatial boundaries but still allowing free flowing use.

3. CLASSIC SHELTER

The classic shelter will be used through out the Valley Creek Park system. This smaller shelter will be situated with different recreational areas to provide shelter from the elements. It will also act as marker for the allocated recreational areas. The shelter's open flow allows various individual or family opportunities.

4. BUS SHELTERS

Bus shelters are to be strategically placed through out the estate along main bus routes. The structures will be created from durable material to address potential vandalism but will still provide critical wall transparency for user views and safety.

Shade Structure and Amenities Location Plan

5. AMENITIES BLOCK

Bonnyrigg Amenities block caters for the Lower Valley Creek Sports Park. The facility provides changerooms, toilets for players and spectators of the sports fields as well as for general community park use. The simple structure allows for natural ventilation and can be easily locked when required. The facility will also provide storage space opportunities for items such as general maintenance equipment.

6. BBQ

BBQs to be located with selected Shade Structures providing cooking facilities to high use park areas.

4.11 Furniture

Objectives

- To provide a range of furniture at strategic locations to provide rest and amenity for park users and to meet the various recreational requirements for each location;
- To build upon the character of the neighbourhood through repeated use of sympathetic materials and designs (line, colour, texture and form) that establish a consistent visual language across various site objects (e.g. furniture, shade structures, and bridges, etc.);
- To provide a robust yet comfortable suite of furniture that is resistant to vandalism and anti-social behaviour;
- To provide equal access and function to all; and
- To potentially incorporate community art designs into site furniture.

Principles

- Locate formal seats associated with pedestrian paths. All seating to be located with consideration of accessibility and views to maximise surveillance and safety from seated position;
- Locate feature seats at civic meeting points in strategic locations to provide higher quality and unique setting;
- Locate informal seats in broader landscape or picnic areas;
- Combined picnic tables and seats generally to be located with shade structure;
- All formal seats are to be set on a concrete footing and be generally accessible from a hard stand surface to provide level access; and
- All informal seats to be located on turf or other free draining surface.

Guidelines

- Provide a suite of furniture that responds to formal, feature and informal requirements;
- Bubblers to be located in locations shown; and
- Bollards to be located along park boundaries with roads to restrict unwanted vehicle access where required.

1. FORMAL PICNIC BENCH

Table and chairs are generally situated with shelters to provide seating and eating facilities. Always located on concrete footing.

2. FORMAL SEATING

Formal seating to be provided on major pedestrian paths to open spaces.

3. FEATURE SEATING

Feature seating to highlight major pedestrian gathering and entrance points and provide a unique celebration of a specific place.

4. INFORMAL SEATING - TIMBER AND STONE

Low sandstone blocks and timber logs associated with the creekline and more informal locations provide a cost effective seating solution.

Furniture Location Plan

5. INFORMAL SEATING - WALLS

Informal retaining walls double as seating walls.

6. BUBBLERS

Bubblers to provide drinking water within high use pedestrian parks

7. BOLLARDS

Bollards are to be located where roads meet park edges.

4.12 Sporting and Recreational Facilities

Objectives

- To provide access to sporting facilities in keeping with the SIA;
- To provide access to a variety of recreational and play opportunities in appropriate locations relevant to immediate residents; and
- To provide a mix of both active and passive and formal and informal recreation/play opportunities across the spectrum of age groups.

1. FULL SIZE SOCCER FIELD

The existing pitch is to be retained and upgraded.

The existing sports field lighting is to be retained and relocated.

2. HALF SIZE SOCCER FIELD

The existing soccer pitch is to be relocated and upgraded

3. INFORMAL SOCCER FIELD

Junior field and goals are located in smaller parks for informal matches.

4. KICK ABOUT SPACES

Free open space provide opportunities for broader play.

5A. FULL BASKETBALL COURT 5B. HALF BASKETBALL COURT

5a Basketball Court is existing and to be upgraded.

5b are half courts

1. TODDLERS 1-3

Toddler playgrounds are generally located at quieter areas away from main roads. They are close to viewing shade structures and protected Turf areas.

2. Kids 4-6

Playgrounds for Children aged 4 - 6 are found in the main valley park providing suitable playing structures with surrounding open space.

3. Kids 5-12

Children aged 5-12 are closely associated with teenage playing facilities. This encourages teenage interaction and team games. Challenging play equipment is also provided.

4. Teenagers

Teenagers are provided with both hard and soft surfaced areas, allowing them to challenge themselves on diverse equipment and in team orientated situations. These include mini soccer fields, basketball courts and tennis walls.

