



**DRAFT**

**GREENER**

**PLACES**

**DESIGN**

**GUIDE**

Open Space for Recreation  
Urban Tree Canopy  
Bushland and Waterways

GOVERNMENT  
ARCHITECT  
NEW SOUTH WALES



## Design principles for NSW

Four principles help deliver green infrastructure in NSW.



### Integration

combine green infrastructure with urban development and grey infrastructure



### Connectivity

create an interconnected network of open space



### Multifunctionality

deliver multiple ecosystem services simultaneously



### Participation

involve stakeholders in development and implementation

## Disclaimer

Implementing the Greener Places Design Guide framework will require new governance arrangements, collaborations, and the identification of roles and responsibilities.

This guide attempts to set out such a framework but it should be noted that all roles and responsibilities, suggestions for “interagency” bodies, and the commitment of resources by State or local government are yet to be agreed and are included for discussion only.

## Feedback

This draft guide is being released for formal consultation, and we welcome feedback on the content which will inform the new Design and Place SEPP being developed in 2020.

Please tell us what you think and what you are doing. Share best practice, opportunities, and priorities with our team.

**government.architect  
@planning.nsw.gov.au**



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Sw**



**The Draft Greener Places Design Guide framework provides information on how to design, plan, and implement green infrastructure in urban areas throughout NSW. The draft guide provides a consistent methodology to help State and local government, and industry create a network of green infrastructure.**

Greener Places explains green infrastructure, why we need it, and the benefits of providing it. The major components that make up the green infrastructure network fall into three categories:

- **Open space for recreation:** green infrastructure for people
- **Urban tree canopy:** green infrastructure for climate adaptation and resilience
- **Bushland and waterways:** green infrastructure for habitat and ecological health.



**SUPPORTING DRAFT GUIDE**

Open space for recreation  
Urban tree canopy  
Bushland and waterways

**Open space for recreation**

This guide provides a framework for improved public open space planning. It outlines the delivery of better quality, easily accessible open space for recreation that keeps pace with expected population growth and increased density in urban areas.

**Urban tree canopy**

This guide provides recommendations for planning and improvement in urban tree canopy. It addresses all levels of government and encourages a collaborative interagency approach. The aim is to empower local government and State agencies to produce evidence-based approaches that preserve and enhance the urban tree canopy.

**Connecting bushland and waterways**

This guide provides a framework for improving connectivity between bushland and waterways supporting habitat and biodiversity in urban areas. It promotes the connection of people to nature within a sustainable environment.

Merewether Baths,  
Newcastle



# Who should use this guide?

Planning for open space and recreation, urban canopy, and bushland and waterways involves a wide range of government and professional organisations including:

- **State government agencies** such as the Department of Planning, Industry and Environment; Office of Sport; Department of Education
- **local government**
- **community organisations**
- **industry professionals** including landscape architects, strategic land-use planners, recreation facility planners, urban designers
- **developers** including government developers and private developers
- **engineers and building professionals**
- **peak industry bodies** in parks, urban planning, recreation, leisure, and the landscape industry
- **businesses**
- **land and asset owners and managers.**

## Premier's Priorities

The Department of Planning, Industry and Environment is responsible for two of the NSW Government Premier's Priorities: **Greening Our City**, seeking to increase the tree canopy and green cover across Greater Sydney by one million trees by 2022; and **Greener Public Spaces** aiming to increase the proportion of homes in urban areas within 10 minutes' walk of quality green, open, and public spaces by 10 per cent by 2023. The Greener Places Design Guide framework supports both priorities with a consistent method to plan for green infrastructure.

## Where can we apply this information?

The information in these documents can be used in a wide range of plans and processes, for State and local government, as well as industry.

### **State**

Coordinating green infrastructure across planning and design, including:

- green plans
- district and regional plans
- place infrastructure compacts
- growth infrastructure compacts
- integrated transport plans
- collaboration areas

### **Local**

Embedding green infrastructure in planning, including:

- local strategic planning statements
- local environmental plan (LEP) and development control plan (DCP) amendments
- open space strategies

### **Industry**

Using guidance documents to support delivery in projects, including:

- master planning
- implementation plans
- urban design frameworks
- spatial frameworks.

This guidance can be applied at various geographic scales ranging from regions and districts to rezoning applications for stand-alone developments in established areas. This guidance is also intended to apply to different urban densities ranging from high densities in cities to lower densities in regional and rural areas.

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NSW acknowledges  
the Traditional  
Custodians of the land  
and pays respect to  
Elders past, present,  
and future. We honour  
Australian Aboriginal  
and Torres Strait  
Islander peoples'  
unique cultural and  
spiritual relationships  
to place, and their rich  
contribution to our  
society. To that end,  
all our work seeks to  
uphold the idea that  
if we care for Country,  
it will care for us.



SECTION ONE

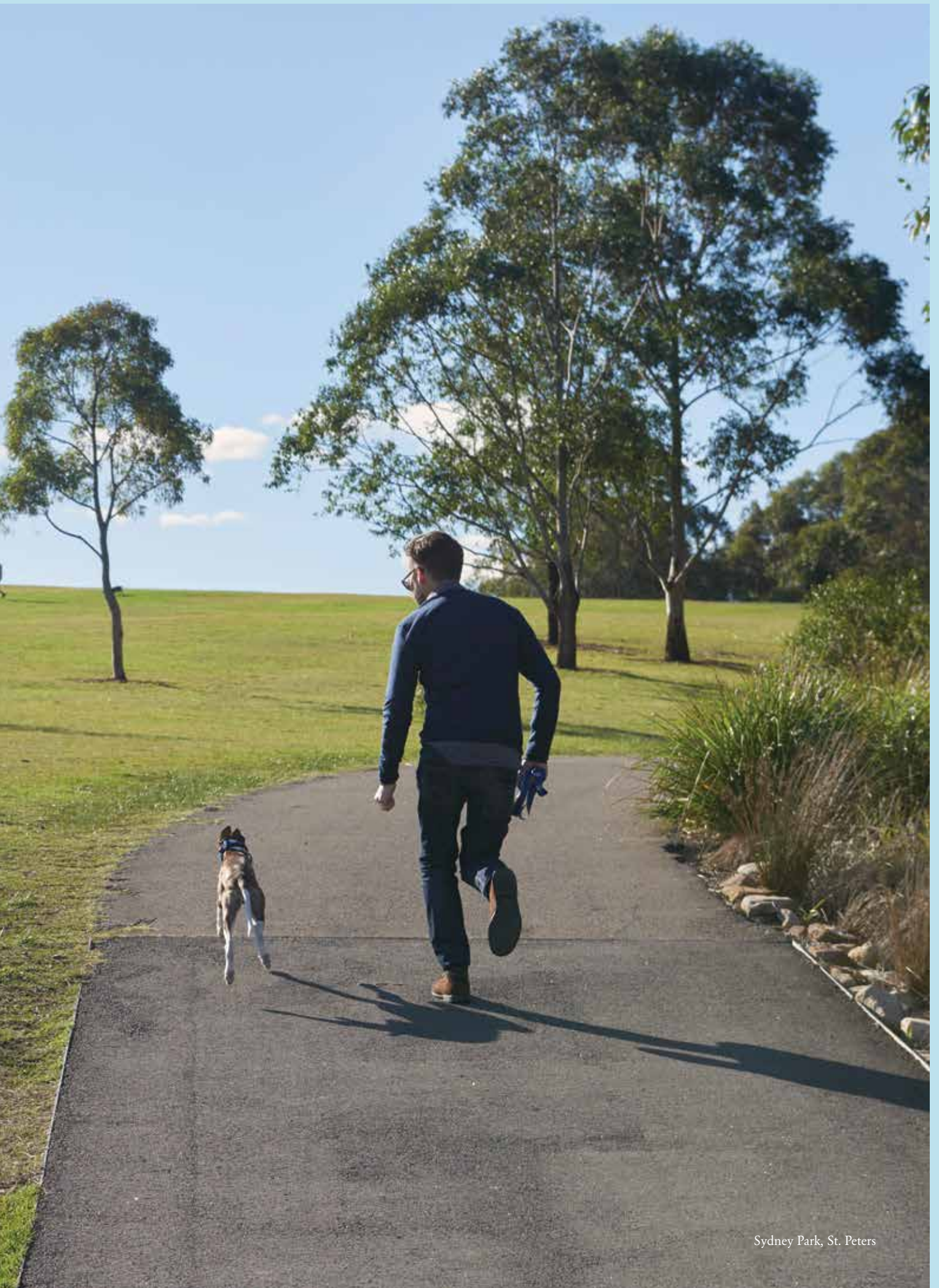
OPEN

SPACE

FOR

RECREATION





Sydney Park, St. Peters



# 1.1

## What is open space for recreation?

**For the purpose of this guide, open space refers to “open” (or not built upon) land that accommodates recreation or provides relief from the built environment.**

Open space can be used for purposes such as personal and social recreation, sport and physical activity, active transport corridors, waterway and riparian corridors, biodiversity and fauna conservation, and visual and landscape amenity. Such settings include natural areas and linkages, foreshore areas, informal parkland, sports grounds and courts, children’s playgrounds, historical sites, formal gardens, and linear walking, cycling, and equestrian tracks.

**Public open space** is open space which is publicly owned and managed by local, State or Federal government and is accessible to the public.

**Private open space** is on private property which is not always accessible to non-owners and non-members, such as privately owned golf courses and racecourses and internal open space provided in unit blocks. Together, public and private open space contribute to the total open space resource in NSW.

**Recreation** covers the broad range of activities that people undertake when engaging in leisure for fun, relaxation, or fitness. Recreation can be undertaken indoors or outdoors, and covers a diverse range of activities that help us to stay physically and emotionally healthy and to interact and connect with our families and our communities.

This guide addresses the provision of **public open spaces** that support outdoor recreation, sport, and exercise. This includes formal sport, self-directed endurance activities, appreciation of nature, socialising, picnicking, walking, and informal group activities, etc.



Public parks and community sportsgrounds



Public gardens



Rooftops



Squares



Reserves



Waterways



Publicly owned forecourts



Plazas

## The importance of open space for recreation

Open space is one of NSW's greatest assets. National parks, harbours, beaches, coastal walks, creek corridors, waterfront promenades, playgrounds, and reserves are integral to the character and life of our metropolitan and regional areas. As we plan for future growth and development, access to high-quality open space will become increasingly important. Our parks and natural landscapes are the places where people can relax, exercise, play, and enjoy our natural heritage and culture. They also provide habitat for wildlife, help mitigate the impacts of climate change, and improve air quality.

The NSW Government is committed to promoting equitable access to high-quality open space to serve the needs of our growing population. Planning, designing, managing, and maintaining open space is a crucial responsibility for any town and city.

With increasing housing demand and community expectations, we need to explore innovative ways of providing open space for recreation that will support active and healthy communities. This guide provides a framework for assessing the values and performance of the urban landscape so we can plan to meet our current and future needs for public open space.



Fitzroy Gardens,  
Potts Point

## 1.2 Planning for recreation opportunities

### Towards a performance-based approach

**With increasing densities and declining land supply, the typical approach of setting aside a quantum of land as part of every development is no longer effective. With urban infill, brownfield development, and higher density development, urban growth is no longer about low-density sprawl and no longer comes with additional land to be apportioned to residential, commercial, and community uses.**

Evidence from around the world for building cities and regional areas around public open space, active recreation areas, green streets, and walking and cycling infrastructure, has repeatedly demonstrated this approach will deliver improved health, social cohesion, vibrant local economies, productivity, and environmental benefits.

Planning that relies on a spatial standard such as 2.8 ha / 1000 people is only effective with high levels of quality control and often works against opportunities for multiple use and innovative solutions. Equally, past approaches such as specifying a percentage of land did not have any direct link to the demand arising from a development, as densities can vary greatly yet the percentage stayed fixed.

Moving towards a performance-based approach encourages planners to look beyond spatial standards or percentages of land area. It encourages consideration of the range of recreation opportunities required and what strategies are available to achieve them. The aim of the performance-based approach is to allow more innovation in planning, more efficient use of land for recreation, and a focus on the quality of the outcome rather than just the quantity.



# 1.3

## Strategies for providing open space for recreation

### 1. Improve the provision and diversity of open space for recreation

The public open space network should include a broad range of spaces and settings including formal parks, undeveloped spaces, natural areas, buffers, linear systems, riparian and waterfront areas, sports fields and gardens within public institutions, and undeveloped land around public infrastructure.

Sydney Park, St.Peters



### 2. Understand the demands on existing open space, and plan for open space in new and growing communities

While effective use of existing parks and other open space areas is encouraged, all parks have a capacity. New demand for open space from increased density or new housing development can impact existing functioning parks. Planning should account for the capacity of an existing asset and set limits on its ability to accommodate new demand.

Stakeholder workshop. Source: NSW ARB.



### 3. Improve the quality of open space for better parks and facilities

Providing adequate quantities of open space based on demand should be understood in relation to the quality of the spaces provided. Open space improvements should be considered especially in urban renewal areas where increases in capacity are possible. Providing quality spaces that are diverse, usable, and accessible can be achieved through better planning and design of the existing network of spaces.

Prince Alfred Park, Sydney



## 4.

### Use open space to connect people to nature

Providing recreation opportunities in outdoor settings that are green and connected to nature is still a primary driver of planning. Predominantly this is about public open space, but public plazas and developed urban open spaces provide a range of opportunities for connection to nature, not the least of which is a softening of the interface between public and private space.

Sydney Park,  
St.Peters



## 5.

### Link to the network of green infrastructure

Developing vibrant towns and streetscapes with a pedestrian-friendly laneway network that connects to open space is essential for usability and access. Defining a pedestrian, cycle, and green network can connect urban centres to local and regional open space.

Glebe foreshore,  
Glebe



## 6.

### Encourage physical activity by providing better parks and better amenity

Providing a public open space network that encourages residents to be physically active and connect with the natural environment is an overriding objective of planning.