Sports Amenities Plan

Playground Facilities

4.13 Public Art

Objectives

- To clearly identify the overall community vision for the future;
- To bring the community together through a range of active, playful and involved processes that strengthen social connections and sense of place;
- To build upon and embody local identity, character and history yet be a symbol of change and of a positive future;
- To provide a vehicle for the expression of the diversity of local community values, aspirations and concerns while ensuring that cultural sensitivities are respected;
- To engender community ownership of the estate as a pro-active measure toward improved safety and environmental care;
- To create dynamism and moments of interest in the fabric of the neighbourhood;
- To explore the potential for art to be integrated into functional items such as shade structures, paths and seating;
- To ensure that all artworks and the processes used to create them are safe and minimise impacts on the environment;
- To ensure that opportunities for vandalism are minimised;
- To integrate artworks across the estate to provide visual links and provide a consistent identity;
- To prioritise the involvement of artists from Bonnyrigg, Fairfield LGA and Greater Western Sydney in both commissioned works and community cultural development projects;
- To generate opportunities for the professional development of emerging artists through selected projects;
- To develop the skills and knowledge base of local residents in the creation of public art through hands on participation on selected projects;
- To establish a process for the selection of artists and artworks that ensures effective consultation and strong community support;
- To identify a staging plan and budget for implementation; and
- To increase access to funding by government agencies, businesses and philanthropic trusts through effective planning.

Public art locations

Public Art Location Plan

4.14 Community Garden

Objectives

- To create the opportunity for the community to participate and engage in horticulture;
- To help people eat well and provide a place to keep active;
- To promote learning about the environment with an understanding of garbage reduction, composting, recycling and water usage;
- To potentially provide a source of employment;
- To promote ownership of the neighbourhood;
- To involve people in protecting and caring about the neighbourhood;
- To teach young people skills;
- To reduce crime and antisocial behaviour;
- To provide a community focus point central to the neighbourhood;
- To ameliorate the reduced allocation of private open space across the neighbourhood, through provision of privately tendered allotments;
- To grow fresh fruit, vegetables, and herbs in a specifically configured space with all necessary facilities provided; and
- To promote residents involvement in compost production.

Principles

- The garden should be driven by and for the community. Early establishment of a management group is required;
- The garden should be co-located with community centre and storage requirements, office, meeting rooms and the like to be included in architectural program (subject to future brief);
- The garden should be allotment style with access along a series of gridded paths;
- The garden should be initially secured with a 2.4m security fence;
- Vehicular access for the delivery of soils etc should be provided for; and
- The garden should include signage inviting all to participate.

Community Centre Plan

4.15 Site Nursery

Objectives

- To provide an opportunity for the community to participate in the production of plant material for use on site;
- To locate the nursery on site in a central and accessible location and to provide all necessary facilities for seedling production;
- To provide facilities for educational workshops associated with the production nursery;
- To partner with an experienced nursery grower to assist Bonnyrigg Partnerships in delivering a high quality production nursery focused on community participation;
- To partner with local Council and employment programs in the development of a social agenda;
- To use the nursery and its produce to screen or buffer unsightly components of the development at various stages;
- To form links between the site nursery and the community gardens when constructed;
- To be temporary and exist for the life of the project only; and
- To provide an opportunity for private or public existing trees to be transplanted and retained in pots until replanting.

Infrastructure

- pumps
- gravel
- fencing
- electricity
- office, sheds, propogation houses, staff amenities
- potting machine, bob-cat, tractors, trailers
- chlorination/disinfection or water treatment tanks
- loading dock
- trucks for transportation
- irrigation
- concrete paths
- wind breaks
- tree support stands
- benches

Considerations

- climate, ie. frost and wind protection
- access for staff and delivery vehicles
- dock area for loading
- water source, type, and storage
- security
- drainage, catchment, and zero run-off
- recycling and water treatment
- orientation and position of nursery
- product mix, sizes, species, volumes, and required area for production
- propogation facilities
- heating and cooling
- OH+S liabilities






4.16 Hardscape Materials

Objectives

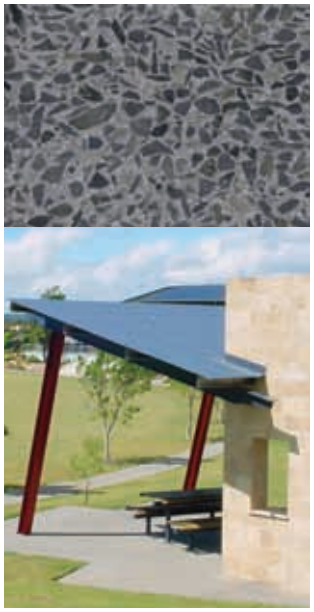
- To provide simple and hard wearing surfaces appropriate for pedestrian and bicycle movement and various recreational requirements;
- To create a family of materials and a language of use consistent across the neighbourhood;
- To maximise use of recycled materials from demolition of existing infrastructure in new landscape hardscapes; and
- To celebrate connection across the neighbourhood from east to west.

Guidelines

- Feature paving to utilise blocks of concrete and brick recycled from on-site demolition to form new surfaces. These are to be associated with shade structures in parks and combine with higher grade concrete surfaces to establish places of higher quality material;
- Higher grade concrete surfaces to be located in gathering places, and shade structures;
- Standard brushed concrete surfaces are to be used for all other pedestrian paths; and
- Bridges to be constructed from pre-cast concrete and exhibit similar proportions to entry markers (refer way finding and signage). Handrails to be avoided.

Feature paving

Quality concrete finish



Standard concrete finish

Bridges/ Crossings

Bitumen Sports/ Carparking

Crusted and graded roof tiles and house bricks

4.17 Lighting

Principles

- Provide a good standard of lighting;
- Lighting to comply with Australian Standards for public lighting AS1158;
- Lighting that illuminates pedestrian areas as well as roads;
- Provide high quality lighting, which will not conflict with plating or create large areas of shadow;
- Light poles and fittings to be consistent with other site elements to form a family of site objects in tune with both the architecture and environment;
- Lighting design and placement to illuminate potential areas of concealment;
- Lighting to be provided in areas of high public use, with type and design of lighting dependent on need, location and use;
- Pathways, driveways, building entrances and exits and common external spaces should be well lit; and
- Bollard top lighting to be avoided where possible.

4.18 Requirements of the Lighting System

Visual Tasks and Requirements

Lighting is generally provided for a number of different reasons - most importantly to enable users of a space to carry out a number of visual tasks.

Orientation and Wayfinding

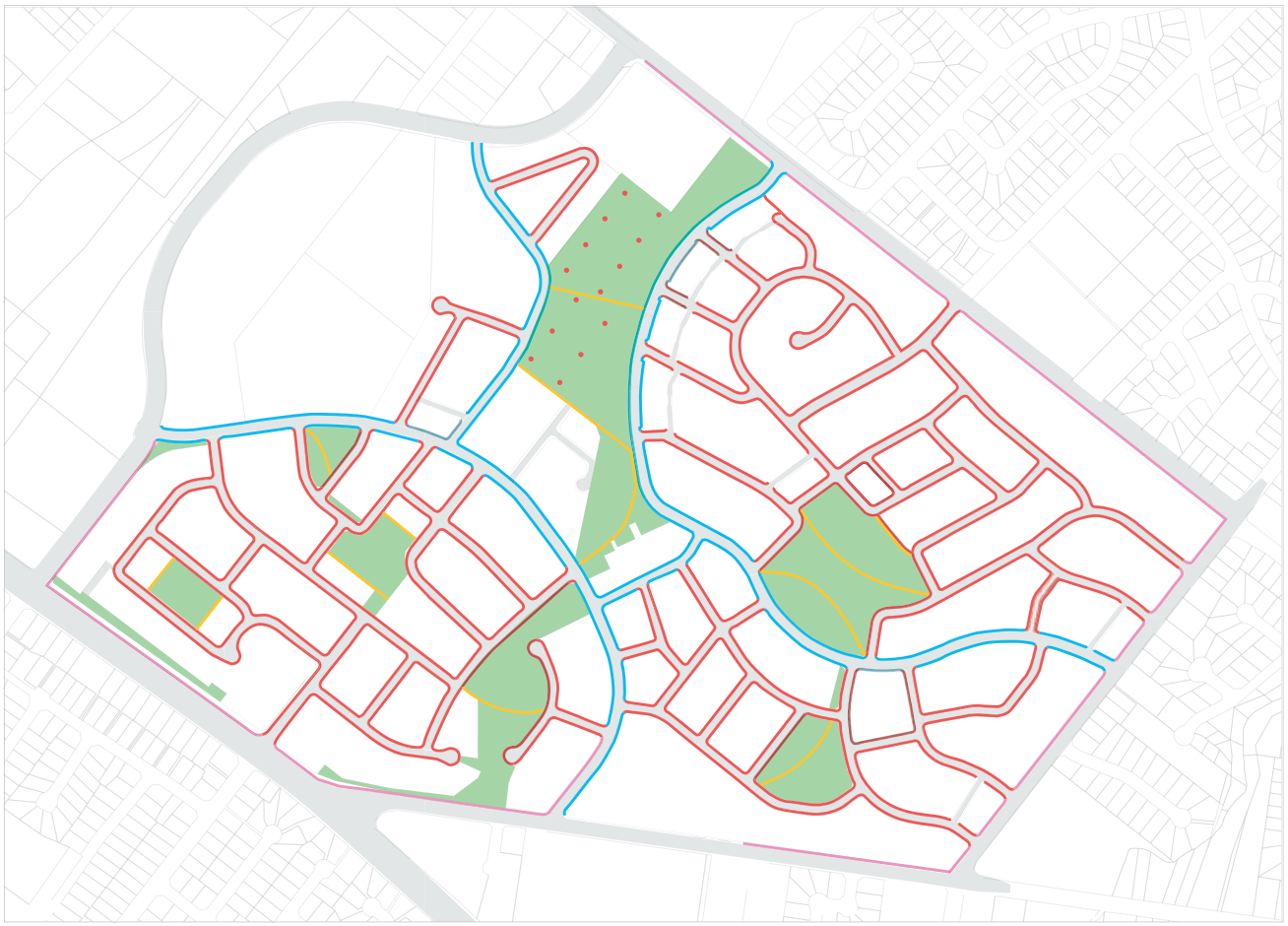
In streetscape environments lighting provides both pedestrians and road users with the ability to navigate their way through the area. Therefore, the lighting system needs to provide an adequate level of lighting beyond their immediate surrounds and along the routes that they are to take. The lighting needs to illuminate not only the horizontal plane of the pathway/road but also sufficient vertical elements to enable to user to distinguish where they are and any potential obstacles.