Thornton Community  
Centre, Penrith



## 7.

### Provide open space that is multifunctional and fit for purpose

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Multiple use of open space is strongly supported in this approach, particularly where local opportunities can be provided that meet important outcomes such as proximity of access. However, the performance criteria that support this approach aim to ensure that any space used for multiple recreation opportunities is “fit for purpose” and the maintenance and management of that space can be achieved efficiently.

Sydney Park Water Reuse project by Turf Design & Environmental Partnership.  
Source: Ethan Rohloff Photography.



## 8.

### Design versatile, flexible spaces

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Public parks are best provided in a way that allows the space to be versatile, flexible, adaptable, and resilient. Community needs can change rapidly and the most effective parks can be reconfigured in design and function to accommodate changing participation, activities, trends, needs, and preferences.

Parramatta Park. Source: Parramatta City Council.



## 9.

### Consider life-cycle costs, management, and maintenance

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Planning needs to consider “life-cycle” costs as well as the community’s return on the investment. The development cost of public open space should be considered as part of the up-front cost of the infrastructure. This means that sometimes the cost of developing suboptimal land should be balanced against a lower development cost for better quality land for open space, and these considerations tempered with the likely maintenance costs of alternative options.

Sydney Royal Botanic Garden. Source: [www.flickr.com/](https://www.flickr.com/photos/creativecommons/1000000000/). <https://creativecommons.org/licenses/by-cc/2.0/au/legalcode>.









## 1.4 Criteria

Six core criteria can help guide performance outcomes which drive the planning of open space for recreation. All criteria are subject to local precinct considerations:

- **accessibility and connectivity**
- **distribution**
- **size and shape**
- **quantity**
- **quality**
- **diversity.**

The performance-based approach used in this guide defines the desired range of recreation opportunities that can be provided for everyone in the community, and then identifies the performance criteria for successful provision of those recreation opportunities.



### Accessibility and connectivity

**Ease of access is critical for the community to be able to enjoy and use public open space and recreation facilities.**

Open space should be accessible to everyone. Accessibility refers to the physical ability of people to access a place or thing. Accessible design mainly addresses the movement needs of people with disabilities. An inclusion-based approach strives to remove obstacles and barriers that prevent people of all ages, abilities (physical and mental), and cultural backgrounds accessing and enjoying open space. Refer to Everyone Can Play (Department of Planning, Industry and Environment 2019) for more information.

For the community, accessibility is more than being within a certain distance of an open space. Barriers such as road corridors, railways, unsafe areas, drains and waterways can create disadvantages for some residents. Visual access, minimum areas of road frontage, and casual surveillance all contribute to perceptions of access and safety. Connectivity is critical both in ensuring access to opportunities but also in ensuring a diversity of opportunity is available. The Premier's Priority Greener Public Spaces seeks increase the proportion of homes in urban areas within 10 minutes' walk of quality green, open, and public space, and complements the need for accessible and connected networks throughout NSW.

#### **Performance indicators**

##### **Local access**

High-density areas > 60 dwellings/ha 2–3 minutes walk / 200 m walking distance to a local park (barrier free)

Medium- to low-density areas < 60 dwellings/ha 5 minutes walk / 400 m walking distance to a local park (barrier free)

**District access** 25 minutes walk / 2 km proximity to a district park  
District parks also provide local access

**Regional access** Up to 30 minutes travel time on public transport or by vehicle to regional open space  
Regional parks also provide local access and district access



## **Distribution**

**The ability of residents to gain access to public open space within an easy walk from home, workplaces, and schools is an important factor for quality of life. The geographic distribution of open space is a key access and equity issue for the community.**

Distribution of recreation opportunities supported within the public open space network needs to consider both equity and connectivity.

The key issues are proximity and safe access to an opportunity. In most cases this is measured by a walking or travel distance. For local or neighbourhood-level opportunities the ability to access a park or an opportunity within 400 m safe walking distance is the dominant measure. However, in some cases solutions that offer a larger, higher quality park within a longer distance can be appropriate if that access is via a high-quality walkway located within a green corridor, such as a riparian open space corridor or a green street.

In some cases equitable distribution may mean that some residents have a linear open space with recreation opportunities within 400 m and others have a local park.

Distribution needs to consider hierarchy of provision as well. Access to higher order opportunities, such as large regional parks or destination play and picnic spaces, may be considered in terms of travel time on public transport or via private vehicle.

### **Performance indicators**

<b>High-density areas</b> (0.15–0.5 ha public open space)	200 m from most houses
Distance of open space from schools	400 m
Distance of open space from workplaces	400 m
<b>Local distribution</b> (0.3–2 ha public open space)	400 m from most houses
<b>District distribution</b> (2–5 ha public open space)	2 km from most houses
<b>Regional/metropolitan distribution</b> (> 5 ha public open space)	5–10 km from most houses

## **Accessibility vs distribution**

While the performance indicators for accessibility and distribution are similar, accessibility indicates barrier-free walking distance and distribution looks at the range of scales and hierarchy of provision for open space.

## **Definitions**

### **High-density areas**

In high-density areas where there is a population density of greater than 60 dwellings/ha with limited access to private open space, smaller local open space can be provided in closer proximity to dwellings.

### **Local open space**

Caters to a local neighbourhood area in urban areas where users predominantly walk or cycle to use the facility because it is reasonably close to residences. A multi-use local open space may serve a regional small town or village.

### **District open spaces**

Typically service catchments of less than one local government area (LGA), or several neighbourhoods, but can service a catchment spanning across two LGAs. The planning assumption is that users will be prepared to drive up to 30 minutes to access district open spaces in urban areas. Sporting facilities mostly operate at district level.

### **Regional/metropolitan open spaces**

Serve whole cities, metropolitan districts, or one or more LGAs; or a regional centre and multiple towns and villages in non-metropolitan areas.

Users will be prepared to drive significant distances to access regional open spaces and recreation facilities. Regional open spaces can be managed by State agencies, trusts, local governments, and other public bodies.





## Size and shape

**Size and shape of open space has a direct bearing on the capacity of that open space to meet and accommodate recreation activities and needs.**

Open space should be of the dimensions required to be fit for its intended purposes and reflect its urban density context. In higher density areas, size is important to ensure there is sufficient area of open space to accommodate demand.

Active recreation and sport requires specific shapes, dimensions, and boundaries, and suitable topography. While there may be design solutions to enable formal sport or active recreation in suboptimal locations, the cost of making a space fit for purpose needs to be considered.

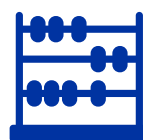
When planning future provision or identifying spaces for formal sporting use, performance measures such as minimum boundary lengths can be a useful quality control to ensure spaces are functional.

### **Performance indicators**

**High-density areas** – the minimum size of a local park is 3000m<sup>2</sup>. In high-density areas, parks are sometimes as small as 1500m<sup>2</sup>. Smaller spaces can provide local amenity but are not adequate for a diverse range of recreational needs. Smaller parks need to be supported by larger open spaces in the network.

**Medium to low density areas** – the minimum size of a local park is 5000–7000m<sup>2</sup>.

Road frontage and visibility are key considerations, especially in high-density areas so open space is accessible for all. Sporting facilities have specific size and shape requirements that need to be met to provide functional space for their use.



## Quantity

**In low- and high-density areas, good provision of public open space is essential to compensate for the lack of private open space to support active living and contribute to a more liveable neighbourhood.**

Quantity is also about capacity, and the community's expectation is that public open space for recreation will have enough area for everyone, and that overcrowding and overuse will not diminish the quality of the experience and the condition of the space.

Investing in increasing capacity can be just as effective as investing in new land and is an alternative response that increases the quantity of opportunity.

Quantity is important when considering the provision of opportunities for organised and informal sport. Minimum size and shape standards apply as do slope and other requirements to ensure safe and functional space for organised sport and active recreation. In addition, participation in sport, organised active recreation, and other group activities means the quantity of provision (i.e. the number of formal spaces) needs to be sufficient to accommodate demand.

### **Performance indicators**

Quantity should be considered in the number of opportunities available. Larger public open space areas mean more opportunities can be provided in one location.

Quantity of land available, along with size and shape, are critical in adequately meeting sporting needs. There are minimum areas needed for different sports, and different sporting spaces can only accommodate so many users.



## Quality

**The quality of design and ongoing maintenance and management is critical to attracting use and activating the open space network.**

Quality is a key driver of both appreciation and use of public open space. Numerous studies have identified that people are far more likely to be active and engage with the outdoors and natural spaces if they have access to clean, well-maintained, shaded, and visually appealing spaces and pathways.

Quality is just as important as adequate quantity. Feedback from many studies indicates the community would much rather limited funds for investment be used for a single high-quality park with a number of activations and opportunities than development of, for example, three smaller parks with basic equipment.

### **Performance indicators**

Open space needs to be strategically planned and designed to create a quality open space network; the sum is greater than its parts. Key characteristics of open space that influence quality include:

- visual and physical access
- landscape setting
- demographic, cultural, and community demand
- condition of facilities and equipment
- maintenance
- number of activations within the space
- size, shape, and topography
- adjacent land uses
- amount of vegetation and shade
- biodiversity outcomes
- safety
- sustainability.



## Diversity

**The range of open space setting types within an urban area will determine the diversity of recreation opportunity for communities.**

Provision of a diverse range of recreation opportunities reflects the diversity of the community. Diversity is important not just in the range of activities but in the settings that create the spaces and places for these activities. Within any urban area, the public open space network should offer both a range of landscape settings for activity and a range of activities.

Diversity of public open space is an important part of contributing to a sense of place within urban environments and for supporting local character.

Having walking or active recreation opportunities along creek corridors in one locale can be complemented by an adjacent opportunity that uses the margins of sports fields or bushlands.

Diversity is also important in the design of public parks. The advantage of having a number of different opportunities (or activations) within a single larger park means a single space can cater for a range of needs and attract a broader user base, which in turn helps to create a sense of community and encourages interaction and social cohesion.

### **Performance indicators**

Performance indicators are outlined for a range of recreation types below. These are not the only types of open space but represent a range of opportunities. They should be combined, as multi-use facilities:

- local play for the very young (LPY)
- local children's play (LPC)
- older children's activity space (OCA)
- youth recreation space (YRS)
- local recreation space (LRS)
- active recreation space (ARS)
- large community outdoor recreation area (LCOR)
- fitness and exercise space (FES)
- trail and path-based recreation (TPR)
- organised sport and recreation (OSR)
- off-leash dog exercise area (DEA).







# 1.5

## Understanding recreation types

The fundamental principle of the improved approach is to consider the range of recreation opportunities that should be provided and then to identify the solutions for providing them within existing public open spaces or in new parks and public spaces.

The solutions presented in this guide are provided as examples, not as the definitive suite of options. There are many ways to meet the outcomes required, and innovation is encouraged.

Darling Quarter playground by Aspect Studios. Image: Florian Groehn.

### Types of outdoor recreation

Different places have different needs. The development of desired recreation types may differ across communities. For example, coastal communities may consider beach and foreshore spaces or activities as part of their required recreation opportunities, while this would not be possible for an inland community where access to riverside recreation may be available.

It is not expected that every recreation opportunity outlined below is provided in its own isolated piece of open space. The opposite is the case. The aim is to find opportunities for multiple activities and uses in current and planned spaces. Often a single large park can accommodate a number of opportunities in a central location and provide both local and neighbourhood opportunities.

1. Local play for the very young	LPY*
2. Local children's play	LPC*
3. Older children's activity space	OCA*
4. Youth recreation space	YRS
5. Local recreation space	LRS
6. Active recreation space	ARS
7. Large community outdoor recreation area	LCOR
8. Fitness and exercise space	FES
9. Trail and path-based recreation	TPR
10. Organised sport and recreation	OSR
11. Off-leash dog exercise area	DEA

\*The categories for children's recreation (LPY, LPC & OCA) can often be combined, as multi-use facilities can often provide greater amenity across age groups.

Planners are encouraged to review these recreation types and criteria to develop further solutions for encouraging communities to participate in a range of recreation opportunities.

Refer to Appendix.

# 1.6

## Planning for different urban settings

### Typical urban settings

In some cases the performance criteria in this guide are tailored for specific urban settings, recognising the particular challenges they present for planning open space recreation. The six typical urban settings are:

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**High-density, inner urban areas** – typically > 60 dwellings/ha and are characterised by attached dwellings (typically terraces) and mixed-use neighbourhoods in the inner areas of Sydney, Newcastle, and Wollongong. The open spaces in these areas are long-established and largely in place. The dominant form of new development is infill; often high-density apartments.

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**High-density areas with high numbers of non-resident users** – typically new mixed-use developments with both high-density residential and significant commercial or retail development. The non-residential uses can generate a substantial daytime population of workers which adds to demand for open space for recreation. Demand from non-resident population can be estimated as 10% of the anticipated resident population.

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**Medium- to high-density redevelopment areas, inner urban, and brownfield areas** – < 60 dwellings/ha and include urban transformation areas in the inner-middle rings of metropolitan centres.

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**Medium-density, outer suburban areas** – the urban form typical of regional cities and towns as well as outer suburbs of metropolitan areas. These areas generally have detached dwellings with increasing infill of medium density.

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**Greenfield, outer urban fringes and expansion fronts** – earmarked for future urban development, either on the metropolitan fringe or in extensions to regional cities and towns. There is opportunity early in the planning process to plan the open space network to meet future needs.

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**Rural areas** – towns and small villages outside Sydney, Newcastle, and Wollongong, and regional service centres.

### Brownfield site and redevelopment areas

Land is often constrained in redevelopment areas and brownfield sites, and there is usually existing public open space that can be considered as part of the supply to meet the desired range of recreation opportunities. Like any land use, a given site can only support a particular level of activity before additional land is needed. The capacity of different spaces to accommodate recreation uses needs to be assessed to determine whether an existing park can meet new demand. When an existing park is at capacity, this should act as a trigger to find new open space, either through conversion of another use, new multiple-use opportunities, or the acquisition of new land.