Specific task areas

There are also parklands and sporting facilities within the Bonnyrigg Living Communities for public use. Lighting should be provided in these areas suitable for carrying out the specific activity intended. For example a football pitch should only be provided with lighting appropriate for playing football where it is specifically intended that the pitch be used during the evening.

Safety

Lighting systems need to provide illumination to the surface of paths and roadways, as well as to vertical elements such as people. Additionally, glare needs to be controlled so that potential hazards are not obscured.



Existing Lighting

Collector (P2)

Local Road (P3)

Cycleway/Footpath (P2)

Sports Field Lighting

Note
To be read in conjunction with lighting strategy

Indicative Lighting Plan

Security

Lighting has a significant part to play in the security of people and property. When people feel that they can be seen, their sense of personal security is increased. Likewise, the perceived risks to a potential attacker/vandal/thief increase related to the likelihood of being observed. The lighting provided should not only light the horizontal surfaces such as the roadway and paths but also provide lighting in the vertical plane so that facial features can be distinguished and potential targets for property crime are illuminated.

Regulations and Standards

- All external lighting design should comply with the most current versions of the following regulations and standards;
- Australian Standard Series 1158 – Lighting for Public Roads and Spaces;
- AS 4282 Control of the Obtrusive Effects of Outdoor Lighting (where applicable). AS 4282 in general does not apply to lighting for public safety however there may be areas where this will apply (e.g. carparks);
- Crime Prevention Through Environmental Design (CPTED) – assessment requirements;
- Fairfield Council requirements; and
- Integral Energy Lighting Design requirements.

The network connection design part of any lighting forming part of Integral Energy's public lighting network must be carried out by a lighting Level 3 Accredited Service Provider. These requirements are not detailed as part of this Masterplan.

The lighting design of any lighting forming part of Integral Energy's public lighting network must be carried out by a full member of the Illuminating Engineering Society (IES) of Australia and New Zealand.

Aesthetics

Lighting and the lighting equipment will contribute to the aesthetic of any installation, both night and day. Therefore it is important that the aesthetics are considered as an integral part of the design.

Day time

The lighting fixtures and associated equipment, such as lighting poles, will have a significant impact on the visual presentation of an area during the day. Choice of fixtures and positioning of equipment is critical in contributing in a positive way to the appearance of the overall streetscape.

Nigh time

Lighting will affect the way an environment looks and feels to users and observers of the area during the night. The following questions should be addressed when evaluating the effectiveness of night time lighting:

- Is the lit area a comfortable space to be in?
- Does the colour feel natural?
- Does the lighting enhance the forms of the landscaping or architectural elements?
- Does the lighting provide drama and interest or does the space feel over lit and/or flat?