The existing supply of open space may include formal parks, buffer lands, linear systems, bushland areas and a range of other public land. However, it is important not to overestimate the capacity of an existing asset (i.e. the population that a single park can service). For example, a park which already services a neighbourhood of 3000 residents may not be able to service a future population of a further 3000 just because it is within 400 or 500 m of the new development.

To avoid the possibility of overcount, a measure of capacity is recommended that considers the ratio of park area to population. The table (on the following page) provides the suggested measure of capacity for the main parkland types, which would be considered for meeting the needs of new populations. This table can be used to determine if an existing park or public open space area has spare capacity to service new residents or if it should be considered at capacity, triggering the need for additional land or other solutions.

Regional-scale opportunities such as national parks and large regional park destinations form part of the network of extended-stay destinations. They have a high degree of variability due to multiple reasons for their establishment usually associated with key cultural, historical, or landscape features. Regional parks can contribute to the supply of opportunity, however, measuring their capacity limits is problematic. Where they are being considered for part of the local (walk-to or ride-to) recreation opportunities, consideration should be given to the current intensity of use.

### Example use of capacity measures

The need to provide some local play and open space opportunities for a new development within 400–500 m of houses might identify an existing park of 5000 m<sup>2</sup> that could meet the needs. However if that park already services a population of more than 1500 within 500 m then it can be deemed to be at capacity and an alternative solution will be needed.

While the capacity measure is a useful tool to determine the ability of an existing park to meet new demand, it should not be used as a way of reverting back to a spatial standard. The intent of this planning approach is to plan around opportunity provision first, before considering what the additional land needs are.

### General capacity measures for existing open space under investigation

OPEN SPACE/ RECREATION OPPORTUNITY	CAPACITY THRESHOLD	ADDITIONAL CONSIDERATIONS
<b>Local parks</b> <b>Small parks</b> <b>Pocket parks</b> <b>Small recreation and play nodes in other open space (e.g. bushland)</b>	Small and local parks are deemed to be at capacity if more than 1500 residents to 5000 m <sup>2</sup> of parkland are within 500 m	Access barriers such as railway corridors or multi-lane roads may exclude a population from use.  Some locations may have a high daytime population of workers or shoppers etc. and this demand needs to be considered along with existing residential demand.
<b>District sporting fields</b> <b>Outdoor sporting spaces</b>	In general outdoor sporting land supply would be deemed to be at capacity if the ratio of residential population to area of public sporting land exceeded a rate of 1000 people/ha	Strategies such as providing lighting for synthetic fields may increase capacity. But overall, the amount of participants to be accommodated on a specific area of land is more related to the peak demand times (the times when everyone wants to play sport) rather than the theoretical hours a field can be used.  Capacity can also be augmented with use and development (for sport) of adjacent public land such as schools or car park rooftops.  Although demand may shift with differing demographics, most communities will move through similar cycles with demand peaking with high youth numbers, so planning should consider the likely maximum demand as it is usually very difficult to add more open space after the land has been allocated.
		In high-density areas with a high volume of employment and greatly increased non-resident population, additional supply should be considered to cater for the social sport and fitness activities undertaken by the non-resident population.  In general non-resident demand could be measured at 10% of residential demand.
<b>District parks</b> <b>Larger parks</b> <b>Destination parks</b> <b>Major play and picnic areas</b>	Destination play and picnic spaces service multiple neighbourhoods and may be of varying sizes. An area-based capacity measure for district parks is recommended.  Capacity limits are reached with 5000 people per 0.5 ha within 5 km	Opportunities may exist for intensifying the development of play and picnic opportunities that would accommodate increased use.  Additional capacity may be present in adjacent open space such as that protecting waterways or providing linear or active transport connections.
<b>Trail and path networks</b>	1000 people per km within 800 m	Walking has the highest participation rate of any active recreation. A single path or trail can only accommodate so much use.  Supplementing path and trail networks with additional linkages to urban pathways and to other networks will increase capacity by dispersing demand across a greater network.



## **Greenfield areas**

When planning new developments in greenfield sites, the opportunity exists to plan for a network of well-located and accessible parks and public open spaces that provide for a diverse range of recreation opportunities for all community members and meet the performance criteria for successful delivery. Greenfield sites are changing and can vary significantly in density provision from low through to medium and high-density.

Good planning of the open space network early on often means a more effective use of land can be achieved while meeting the performance outcomes for open space recreation.

### **Key considerations in planning for greenfield areas:**

- Understand the natural systems and key natural and cultural landscape features that the urban area is being planned around. Planning open space for recreation considers how enhancements to this network can provide for recreation uses.
  - Natural systems will include ridge lines, bushland corridors, waterways, foreshores, and important natural areas. These offer opportunities for path and trail links as well as a range of landscape settings for different opportunities. Natural systems are invaluable in defining local character and offer opportunities for active transport connections and integrated open space planning that supports water-sensitive urban design and local habitat conservation.
  - Cultural features can include aboriginal and non-aboriginal items. The *Environmental Planning and Assessment Act 1979* (EP&A ACT) requires the sustainable management of built and cultural heritage, including Aboriginal cultural heritage.
- Analyse land capability to identify potential locations for open space that would meet the land quality.
- Establish the open space and green space framework that you are working with by determining what the core open space network is for the proposed development
- Use performance criteria (see Section 1.4). to provide for adequate open space and recreational opportunities.
- Use the principles of Greener Places to determine opportunities for connectivity, active transport, and diversity of settings that supports a successful public open space network.
- Use the bushland and waterways and urban tree canopy guidance to plan for a green infrastructure network that protects existing green space, improves the quality of green spaces for recreation opportunities and biodiversity, and enhances and connects to the network of green space.

## **Desired outcomes**

The desirable outcome in greenfield areas is to base the public open space framework around natural systems. This will provide opportunities for connectivity, active transport, and diversity of settings that support a successful public open space network. The green infrastructure framework should be complemented by additional areas of public open space that provide for a range of active uses such as sport, active recreation, and exercise.

In addition, natural systems are invaluable in defining local character. They offer opportunities for active transport connections and integrated open space planning that support water-sensitive urban design and local habitat conservation, as well as promoting walkable environments for the health and wellbeing of its inhabitants.

### **Parkland provision: hierarchy of service**

When planning new developments, the public open space network will include a range of parks serving different catchment sizes – a hierarchy of service. Typically, the further up the hierarchy, the larger the park is and the more diverse the range of opportunities within that park. The parkland hierarchy of service broadly corresponds to the planning for recreation opportunities.

Local parks will provide most of the local opportunities. Higher order parks will generally also fulfil lower order opportunities for the immediate neighbourhood (i.e. a district-level park also provides local-level opportunities).



Lizard Log Playground,  
Western Sydney  
Parklands, by  
McGregor Coxall.  
Source: Simon Wood.

### Typical hierarchy of parkland provision

PARK TYPE	TYPICAL OPPORTUNITIES	EXAMPLE DESIGN SOLUTIONS
<b>Local park</b>	Local play and recreation opportunities	Local park of 5000 m <sup>2</sup> with 50% road frontage and functional space for informal activities
<b>Linear park / open space corridor</b>	Recreational and active transport pathways	Large creekside linear park with a minimum of 20 m from top of bank and not steeply sloping
	Linkage to formal parks	Multiple entry points and minimum 50% road frontage or public space access
	Minor recreation features such as seats	
	Active opportunities such as fitness equipment	
<b>District park</b>	Local and destination play	District park of a minimum 2 ha with 50% road frontage and large usable areas for active recreation
	Picnic and gathering spaces for groups	
	Large active spaces for youth	
	Recreation spaces	
<b>District sport precincts</b>	Provision of formal, developed playing areas for field and court sports and built sporting facilities	10+ ha site with multiple fields and courts and built facilities supporting formal use such as clubhouses, change and amenities buildings, on-site parking, access networks, and buffer spaces to adjacent uses
<b>Regional/ metropolitan / citywide parks</b>	Large group spaces	Large destination parklands of more than 5 ha focused around a key landscape feature such as a riverside or central reserve
	Picnic and barbecue facilities	
	Large destination play	Multiple spaces and activities and highly accessible
	Key landscape features	
	Path and trail-based recreation	
<b>Regional/ metropolitan / citywide sporting precincts</b>	Long-stay facilities	Large precincts of 20+ ha with a number of focus zones for different sporting-use types (e.g. rectangular fields, ovals, outdoor courts, indoor sports)
	Large multi-sport destinations where sports organisations conduct major competitions and use multiple playing surfaces for each code	
		Shared access and parking nodes supporting multiple clubs with their own built facilities such as clubhouses and change rooms





Sydney Park, St.Peters

# 1.7

## Fit for purpose

A core issue in this performance-based planning approach is ensuring that any land proposed for recreation use is fit for purpose.

### Site quality performance criteria to assess site suitability and intended purpose

<b>HAZARDS AND CONSTRAINTS</b>	<p>Land must be free of hazards and constraints to community use. Unacceptable land includes land:</p> <ul style="list-style-type: none"> <li>— listed on a contaminated land register or environmental management register</li> <li>— known or suspected to be contaminated</li> <li>— under high-voltage powerlines or within 50 m of the line easement</li> <li>— where community use is constrained by easements</li> <li>— constrained by proximity to noxious uses.</li> </ul>
<b>MINIMUM WIDTHS</b>	<p>Land should be greater than 15 m wide (excluding the width of any creeks or waterways measured from top of bank) unless it is part of a linkage or minor entry point, then 5 m minimum width applies.</p> <p>Land for sporting use must generally be 150 m or greater for any dimension to allow for proper orientation of fields or courts.</p>
<b>SAFETY AND DESIGN</b>	<p>All location and development of public parks and community facilities should consider crime prevention through environmental design (CPTED) principles and any design guidelines for public spaces and facilities adopted by council.</p> <p>In general all public open spaces should have a minimum of 50% road frontage or combined road and public use area e.g. major foreshore and multi-use pathway, or plaza and shopping or retail precinct.</p> <p>Linear systems should have at least 25% road frontage with no section of road frontage less than 50 m.</p>
<b>BUFFERS AND ADJACENT LAND USE</b>	<p>Parks should consider adjacent land uses and be adequately buffered from incompatible uses. Solutions may include vegetation corridors, planted mounds, and fencing.</p>
<b>CONSTRUCTED DRAINS AND FLOODING</b>	<p>Constructed drains and overland flow paths are not suitable for parkland.</p> <p>Detention and retention basins are not suitable for parkland or active sport or recreation unless their design meets suitable criteria for dual or multiple use for drainage open space.</p> <p>Land for active open space may be situated on land which is periodically inundated if it is well-drained. Sandy soil rather than clay soil is preferred.</p> <p>Clubhouses and other substantial buildings should be located on the higher elevation of the site preferable above 1% annual exceedence probability (AEP). Buildings associated with open space (public toilets, kiosks, etc.) may be located in areas with higher flood frequency.</p>



SECTION TWO

# URBAN TREE CANOPY





Fitzroy Gardens,  
Potts Point



## 2.1

# What is urban tree canopy?

**Urban tree canopy refers to all trees on public and private land within urban areas. This comprises a variety of tree types such as exotics, natives, deciduous trees, and evergreens occupying a range of environments from busy city centres to regional main streets and suburbs.**

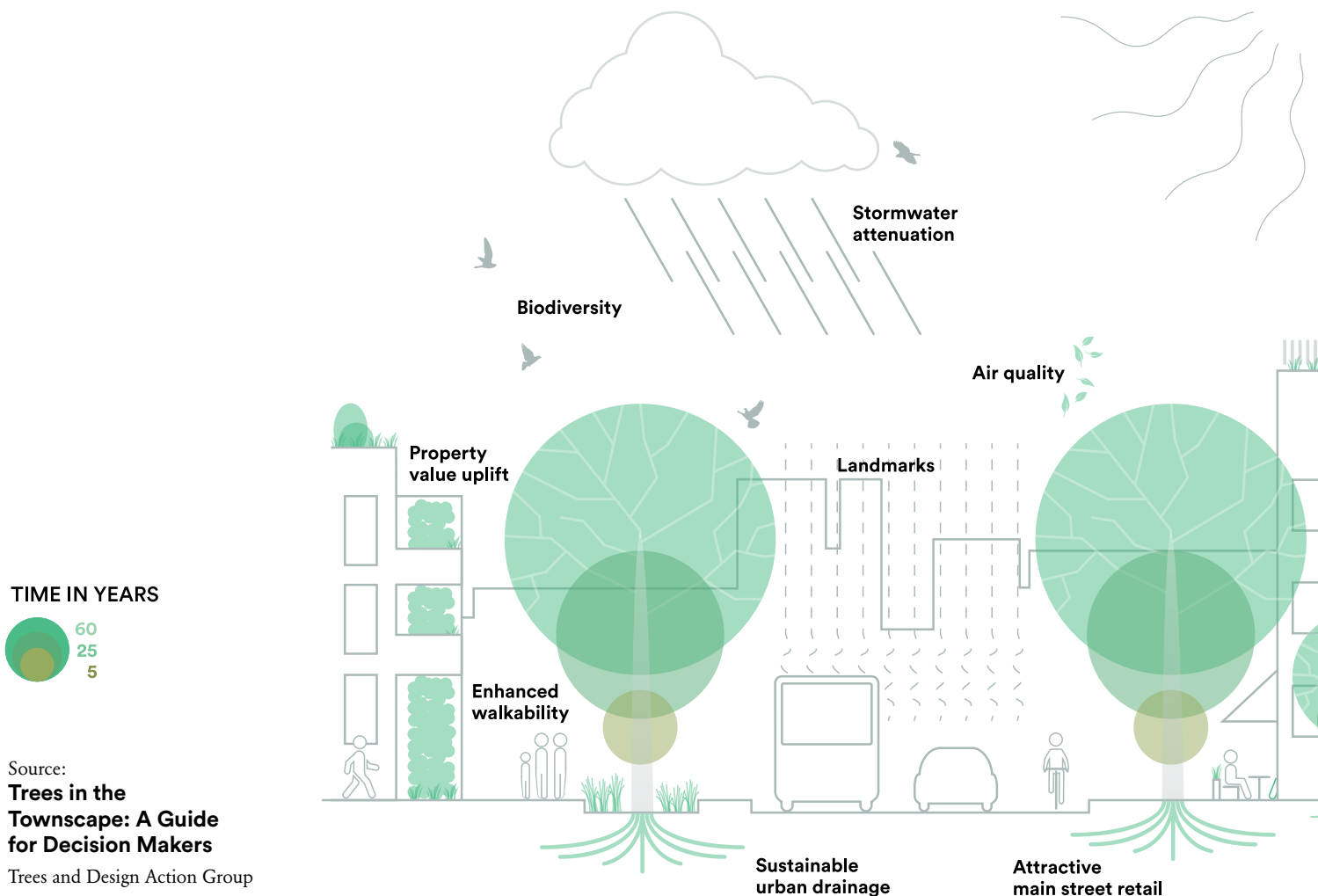
Urban tree canopy can be found within public parks, squares, and plazas, in street verges, rail corridors, creek embankments, campuses, and private gardens. Urban tree canopy is an important part of green infrastructure, enabling linkages to occur in a small footprint.

### The importance of urban trees

Urban trees have a critical role in creating healthy cities. They provide shade and shelter, improve air quality, absorb carbon and rainfall, cool local environments, and support wildlife. Trees contribute to attractive urban places, providing seasonal variation and creating memorable landmarks. The network of trees in our cities plays a critical function, and provides an array of benefits.

#### **Economic benefits**

The economic benefits of the urban tree canopy have been measured in a range of studies. The existing urban tree canopy in 10 global cities was found to provide on average US\$482 million per year in savings through improved air quality, avoided stormwater processing by wastewater facilities, heating and cooling savings, and carbon dioxide sequestration. Planting more urban trees could nearly double the benefits<sup>1</sup>. The combined benefits of urban trees are vast. Urban trees in the United States have been estimated to store 700 million tonnes of carbon<sup>2</sup> and establishing 100 million mature trees around residences could save about US\$2 billion annually in reduced energy costs<sup>3</sup>.





Urban trees can provide economic benefits for individual households. Recent Australian studies have found that on average, a 10 per cent increase in tree canopy cover on adjacent streets, parks, and reserves adds about A\$14,500<sup>4</sup> to a property's value, and a street tree in the front verge of a property can increase the median property price by A\$16,800<sup>5</sup>. Economic benefits can also be provided through the tree shade which can reduce electricity costs. Mature street tree planting can provide more than A\$400 in electricity savings over one year from direct shading to homes<sup>6</sup>.

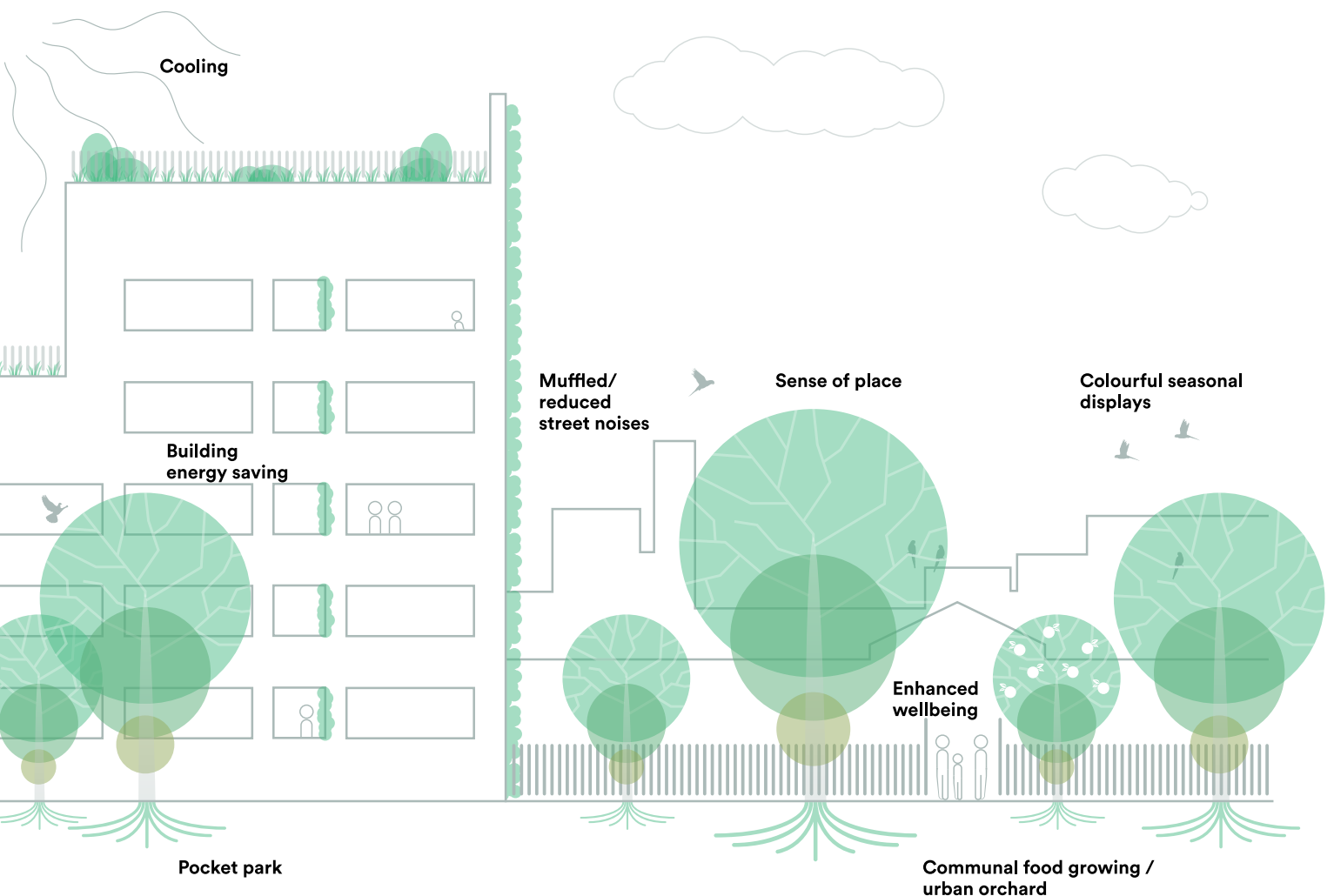
#### Improved health and wellbeing

The role of trees and greenery in improving physical health and wellbeing is another significant benefit. Improving air quality provides significant benefits to human health. Trees in the United States for example, removed 17.4 million tonnes of air pollution in 2010, with human health effects valued at US\$6.8 billion<sup>7</sup>. Research has found that having 10 or more trees in an urban block can reduce instances of obesity, hypertension, and heart conditions in residents, making them feel seven years younger<sup>8</sup>. Access to urban greening and trees has been shown to reduce stress<sup>9</sup>, and improve cognitive function and mental health<sup>10</sup>.

#### Urban trees and the heat island

Trees can play a role in moderating and reducing the urban heat island. The urban heat island is the phenomenon of increased temperature in urban areas, caused by loss of vegetation, changes in built form, and increased areas of dark impervious surfaces such as asphalt.

Tree canopy can reduce urban temperatures and improve air quality<sup>11</sup>. Trees influence climate by transpiring water, changing wind speeds, shading surfaces, and modifying the heat absorbed by urban surfaces<sup>12</sup>. In a study of Los Angeles, city blocks with 30 per cent tree cover were found to be up to 2.7°C cooler than areas with 1 per cent trees<sup>13</sup>.



## 2.2 Improving the approach

**The guide proposes an improved approach for NSW, outlining the strategies and indicative targets to achieve improved canopy cover across the Greater Sydney Region, and other urban areas across NSW.**

University of Sydney,  
Sydney

As more and more people live in high-density environments with no backyards, the importance of high-quality green space is paramount. Tree-lined streets and footpaths which promote connectivity are important in denser urban areas. This is not a city-centric challenge, but a suburban and regional challenge too. All of NSW is growing, and tree canopy targets need to be promoted throughout NSW to improve the lives of its inhabitants.

The improved approach for NSW looks to develop coordinated statewide action, setting minimum standards and targets, along with guidance to support this implementation plan.





## 2.3 Strategies

### 1.

**Protect, maintain, and enhance the existing urban tree canopy, to:**

---

improve the quantity and quality of the urban forest

---

provide a higher quality public domain

---

define precincts and links with history

---

contribute to character and sense of place.

Image: Fitzroy Gardens, Potts Point



### 2.

**Create an interconnected urban tree canopy across NSW, that:**

---

assists in climate mitigation and adaptation

---

reduces the urban heat island

---

improves health and wellbeing

---

supports healthy ecosystems and improves biological diversity

---

improves urban ecology

---

uses water-sensitive urban design (WSUD), improving soil moisture and water quality

---

links green spaces through the green infrastructure network.

Image: Glebe Foreshore



### 3.

**Build knowledge and awareness of urban tree canopy across State and local government, and the community, by:**

---

positioning Greater Sydney and NSW as a leader and facilitator

---

developing information and resources for use by all parties

---

increasing Australian-based urban tree canopy research and development

---

increasing the public profile and understanding of the attributes, role, and benefits of the urban tree canopy

---

informing and involving the community in decision-making.

Image: City of Melbourne





## 2.4

# What is the optimal canopy cover level?

The optimal tree canopy varies depending on the climatic and land-use patterns within a city. Targets are best developed based on constraints such as density and land use. For example, dense development patterns with more impervious surfaces often have less opportunity for cover.

Examples of targets adopted nationally and internationally are listed in the table below. The sample cities in Australia are located primarily in temperate climates. Sydney has a temperate climate, and a mild temperate climate west of Bankstown.

The City of Sydney has adopted a method based on United States Department of Agriculture guidelines that recommend canopy cover targets by land use. This guidance recommends the scale of canopy cover varies between CBD areas (15 per cent) and suburban areas (50 per cent). Based on this, a 22 per cent target increase was nominated.

The City of Melbourne has adopted a target to increase public realm trees from 22 per cent to 40 per cent by 2040. The Urban Forest Strategy cites a recent study on the urban heat-island effect in Melbourne and recommends a minimum canopy cover of 30 per cent with a leaf area index (a measure of shade density) of 5.3 to achieve the most effective mitigation<sup>14</sup>.

It is also important to consider that while more canopy cover is generally better, there is also a requirement to provide adequate resources to maintain and manage a healthy urban tree canopy.

Global and national tree canopy targets

Tree Canopy Targets	Existing Tree Canopy Cover	Urban Tree Canopy Target	Target Date	Climate (Köppen Classification)
National City* Targets				
Melbourne	22% (2017)	40%	2040	Marine west coast
Adelaide	27.8 % (2017)	>30%: 20% increase <30%: no net loss	2045	Mediterranean
Perth	19% (2016)	30%	2036	Mediterranean
International City Targets				
Toronto, CA	27% (2008)	40%	2060	Humid continental
Washington DC, USA	35% (2009)	40%	2029	Humid subtropical
Detroit, USA	22% (2008)	40%	N/A	Hot summer continental
New York, USA	24% (2006)	30%	2036	Humid subtropical
London, UK	20% (2008)	30%	2050	Marine west coast

City of Melbourne Urban Forest Strategy, Making a great city greener 2012-2032. Sourced at <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/urban-forest-strategy.pdf>.

Living Adelaide, the 30-year plan for greater Adelaide, 2017 update. Sourced at [https://www.perth.wa.gov.au/sites/default/files/City%20of%20Perth%20Urban%20Forest%20Plan\\_0.pdf](https://www.perth.wa.gov.au/sites/default/files/City%20of%20Perth%20Urban%20Forest%20Plan_0.pdf).

International references in table: Davey Institute, The sustainable urban forest. Sourced at [http://www.itreetools.org/resources/content/Sustainable\\_Urban\\_Forest\\_Guide\\_14Nov2016.pdf](http://www.itreetools.org/resources/content/Sustainable_Urban_Forest_Guide_14Nov2016.pdf).

\*City refers to Local Government Area.

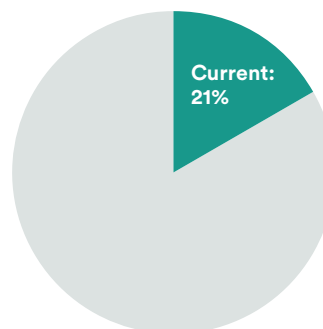
## 2.5 Indicative targets

**The target for the Greater Sydney Region is to achieve 40 per cent urban tree canopy cover by 2056. Other urban areas in NSW may choose to adopt a similar target.**

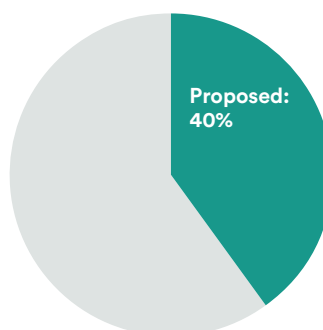
The 40 per cent figure aligns with the Greater Sydney Region Plan<sup>15</sup>, and the Department of Planning, Industry and Environment's 5 Million Trees Program<sup>16</sup>, and is based on international and national best practice. Implementing this percentage figure requires spatial analysis that accounts for the varied needs of individual places. Regional urban areas require further review and feedback based on these indicative figures. Preparing an urban tree canopy plan (UTCP) can assist with this analysis.