These are all important aspects to the aesthetics of a lighting design and can affect whether an area is used in the evening as intended or not. Lighting has the potential to encourage use of a space or repel users away from it in a way that can be quite separate from the security or perceived security of the area. The aim is to provide attractive lighting that enhances the area whilst maintaining good visibility and sense of security.

Environmental Impacts

The impact of lighting on the environment ranges from emissions as a result of energy use to light pollution (sky-glow). Environmental considerations are important in the overall lighting strategies of today's modern developments. Efficient light sources, effective luminaries, sensible levels of illumination, and a strategic approach to system maintenance are all significant factors.

This Masterplan addresses the impact of lighting systems on the environment through the following considerations:

- Selection of high efficacy, long-life lamp types;
- Limiting the selection of luminaries to those which are considered efficient and of high quality;
- Luminaire selection which aims to limit spill or waste light. Generally, full cut-off reflectors should be used;
- Selection of levels of illumination which enhance the night-time aesthetic without 'over-lighting';
- In some cases opting to not light areas considered to be minimal-use or low-risk security areas;
- Limiting the use of general flood lighting or up-lighting;
- Pole and luminaire specification which assists with ongoing maintenance requirements of the lighting system; and
- Thoughtful positioning and pole height selection in order to gain more out of the light sources to achieve the required result.

4.19 Operation and Maintenance of Lighting System

One of the most important functions of any lighting system is to provide a minimum amount of light for the safe use of the area. As the light output of luminaires deteriorates as the lamps age and the luminaries become dirty it is therefore critical that the lighting design is referenced to a realistic maintenance regime to ensure that the light levels remain acceptable between scheduled maintenance.

Further, it is important that the lighting equipment is maintained as per the manufacturers recommendations and that lamp and equipment failures and damage are promptly rectified. This aspect of the maintenance however is beyond the scope of the design except in so far as that the design should utilise equipment which is of good quality, long design life, suitable for the intended environment and as vandal resistant as practicable.

Where street lighting forms part of the Integral Energy lighting network, maintenance will be carried out by Integral Energy. Maintenance of private, public area lighting installations, such as sports fields or landscape lighting will be the responsibility of Becton Property Group and later Fairfield Council, unless express approval with the supply authority is granted.

Final lighting designs for Bonnyrigg Living Communities must take into account the intended maintenance regimes agreed with Becton Property Group, Integral Energy and Fairfield Council.

4.20 Lighting Masterplan

Area Lighting Approaches

The following should be referenced with the masterplan lighting strategy plans for appropriate classification.

Street lighting

Street Lighting within the community will be provided in accordance with AS1158.3.1 – P Category Lighting.

Pathway lighting

Pathway Lighting shall be provided in accordance with AS1158.3.1 – P Category Lighting.

Parkland Lighting

Whilst there are no specific lighting standards requirements / category for general park lighting, park areas seen to be of high-risk will be lit to a low level to discourage anti-social behaviour at night by increasing visibility as recommended by the CPTED report.

Sports Facilities

Should lighting be required through amenity, sports facilities will be lit according to the appropriate standards for the type and usage of each facility. Sports lighting shall be controlled via photocell and timer so that it is not inadvertently left on all night. Sports lighting designs must also minimise spill and glare to neighbouring properties.

Entries to the Estate

Entries to the Estates will be provided with suitable feature lighting to highlight the rejuvenation of the area and to encourage a sense of community.

BBQ Areas / Social Facilities

Whilst there is no specific lighting standards requirements or category for BBQ areas, selected facilities of high-risk will be lit to a low level to discourage anti-social behaviour at night by increasing visibility as recommended by the CPTED report.

Playgrounds

Whilst there is no specific lighting standards requirements or category for playgrounds, selected facilities of high-risk will be lit to a low level to discourage anti-social behaviour at night by increasing visibility as recommended by the CPTED report.

Amenities Buildings and Areas

The external areas surrounding amenities and civic buildings will be lit to discourage crime and provide and focus point to the central civic building area.

Bus Shelters

Bus Shelters will be provided with lighting integral to the shelter structure for increased safety and identity.

Housing

The external lighting design of the housing will be co-ordinated with the public lighting to ensure safe entry to dwellings.

Lamp types and colour

It is envisaged that high efficacy “white” coloured light generally be used across the site in the form of fluorescent and metal halogen lamp types.