Detailed indicative targets based on three urban conditions are proposed below for investigation. State and local government can use these indicative targets to identify areas where tree canopy is deficient. Section 2.6 outlines a range of recommendations to help achieve the tree canopy targets.

**Current state of urban tree canopy in the Greater Sydney Region**



**Target for urban tree canopy in the Greater Sydney Region**



### **Indicative place-based targets under investigation – based on and subject to urban conditions**

These targets are set to increase tree canopy cover. Where up-zoning occurs, it is not the intention of these targets to reduce, or support the reduction of canopy cover.

#### **CBD TARGET**



**Greater than 15 per cent urban tree canopy cover in CBD areas**

#### **MEDIUM- TO HIGH-DENSITY TARGET**



**Greater than 25 per cent tree canopy cover in urban residential (medium- to high-density) and light commercial areas**

#### **LOW DENSITY TARGET**



**Greater than 40 per cent tree canopy cover in suburban areas**

14. City of Melbourne (2011), Urban Heat Island Effect: Mitigation Strategies and Planning Policy Approaches, GHD report for City of Melbourne, from City of Melbourne Urban Forest Strategy: Making a great city greener 2012–2032.

15. Greater Sydney Commission (2018), Greater Sydney Region Plan, p164.

16. Department of Planning, Industry and Environment, 5 Million Trees, <https://5milliontrees.nsw.gov.au/about-the-project>.

How to measure urban tree canopy

Canopy refers to the extent of an individual tree crown (including branches and leaves) or the combined canopy area of a group of trees. A common method for determining the amount of urban tree canopy is to measure the area of canopy as a percentage of total land area. This allows government authorities to understand changes in tree canopy over time.

Variations in urban tree canopy across Greater Sydney have been determined using this method.

Analysis of tree canopy cover in Sydney neighbourhoods

A review of tree canopy cover across various neighbourhoods in Sydney indicates that variations do exist between different land uses, urban conditions, and development types. The following figures show various neighbourhood locations, people per hectare (people/ha), dominant dwelling type, and percentage of canopy cover. Population and dwelling data was sourced from ABS 2011 and mapping was undertaken using aerial photos and canopy modelling (2017). The following characteristics were evident:

**Low-density neighbourhoods** with detached housing as the main dwelling type: examples range between 56% and 21% canopy cover.

**Medium-density neighbourhoods** with a mix of older and new apartments: Neutral Bay (119 people/ha), Wollstonecraft (108 people/ha) have 24 per cent and 34 per cent canopy cover respectively.

**Medium to higher density neighbourhoods** with new apartments: Camperdown (335 people/ha) has 24 per cent canopy cover.

**High-density mixed-use neighbourhoods** with old and new apartments: Pyrmont Ultimo (265 people/ha) has 23 per cent canopy cover.

This indicates that while some low-density suburbs are below the target, urban tree canopy can be achieved in a range of urban conditions, and targets can be developed that respond to varying urban characteristics, including high-density, mixed-use precincts.



MED-HIGH DENSITY

LOCATION 1 CAMPERDOWN	
AREA 6.64 ha	DENSITY 335 people/ha
DOMINANT DWELLING STRUCTURE Apartments	CANOPY COVER 24%



MED-HIGH DENSITY MIXED USE

LOCATION 2 PYRMONT	
AREA 83.98 ha	DENSITY 265 people/ha
DOMINANT DWELLING STRUCTURE Apartments	CANOPY COVER 23%

Tree canopy cover detailed studies

Reference material for density and dominant dwelling structure sourced from ABS 2011 data (<https://atlas.id.com.au>). Aerial imagery: Nearmaps 2017.





### **MED DENSITY**

#### **LOCATION 3 NEUTRAL BAY**

AREA	DENSITY
12.18 ha	119 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Apartments	24%



### **LOW DENSITY**

#### **LOCATION 5 NEWINGTON**

AREA	DENSITY
83.98 ha	68 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Separate houses	37%



### **LOW DENSITY**

#### **LOCATION 7 AVALON**

AREA	DENSITY
38.38 ha	30 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Separate houses	56%



### **MED DENSITY**

#### **LOCATION 4 WOLLSTONECRAFT**

AREA	DENSITY
26.67 ha	108 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Apartments	34%



### **LOW DENSITY**

#### **LOCATION 6 CRANEBROOK**

AREA	DENSITY
25 ha	36 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Separate houses	30%



### **LOW DENSITY**

#### **LOCATION 8 KINGS PARK**

AREA	DENSITY
39 ha	30 people/ha

DOMINANT DWELLING STRUCTURE	CANOPY COVER
Separate houses	21%

Aerial images are not to the same scale.



## 2.6 Recommendations for urban tree canopy

### Recommendations for discussion

These recommendations align to the three strategies identified in Section 2.3; many may be applicable to more than one principle.



Glebe Foreshore,  
Glebe

Detailed recommendations for State and local government are based on establishing the appropriate governance at multiple levels to support delivery of urban tree canopy. Governance should include the Five Million Tree (5MT) commitment to creating a greener city by 2030 and the Greening our City Premier's Priority.

STRATEGY	STATE GOVERNMENT	LOCAL GOVERNMENT
<b>1.</b> <u><b>Protect, maintain, and enhance the existing urban tree canopy</b></u>	1. Establish urban tree canopy targets in all NSW regional plans.	1. Establish LGA-wide UTCs with targets and timeline for implementation.
	2. Adopt urban tree canopy targets in the Greater Sydney Region Plan and include in district plans.	2. Identify priority planting and tree canopy protection zones in UTCs.
	3. Explore opportunities for infrastructure and utilities policies to prioritise above-ground and underground space for establishment and protection of effective urban tree canopy.	3. In locations where there is mature urban tree canopy, incorporate succession planning into relevant council plans and policies to ensure their ongoing provision.
	4. Explore opportunities for infrastructure and water policies that consider ongoing urban tree canopy resilience through provision of recycled water systems, dual plumbing, and WSUD.	4. Strengthen tree protection regulations and conformance; improve reporting on tree removal.
		5. Incorporate urban tree canopy priority plantings with strategic plans and budgets; establish management and maintenance priorities.
<b>2.</b> <u><b>Create an inter-connected urban tree canopy across NSW</b></u>	1. Assess opportunities to achieve increases in urban tree canopy on all State government managed lands.	1. Incorporate urban tree canopy targets into existing strategic planning and reporting frameworks.
	2. Establish minimum best practice urban tree canopy targets for NSW State significant projects including priority precincts, growth areas, and transport and infrastructure corridors.	2. Modify existing council policies including street tree policies to prioritise effective urban tree canopy provision, and to improve benefits such as tree shade. Review tree species to encourage species diversity.
	3. Modify existing State government policies and guidelines to achieve effective urban tree canopy.	3. Adopt revised LEP and DCP provisions for urban tree canopy. Apply mechanisms and controls to improve tree canopy provision on private land (such as through revisions to design criteria for deep soil).
	4. Develop valuation tools that include all aspects of urban tree benefits.	4. Develop and adopt minimum tree replenishment policies for new development in LEPs and DCPs.
		5. Integrate green infrastructure management into plans of management for public land.



STRATEGY	STATE GOVERNMENT	LOCAL GOVERNMENT
<b>3.</b> <b><u>Build knowledge and awareness of urban tree canopy across State and local government, and the community</u></b>	1. Empower councils to prepare UTCs, using the process in this guide.	1. Outline information resources to assist communities and decision-makers with the roles and benefits of urban tree canopy.
	2. Develop standardised LEP provisions for urban tree canopy. Incorporate these into the development assessment system established by the EP&A Act. Develop standardised DCP provisions for council use.	2. Consider embedded green infrastructure expertise to liaise between internal and external and other relevant agencies.
	3. Encourage councils, agencies, and infrastructure and service providers to embed planning and resourcing of urban tree canopy initiatives into existing strategic planning and reporting frameworks, including community strategic planning processes, the associated integrated planning and reporting framework under the <i>Local Government Act 1993</i> , strategic asset management planning and total asset management planning processes and reporting.	3. Implement coordinated community engagement to improve awareness of the benefits of urban tree planting.
	4. Outline information resources to assist communities and decision-makers with the roles and benefits of urban tree canopy.	4. Create community programs for tree planting.
	5. Develop tools including detailed maps, baseline information, heat maps to assist LGAs in establishing UTCs.	5. Provide opportunities for community involvement through local tree funding, planting, and management initiatives.



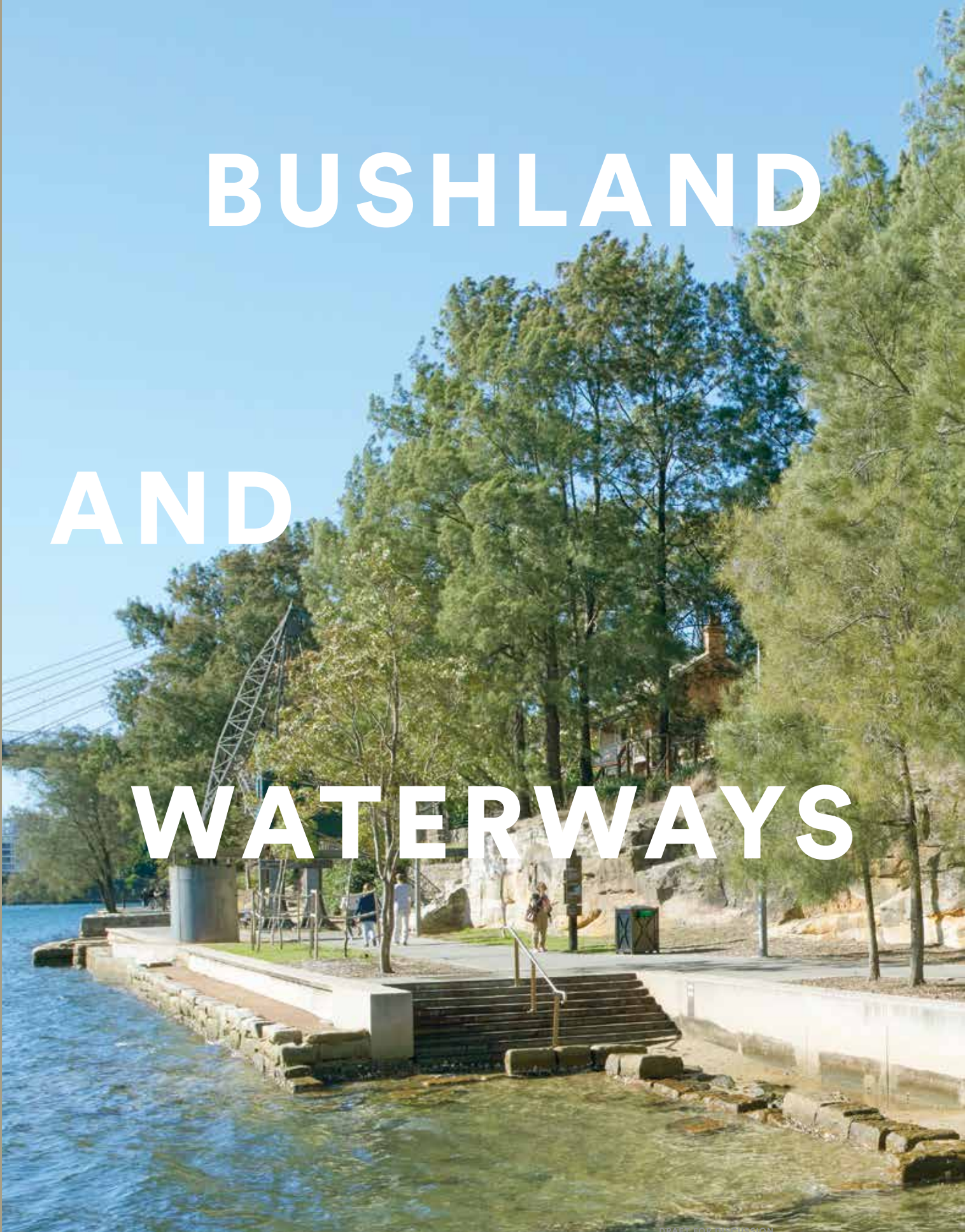


Orange, NSW



SECTION THREE

# BUSHLAND AND WATERWAYS







Glebe Foreshore, Glebe



## 3.1

# What do we mean by urban habitat?

This guide uses the following terms and definitions:

**Connection zones** – are areas that support urban habitat and the movement of wildlife between core areas of bushland or waterways. Connection zones support genetic dispersal, ecological function and resilience and can include vegetated riparian corridors, street trees, ponds, rocky outcrops, parks, gardens and green roofs, and balconies. They are areas where most city dwellers interact with nature.

**Core areas** – of bushland and waterways are the least disturbed and the most biodiverse, representative of the structure, function, and composition of natural areas. Protection and management of these areas is important to protect biodiversity and ensure long-term stability of ecosystem functions.

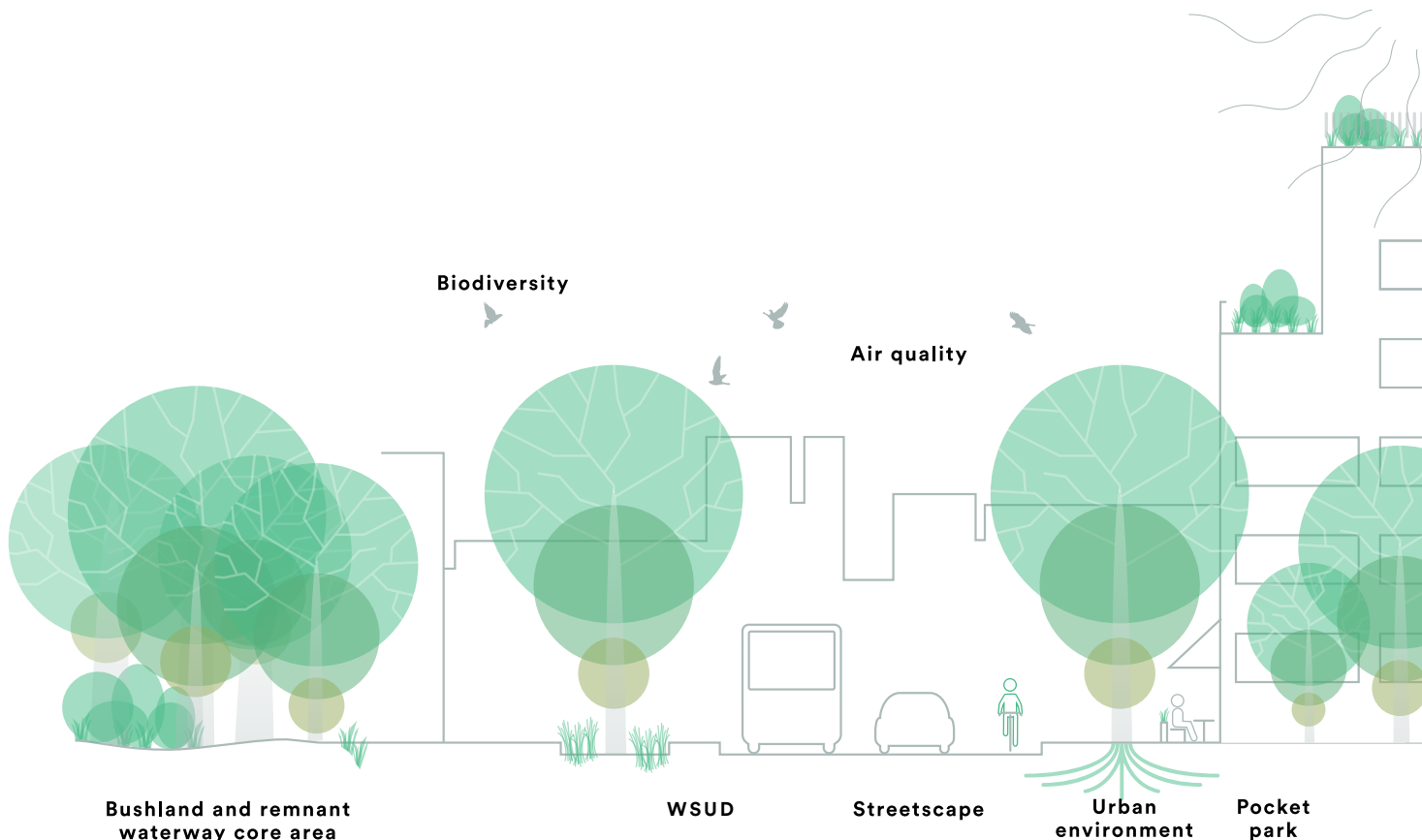
**Transition areas** – are located at the interface between a natural area and an adjoining urban environment and represent the transition from one ecosystem to another. These areas function as a buffer to core zones, protecting their condition, promoting regeneration, and improving their resilience to threats. Transition areas vary in extent and composition and may require ongoing maintenance. They can provide wildlife habitat, are often more suited to recreation uses such as cycleways, walkways, and picnic areas, and may offer benefits such as an asset protection zone for bushfire protection or buffer to core zones from invasive species.

**Urban areas** – comprise cities, towns, or suburbs where people live at high densities in a variety of housing forms supported by commercial and industrial land uses and essential infrastructure.

In Greater Sydney, the urban area is mapped in the Greater Sydney Region Plan<sup>17</sup>. For regional NSW, urban areas are typically characterised by places that contain an urban centre – including regional cities, strategic centres and local centres (or other centre types) as outlined in the Department's regional plans<sup>18</sup>.

<sup>17</sup> Greater Sydney Commission (2018), Greater Sydney Region Plan, Figure 51 Urban Area, p162.

<sup>18</sup> Department of Planning, Industry and Environment (2017), Regional plans, <https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans>.



**Urban bushland** – is land in an urban area that contains vegetation that is natural or representative of the structure and floristics of the native vegetation that existed for thousands of years. This encompasses a spectrum of areas that extend spatially from core contiguous terrestrial bushland areas in national parks or large council bushland reserves to small pockets of bushland and vegetated riparian corridors. This land may be in public or private ownership and may include areas previously cleared that have regenerated or areas that may be degraded, yet still provide an important ecological function and future potential.

**Urban habitat** – not only comprises areas of urban bushland and urban waterways which support the most endemic species, but also the built environment where some endemic Australian and non-Australian species can exist and at times flourish in areas such as parks and gardens, green roofs, along street verges, in artificial wetlands, and in ponds.

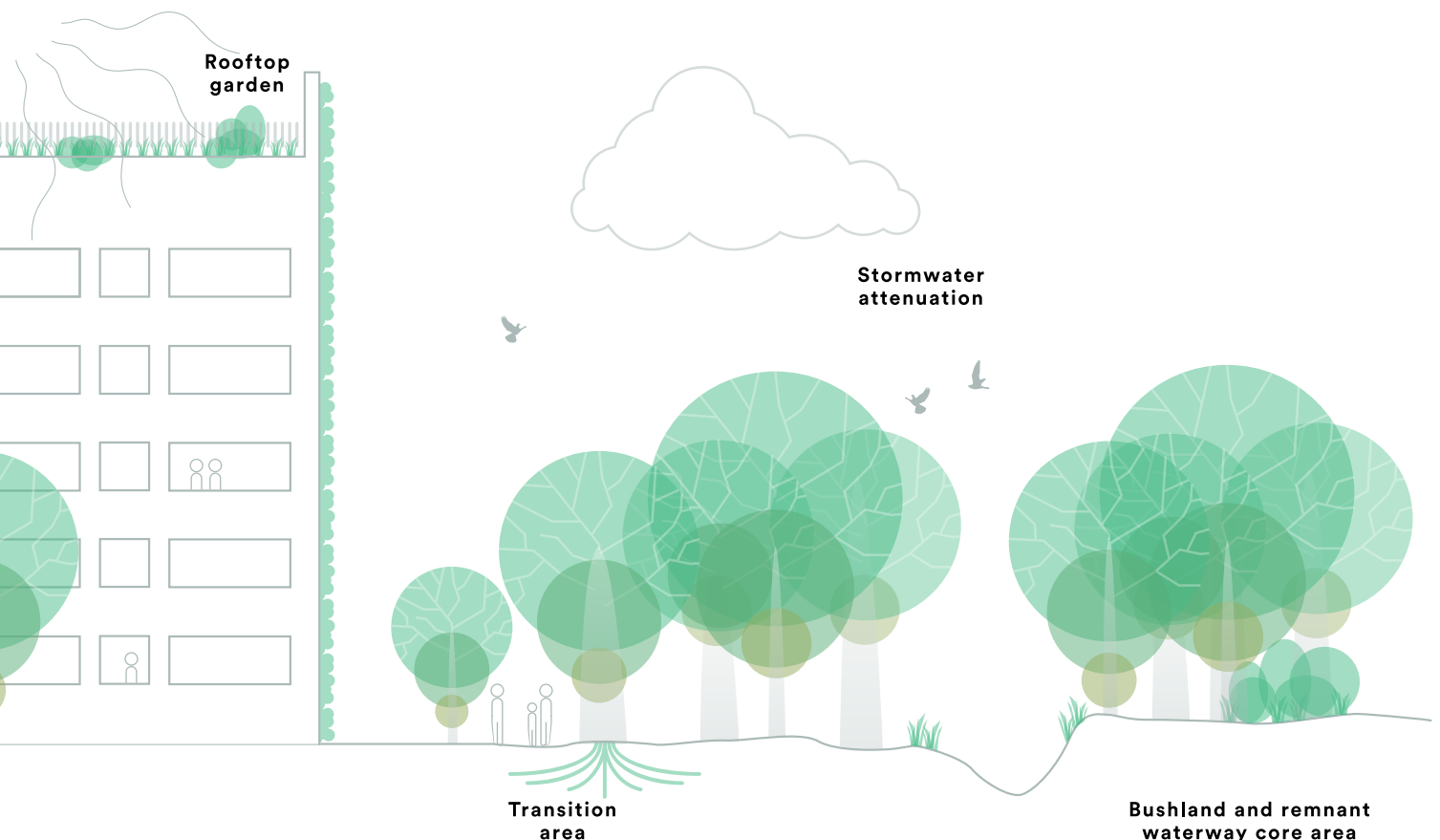
**Urban waterways** – are either constructed or natural waterbodies including rivers, creeks, ponds, lakes, wetlands, bays, and harbours where a significant part of their catchment either comes from or flows through urban areas.

## **The importance of urban bushland and waterways**

**The role of bushland and waterways in making our urban areas more liveable and supporting biodiversity cannot be overstated. Urban habitat that is well-preserved, maintained, and connected contributes to making NSW a healthier, more enjoyable, and prosperous place to live.**

Biodiversity loss is one of the greatest threats worldwide and needs attention from policymakers on all levels. Despite the pressures of urbanisation on biodiversity, green places in urban areas can be home to a significant number of species, offering biodiversity protection and nature experience for people.

Green infrastructure planning and design seeks to contribute to biodiversity conservation by providing habitats or establishing connections between habitats and populations. It is imperative that we support biodiversity networks from large areas such as national parks and forests to networks within more built-up urban systems. Urban biodiversity is more than just threatened species – it is all the plants, animals, and microorganisms that live in our cities. Biodiversity can exist in our streets, in our gardens, in brownfield sites, and in other unexpected places.





## 3.2 Planning for connectivity

**As half of the world's population now live in urbanised areas, and this continues to increase, the international community has come to recognise that our urban areas play an important role in biodiversity conservation. Urban areas and biodiversity can interact successfully and cities are now seen as part of the solution to stem the global loss of biodiversity.**

In 2008 the Conference of the Parties to the Convention on Biological Diversity (UN 1993) (which Australia ratified in 1993) marked a watershed in recognising how cities can play a role in stemming global biodiversity loss through:

- the implementation of strategic plans at the national and local levels for biodiversity
- use of the Singapore Index on Cities' Biodiversity<sup>19</sup> to monitor biodiversity and assist in evaluating progress in conservation measures.

<sup>19</sup> Chan, L., Hillel, O., Elmqvist, T., Werner, P., Holman, N., Mader, A. and Calcaterra, E., 2014. User's Manual on the Singapore Index on Cities' Biodiversity (also known as the City Biodiversity Index). Singapore: National Parks Board, Singapore. © July 2014 National Parks Board, Singapore



Sydney Park, St.Peters

### 3.3

## Introducing strategic urban biodiversity frameworks

**Strategic urban biodiversity frameworks (SUBF) could replace existing local government biodiversity strategies. They could be designed to approach the conservation of urban habitat and biodiversity in a holistic way that not only directs strategic planning but also acts at the management level, including for example reserve plans of management and volunteer engagement to undertake conservation works.**

A range of legislative instruments, policies, and strategies already exist for the protection of urban bushland and waterways, including but not limited to the UN Convention on Biological Diversity, State environmental planning policies, local environmental plans and development control plans. These need to be taken into account when preparing a SUBF.

A SUBF can:

- assist in implementation of the NSW green infrastructure design framework, in and outside the Greater Sydney Region, by identifying priorities and actions to improve urban habitats and bushland and waterway connections at the local level
- assist local government to monitor and report on their implementation of these actions; in the Greater Sydney Region this could inform periodic updates of the Sydney Green Grid
- provide a narrative to bring the community closer to nature and give meaning and purpose to projects and places of urban habitat value.

Priorities and actions included in SUBFs can be:

- included in local strategic planning statements
- integrated into local environmental plans and development control plans in the form of maps identifying core, transition, and habitat connection areas, with development controls and land management provisions suited to the local area
- integrated into other land-use strategies and management plans, for example strategies or plans for water-sensitive urban design, green roof projects, and reserve plans of management.

#### Improving the approach

**SUBFs can be designed to identify:**

- **ecological values and map them**
- **opportunities to improve urban habitat**
- **ways to connect people to nature**
- **implementation mechanisms and resource needs to connect, protect, enhance, and create urban habitat**
- **indicators for undertaking monitoring and review.**

Councils seeking additional guidance to prepare a SUBF are encouraged to contact GANSW.

Salt Pan Creek.





## 3.4 Strategies for urban bushland and waterways

Five key strategies have been developed to connect, protect, restore, enhance, and create urban habitat as an integral part of how urban areas are planned, constructed, and maintained. The strategies apply to remnant, transition, and urban environments that provide connections between core habitat. This approach recognises the important role of integrating nature into urban areas and the lives of people, not just protecting selected sites and landscapes.

See Section 3.5 for recommendations aligned with these strategies.

### 1. Protect and conserve ecological values

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The protection and conservation of existing remnant ecosystems is crucial to the prevention of further habitat and biodiversity loss and the viability of green infrastructure. Remnant ecosystems provide important habitat resources for urban biodiversity, and community access to natural landscapes.



### 2. Restore disturbed ecosystems to enhance ecological value and function

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Where ecosystems have been disturbed, restoration is the preferred option to improve habitat structure and function and support biodiversity. Restoration not only includes bush regeneration and weed management in the reserve system, which is statutorily required, but also refers to urban habitat corridors where the built form as well as gardens, street verges, parks, and large institutional properties etc. can all play a role in improving habitat through the way they are designed and managed. Specific actions will vary depending on location; condition; identified values; past, current, and anticipated pressures; and what is feasible and practical.



### 3. Create new ecosystems

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Where habitat linkages are needed within a corridor in areas devoid of habitat, new ecosystems can be created. Green infrastructure and water-sensitive urban design elements, such as green roofs, wetlands, and bioswales, can provide habitats and ecosystem services. More effective urban green spaces can be created when the improvement of the space considers multiple benefits at the design stage including improved economic, social, and environmental outcomes.



## 4. Connect people to nature

People connect with nature through sport, recreation, education, bushwalking, volunteer activities, and health-related activities. Daily exposure to nature can be improved using urban design features such as biodiverse green walls or street trees, and by providing infrastructure to facilitate access such as walking tracks, picnic areas, and lookouts. These connections are fundamental to benefit people but also the environment. Improving people's connection to nature may support longer term land management as people are motivated to care for and enhance their natural spaces.



## 5. Connect urban habitats

Species diversity and genetic health relies on the total area of habitat, proximity of habitats, and the capacity of species to move between habitats. Corridors allow plants and animals to recolonise areas where they have become locally extinct so they can be enjoyed by future generations and have long-term viability. They also allow species to find alternative habitat in times of major disasters such as fire or flood, and escape major threats such as clearing or disease.



It is important to understand the existing network of green and blue habitats and their links. Where links between existing habitats are incomplete, approaches are needed that help to restore both corridor and stepping-stone habitat connections. Urban green and blue grid corridors and networks can also provide a range of social benefits including improved recreation opportunities and neighbourhood destinations.

Images: 1. Restoration and rehabilitation. Image: Department of Planning, Industry and Environment. 2. Image: Regenerated habitat for superb parrot on the abandoned Boroowa railway line. John Hewat. 3. Envite planting. 4. Lizard log playground, Western Sydney Parklands, by McGregor Coxall. Image: Simon Wood. 5. Centennial Parklands.



## 3.5 Recommendations for urban bushland and waterways

When assessing urban habitat needs, State agencies and local government can implement five recommendations:

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**Councils can prepare a strategic urban biodiversity framework (SUBF).**

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**Reflect the outcomes of the SUBF in LEP amendments.**

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**Where potential exists, incorporate tailored controls to support SUBFs into DCP amendments.**

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**For LGAs connected to the Sydney Green Grid, align urban tree canopy targets with the percentage of canopy cover in areas identified as Green Grid priority links.**

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**Invest in green infrastructure projects to increase people's interaction with nature and urban habitats.**

**State and local governments can follow these detailed recommendations to improve urban habitat, support biodiversity, and connect people to nature. The recommendations align to the five strategies. Many are applicable to more than one strategy.**



The Great North Walk,  
NSW

STRATEGY	RECOMMENDATIONS	STATE GOVERNMENT	LOCAL GOVERNMENT
<b>1.</b> <b>Protect and conserve ecological values</b>	1. Incorporate the goal to protect and conserve urban habitat in all relevant legislation, policies, strategies, plans, and programs.	x	x
	2. Require that urban habitat is treated as a component of green infrastructure, an asset class recognised by Infrastructure Australia, Infrastructure NSW, and the NSW Independent Pricing and Regulatory Tribunal (IPART) and included in the State Infrastructure Strategy.	x	
	3. Plan and manage land and water assets to protect and support ecological values on their estate.	x	x
	4. Establish place-based targets for the protection and conservation of urban habitat including greenfield areas.	x	x
	5. Establish threshold levels for ecological communities beyond which no further development can be considered.	x	x
	6. Review planning policies that conflict with the provision of urban habitat and corridors, and devise triggers to switch off incompatible policies, or incorporate provisions to avoid incompatible outcomes in core, transition, and corridor areas in consultation with local government.	x	
	7. Require government and all landholders and managers to minimise edge effects on core, transition, and corridor areas, assisted through local government plans and management strategies.	x	x
	8. Sustainably manage all water sources on a catchment and system basis, including managing stream process and ecological function, through interagency government programs.	x	
	9. Support recreation opportunities in major waterways and implement catchment programs to meet water quality targets.	x	x
	10. Develop guidelines to help local government and developers retain groundwater flows, habitat features, and tree root systems on or adjoining excavation sites, and use appropriate development controls to manage impacts.	x	
<b>2.</b> <b>Restore disturbed ecosystems to enhance ecological value and function</b>	1. Develop a prioritisation process for natural area management decisions, and decisions about natural area restoration. Incorporate consideration of threatened species, endangered ecological communities, locally rare species, core bushland, and strategic linkages to maximise biodiversity conservation.	x	x
	2. Assess impacts on biodiversity at the lot scale and incorporate suitable development controls to provide for habitat enhancement and avoid cumulative impacts to habitat, including habitat loss. Accompany this with monitoring and enforcement.		x
	3. Require plans of management to incorporate the need to protect, restore, enhance, create, and connect ecological habitats and provide opportunities to connect people to nature.		x
	4. Encourage local government, infrastructure agencies, and the community work to the Saving our Species program (Department of Planning, Industry and Environment) to improve outcomes for threatened species and endangered ecological communities.	x	x



STRATEGY	RECOMMENDATIONS	STATE GOVERNMENT	LOCAL GOVERNMENT
<b>3.</b> <b>Create</b> <b>new</b> <b>ecosystems</b>	1. Include natural areas and waterways when analysing open space and recreation needs, and where suitable, design projects to create new ecosystems in the provision of new recreation facilities and the management of existing ones.	x	x
	2. Create development controls that support deep-soil landscape zones on private land to enable the planting of canopy trees which will contribute to creating new connections and ecosystems.	x	x
	3. Create guidelines, development controls, and incentives that promote the creation of habitat opportunities in the built form (green roofs, balconies, and walls).	x	x
	4. Work with relevant agencies to update design standards for footpath and road verge areas to support vegetation and habitat corridors connecting core bushland areas and waterways.	x	x
	5. Identify projects to capture, harvest, and re-use urban stormwater and wastewater to create new habitat, such as ponds and wetlands that minimise impacts on waterways and enhance the blue grid.	x	x
<b>4.</b> <b>Connect</b> <b>people to</b> <b>nature</b>	1. Design projects that encourage people to connect with nature while minimising ecological impacts, such as lookouts, bike and walking tracks, picnic facilities, interpretative signage, nature playgrounds, adventure sports facilities, water sports, ecotourism and wellbeing activities.	x	x
	2. Facilitate education and community engagement programs that promote a better understanding and appreciation of urban habitat and encourage participation in volunteer conservation programs (e.g. Bushcare, citizen science, and National Tree Day, and efforts to improve urban habitat within private gardens).	x	x
	3. Foster opportunities to create habitat when planning and assessing development on urban infill sites through innovative features (e.g. green walls, green roofs, balconies, artificial hollows, and water-sensitive urban design features such as wetlands).	x	x

STRATEGY	RECOMMENDATIONS	STATE GOVERNMENT	LOCAL GOVERNMENT
<b>5.</b> <b>Connect urban habitats</b>	1. Prepare and implement SUBFs at council or joint organisation of council level. Identify core, transition, and corridor areas and devise appropriate actions to connect, protect, conserve, enhance, and create urban habitat at all planning and land management levels.		x
	2. Include controls in LEP and DCP templates to connect, protect, restore, enhance, and create urban habitat. Design the templates so that councils can tailor their responses to reflect their locality.	x	
	3. Use SUBFs and green infrastructure networks (e.g. the Sydney Green Grid) to connect habitats when planning, designing, and managing precinct-level redevelopments (including State, district, and locally significant sites).	x	x
	4. In collaboration with local government and planning panels, implement green infrastructure frameworks such as the Sydney Green Grid, and monitor their progress and periodically revise it.	x	x
	5. Develop best practice targets for urban habitat provision in significant projects including planned precincts, and road and transport infrastructure projects, to ensure connectivity is enhanced not reduced.	x	
	6. Develop indicators for assessing the effectiveness of actions in SUBFs. The indicators need to be measurable, practical, and evidence-based to inform and measure the results of planning and urban design decisions. The Singapore Index <sup>20</sup> can inform this process.	x	x
	7. Collaborate with researchers, industry groups, and the community to develop methods that include all aspects of urban habitat and connectivity benefits (environmental, social, and economic).	x	x
	8. Leverage biodiversity offsetting mechanisms to strategically identify, protect, restore, and enhance the ecological connectivity of green and blue grids.	x	x
	9. Collaborate with researchers and industry groups to develop technical guidelines and specifications to support the integration of urban habitat principles in buildings, streets, parks, and public spaces. This could include a building rating scheme that incentivises the construction and retrofitting of buildings, stormwater infrastructure, and public spaces to incorporate urban ecology and facilitate connectivity in key corridors.	x	x
	10. Collaborate with researchers, and industry groups to develop and implement incentive mechanisms to prioritise urban habitat in the building and construction sector and respond to and create connected local habitats.	x	x
	11. Develop appropriate minimum standards and targets for urban habitat and connectivity. Develop targets that reflect variations in context, and encourage use of SUBF targets designed for the specific area.	x	x
	12. Implement coordinated community engagement to improve awareness of benefits and foster acceptance of habitat within urban areas.	x	x

<sup>20</sup> Chan, L., Hillel, O., Elmqvist, T., Werner, P., Holman, N., Mader, A. and Calcaterra, E., 2014. User's Manual on the Singapore Index on Cities' Biodiversity (also known as the City Biodiversity Index). Singapore: National Parks Board, Singapore. © July 2014 National Parks Board, Singapore



## 3.6 Planning considerations for improving urban habitat and connectivity

### Natural values

**The size of the core** and distance between core areas:

- Significant large core areas need wider corridors than smaller ones as they have the most biodiversity.
- More successful connections result when core habitats are closer to each other. Connections must be designed and structured effectively to meet the needs of a range of native fauna e.g. reptiles, small birds, and arboreal mammals. Lower, medium, and upper canopy features can be targeted to suit threatened species that occur in the area.

**The ecological sensitivity** of the core area and the needs of the species that occur in there (particularly threatened or locally rare species).

**The natural attributes of an area** – areas with an existing canopy and opportunities for green spaces such as street verges, private gardens, and recreation areas that adjoin core areas are best suited to providing potential corridors.

Ermington cycleway



### Design

**Development controls** – land-use zoning, minimum lot size, minimum landscape area, minimum building setbacks, tree and native vegetation preservation codes, landscape preservation codes, minimum deep-soil planting areas for canopy trees, hard-surface limits and water-sensitive urban design requirements all influence the ability of sites to provide habitat.

**Urban design** – wide street verges, increased building setbacks and pocket parks can all contribute to creating corridors and stepping stones in the urban landscape that can enable multiple canopy trees and shrub plantings.

**Landscape design** – installing a range of habitat features in designs can significantly improve urban habitat. Design features can include:

- nocturnal animal-friendly night lighting
- replacing concrete paving with permeable pavements to support infiltration of water
- artificial wetlands
- structures that mimic rock pools
- artificial nest boxes
- native or non-native vegetation fit for key species
- integrating different types of habitats such as a mix of trees, shrubs, and groundcover plants that can provide shelter and food for targeted species, or help connect residents to nature by attracting iconic fauna.

**Buildings** – innovations are constantly evolving due to new technology. Ecology-enhancing elements include green roofs, green walls, biodiversity-friendly construction materials that embed habitat opportunities, water-sensitive urban design solutions within stormwater drainage systems such as bioretention systems and rain gardens, or water retention features for stormwater capture and filtration.

**Restrictions or barriers to the movement of species** – solutions are best incorporated at the design stage to cater for the specific ecology of the area. Solutions include installing wildlife crossings under or over major roads, tunnels, traffic-calming devices, signage, ensuring canopy trees can create canopy bridges over roads, or restoring and rehabilitating piped creeklines.

One Central Park, Chippendale



## **Community and partnerships**

**Education and community engagement programs** – these can have a profound impact, reaching a cross-section of society and changing behaviours due to a better understanding of ecological needs such as reducing the use of pesticides. Landowners can be encouraged to create habitat in their own backyards through education programs and incentive schemes, including programs like 5 Million Trees for Greater Sydney, free advice from councils, and free plants from council nurseries.

**Connect people to nature** – there are many ways the urban environment can be designed to connect people to nature while minimising ecological impacts. Community participation in volunteer conservation programs such as Bushcare, citizen science and National Tree Day are other effective ways to connect people to nature.

**Community will** – successful partnerships and collaboration with stakeholders are essential to effective implementation. Community concerns may include human–nature conflicts, economic feasibility, and limits to development potential.

**Conservation partnerships** – State or local government assistance can be provided to private landowners of core habitat to help them measure, manage, and monitor the natural values on their land, and to provide advice, education, and funding assistance.

Image: The Royal Botanic Garden, Sydney.  
Source: [www.flickr.com/](https://www.flickr.com/). <https://creativecommons.org/licenses/by/2.0/au/>.



## **Priority projects and funding**

**Priority projects** – priority projects for the Greater Sydney Region have been identified in district plans. In these Sydney LGAs, and in regional LGAs, an audit of major obstacles to ecological health and fauna movement across identified habitat corridors can help identify local priority projects and funding needs following consultation with the community.

**Funding** – funds can come from State or Federal government, council environmental levies, capital works funds, private and organisation dedications and grants, conservation agreements, planning agreements, levies raised under the Special Infrastructure Contributions program, community title schemes, biodiversity offsets, and conditions of consent. Grants can be allocated to the community, local councils, and organisations to conduct rehabilitation works such as removal or modification of barriers to fish passage, rehabilitation of riparian areas and bank stabilisation, removal of exotic vegetation from core areas and waterways, and reinstatement of natural flow regimes for waterways.

Lindfield





# APPENDIX

## Planning considerations for each recreation type

Detailed planning considerations for each type of outdoor recreation are set out below. The key principle is multi-use of recreation space where possible.

### 1. Local play for very young (LPY)

Locally accessible walk-to space for parents and very young children (up to 5 y.o.) to play outdoors

#### SUITABLE AREAS

Any park area

Foreshores

Linear open space or waterway corridors with useable space above top of bank that is a minimum 20 m wide

#### EXAMPLES OF POSSIBLE SOLUTIONS

One high-quality play space within local parkland

Play events provided in small spaces that are part of sports parks or multi-user public open space areas

Small play area provided as children's garden or similar

Outdoor sculpture play and local recreation node in a linear open space corridor (e.g. waterway), with design to limit risks associated with location

#### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards
<b>Location</b>	Quiet pram-friendly location, not adjacent to highways or main roads High degree of visibility and passive surveillance
<b>Diversity</b>	Play areas should have different settings or themes from those immediately adjacent such as: — nature-based — structured — landscape play sculpture
<b>Shade</b>	Natural or built shade to 50% of open space area Play space to be predominantly shaded
<b>Features / facilities</b>	Inclusive play space (refer to Everyone Can Play) Furniture (seating, tables) Water station Fenced if area adjacent to busy road
<b>Min. area for LPY</b>	The play feature should be greater than 50 m <sup>2</sup> within a larger playground
<b>Shape and boundaries</b>	Shape flexible No boundary to be less than 20 m Minimum 50% road frontage

### 2. Local children's play (LPC)

Locally accessible walk-to, ride-to play opportunities for children of primary school age (5–12 y.o.)

#### SUITABLE AREAS

Any park area

Foreshores

Sport parks

Large, linear, open space corridors with at least 20 m from top of bank

#### EXAMPLES OF POSSIBLE SOLUTIONS

One large multi-featured play area per neighbourhood in a highly accessible central location catering to a range of ages

Nature play area provided in bushland park or as part of a waterway corridor or linear open space

Splash play and zero-depth water play

Guaranteed community access to school or other public grounds with play facilities

#### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards
<b>Location</b>	Quiet pram-friendly location, not adjacent to highways or main roads High degree of visibility and passive surveillance
<b>Diversity</b>	Children's play spaces should be of diverse types or styles from those immediately adjacent. For example: — natural bush play — adventure play — structured play — water play
<b>Shade</b>	Natural or built shade to 50% of the host space Play facilities or spaces to be minimum 80% shaded
<b>Features / facilities</b>	Inclusive play space Seats Water Fenced or landscape barriers if near roads or hazards
<b>Min. area for LPC</b>	The play feature should be greater than 100 m <sup>2</sup>
<b>Shape and boundaries</b>	Shape flexible – no boundary to be less than 20 m Host site to have minimum 50% road frontage

### 3. Older children's activity space (OCA)

Locally accessible ride-to or walk-to play and active recreation space for older children (10–15 y.o.)

#### SUITABLE AREAS

Any park area

Foreshores

Sport parks

Bushland reserves and natural areas

Large, linear, open space corridors with at least 20 m from top of bank

Multiple-use areas such as detention basins

#### EXAMPLES OF POSSIBLE SOLUTIONS

Large multi-age play space provided in large park

Natural bush exploration and activity space

Adventure play equipment and structured play equipment

Water-play and creek-play areas

Bike tracks, small pump tracks, skate plazas and outdoor courts

Active play trail with features along a linear system such as a creek or bushland trail

Kickabout space of 40 m x 60 m

#### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards
<b>Location</b>	Highly accessible central location High degree of visibility and passive surveillance Adequately buffered from other user groups
<b>Diversity</b>	Should be of diverse types or styles from those immediately adjacent including: — adventure play — creek-based nature play — active play trail along a linear system; kickabout space of 40 m x 60 m
<b>Shade</b>	At least 50% built or natural shade over activity space
<b>Features / facilities</b>	Development to include shelters, tables, water, and access to toilets Must include active recreation elements
<b>Min. area for OCA</b>	The play feature should be greater than 1000 m <sup>2</sup>
<b>Shape and boundaries</b>	Shape is flexible – no boundary less than 40 m Open space area to have minimum 50% road frontage



## 4. Youth recreation space (YRS)

Neighbourhood-level, larger, youth-focused area suitable for youth (13–20 y.o.) and providing both active recreation and space to gather and interact

### SUITABLE AREAS

Any park area larger than 1 ha
Larger foreshore areas
Sport parks
Large, linear, open space corridors with greater than 20m from top of bank
Multiple-use areas such as detention basins (if providing informal sport field)
Should be visible and preferably located near shop

### EXAMPLES OF POSSIBLE SOLUTIONS

Designed for longer stays so should have access to public toilets
Activation options include: <ul style="list-style-type: none"> <li>— a small jump park or BMX track</li> <li>— parkour elements, exercise and fitness equipment</li> <li>— sports courts, half courts, exercise area provided as part of a district park</li> <li>— youth friendly space with 60 m x 40 m informal field</li> <li>— youth “plaza” with wifi and versatile group spaces</li> </ul>

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards Should be within 500 m of public transport stop
<b>Location</b>	Not suitable adjacent to play areas for younger children Should be visible (high passive surveillance) and preferably located near shops
<b>Diversity</b>	Youth recreation spaces should aim for diversity across districts including: <ul style="list-style-type: none"> <li>— parkour, skate or BMX tracks</li> <li>— mountain-biking trails and trail head shelter facilities</li> <li>— sports court / half court</li> <li>— exercise area</li> <li>— cricket nets</li> <li>— fishing platform and shelter</li> </ul>
<b>Shade</b>	Host site should have 50% natural or built shade
<b>Features / facilities</b>	Active recreation and “social” space with seats, shelters, water and access to public toilets Should provide for larger and small groups Provides dedicated youth area which legitimises their presence in public space
<b>Min. area for YRS</b>	Must be at least 2000 m <sup>2</sup> of developed activity area
<b>Shape and boundaries</b>	Shape is flexible At least 50% road frontage

## 5. Local recreation space (LRS)

Locally accessible walk-to outdoor recreation facilities providing for passive enjoyment of outdoors and nature

### SUITABLE AREAS

Any park area
Foreshores
Sport parks
Bushland reserves and natural areas
Large, linear, open space corridors with at least 20m from top of bank
Multiple-use areas such as detention basins

### EXAMPLES OF POSSIBLE SOLUTIONS

Local park with seats, tables, water, and shade and other activations
Recreation nodes provided as part of riparian open space corridor
Landscaped gardens and public space areas provided as part of larger public precinct or sporting parks
Recreation node developed on land surrounding public infrastructure (e.g. reservoir or public building)
Conversion of cul-de-sac or disused road corridor to public parkland space
Viewpoints and lookouts

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Pram friendly Connected to active transport network and meets access standards
<b>Location</b>	Quiet open space location with high visibility and passive surveillance Not adjacent to highways or main roads Must be adequately buffered from adjacent uses
<b>Diversity</b>	Diversity of settings (i.e. host open space areas) is desired across neighbourhoods including: <ul style="list-style-type: none"> <li>— view points</li> <li>— bushland</li> <li>— waterfronts</li> <li>— public gardens</li> <li>— local parks</li> </ul>
<b>Shade</b>	At least 50% natural shade
<b>Features / facilities</b>	Must have a predominantly parkland, natural, or garden style landscape Seats and at least one other feature such as views, play facilities, or shelters
<b>Min. area for LRS</b>	Minimum area for the recreation space (the developed facilities) is 5000 m <sup>2</sup>
<b>Shape and boundaries</b>	Shape flexible No boundary less than 15 m Open space area to have minimum 50% road frontage

## 6. Active recreation space (ARS)

Neighbourhood-level accessible open space area with elements or facilities to encourage individual and group-based active recreation such as a social sporting activity

### SUITABLE AREAS

Larger park areas exceeding 1 ha
Sport parks
Multiple-use spaces such as detention basins designed for recreation use
Riverside and foreshore open space areas wider than 40m
Large district parklands
Community access to outdoor courts or fields provided at other public facilities

### EXAMPLES OF POSSIBLE SOLUTIONS

District parklands with community tennis courts, bocce courts or outdoor sport courts
Park with informal field a minimum 60 m x 40 m
Wide, linear open space (such as along a waterway) with beach volleyball courts or multi-courts
Exercise site and stations along an open space corridor
Synthetic playing field or court on top of built structures supported by adjacent open space

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Bikeway/pathway access essential
<b>Location</b>	Central area preferred as part of activation features of large park Generally flat with main use area at no greater than 1:100 slope
<b>Diversity</b>	Should provide diversity across neighbourhoods. For example: <ul style="list-style-type: none"> <li>— informal field minimum 60 m x 40 m</li> <li>— beach volleyball courts</li> <li>— bocce courts</li> <li>— community tennis courts or outdoor sport courts</li> </ul>
<b>Shade</b>	At least 50% shade for perimeter of active space Host site should have 50% shade overall
<b>Features / facilities</b>	Must be co-located with water, seats, and shade, and toilets in adjacent parkland Should be well-buffered from adjacent residential areas to limit noise impact
<b>Min. area for ARS</b>	Should be a minimum of 2500 m <sup>2</sup>
<b>Shape and boundaries</b>	A regular-shaped area with no boundaries less than 60 m is preferred

## 7. Large community outdoor recreation area (LCOR)

District-level open space area that provides a range of activities for individuals, and small and large groups. Should support community gatherings and extended stays for picnics, play, and other activities

### SUITABLE AREAS

Large district parklands and park areas exceeding 2 ha

Mixed-use recreation and sport parks

Extended riverside and foreshore open space areas wider than 40 m

Bushland and heritage parks with developed visitor facilities

### EXAMPLES OF POSSIBLE SOLUTIONS

A large district park of more than 3 ha with a mix of active and passive activities and a common or plaza suited to community gatherings

Foreshore parkland with play and picnic facilities with multi-user pathway and links along the corridor to a number of activity points

Viewpoint destinations which may be smaller but provide open vistas and have developed facilities for groups

Bushland reserves with basic facilities and activations such as trails and lookouts and a larger developed picnic and play area

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards Should be within 500 m walk of public transport
<b>Location</b>	Large, highly accessible public open space Preferred as green and predominantly natural public space for picnicking, relaxation, nature enjoyment
<b>Diversity</b>	Should provide a range of activities for individuals, small and large groups
<b>Shade</b>	50% natural shade
<b>Features / facilities</b>	Picnic areas of different sizes with shelters and tables, water, and barbecues provided Site should include at least 5 different activations and public toilets
<b>Min. area for LCOR</b>	500 m <sup>2</sup> of developed picnic area Plus space for community gathering
<b>Shape and boundaries</b>	50% of host open space must have road frontage Shapes may vary to take advantage of local landscape features No boundary to be less than 30 m

## 8. Fitness and exercise space (FES)

Local exercise and fitness opportunities for individuals that are free of charge and located in public open space

### SUITABLE AREAS

All open space areas including multi-user path networks

### EXAMPLES OF POSSIBLE SOLUTIONS

Access to a car-free running loop of more than 2 km

Linear, multi-use, open space corridor (e.g. supporting stormwater) with a pathway and exercise stations

Exercise sites or stations in a local or district park

Exercise equipment in sports parks

Public access to fields and internal path or road systems for running and walking

Perimeter walking and running paths around public facilities

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards Should be within 500 m of public transport stop
<b>Location</b>	Most open space areas including linear systems Must be visible location and safe for evening use
<b>Diversity</b>	Access to at least one of the following: — cycle and running return circuit of minimum of 2.5 km — exercise stations in public open space — bushwalking trails of longer than 1 km — large open space suitable for exercise or group fitness — other similar exercise opportunity
<b>Shade</b>	50% natural or built shade
<b>Features / facilities</b>	Seats, water, exercise equipment or running loops, etc., and any wayfinding or exercise guide signs provided Space should be buffered from other users
<b>Min. area for FES</b>	Area of activation may vary depending on the activity (e.g. fitness stations vs running loop)
<b>Shape and boundaries</b>	Shape variable Minimum 50% road frontage, or if linear system 30% road frontage, with no road boundaries to be less than 40 m

## 9. Trail and path-based recreation (TPR)

Local access to car-free walking, cycling, and running trails allowing for extended activity times, linking to longer networks in public open space, natural areas, and community destinations

### SUITABLE AREAS

Potential locations, include but are not limited to:

- waterfronts, waterways, and drainage corridors
- wetlands
- bushland reserves and natural areas
- foreshores and beaches
- significant landscape features
- historic and heritage sites
- linear open space and multiple-use open space

### EXAMPLES OF POSSIBLE SOLUTIONS

Recreation trails and paths provided as part of planned development and opportunistically where bushland and other non-developed areas allow

District and larger parklands with trail and path networks

Local bikeway, shared pathways, footpaths

Perimeter path networks on golf courses, through cemeteries, public institutions, and alongside transport corridors

Promenade-style paths around water bodies or along waterfronts

### PERFORMANCE CRITERIA

<b>Connectivity</b>	Must be connected to active transport network and have safe visible trail heads or access points
<b>Location</b>	A range of opportunities will contribute to this outcome including shared user pathways and local bush tracks Most open space areas especially linear systems
<b>Diversity</b>	Diversity should focus on both setting (e.g. urban, waterside, and bushland trails) and diversity of activity (e.g. cycling, running, bushwalking)
<b>Shade</b>	Shade should be available adjacent to trails or covering paths at least 50% of the distance
<b>Features / facilities</b>	Seats and wayfinding signage Trail heads and major access points should include water and shade Opportunities for general enjoyment and reconnection with nature
<b>Min. area for TPR</b>	Minimum of 50 minutes walking on a return loop
<b>Shape and boundaries</b>	Corridors must be 10 m wide clear space or greater, particularly in high-use areas such as alongside Sydney Harbour / Parramatta River, lakes, rivers, beaches, and other similar path settings



## 10. Organised sport and recreation (OSR)

### District-level access to sporting and organised recreation activities

#### SUITABLE AREAS

District-level sporting and organised recreation activities typically require large flat areas of public open space which is relatively flood-free, with at least 20% of the land flood-free or able to be made so without significant cost. Siting of the flood-free area should consider that it will be required for built facilities and amenities.

Sports fields should have a minimum average exceedance probability (AEP) of 0.095 which is similar to the former average recurrence interval (ARI) of 1:10 years. An AEP of 0.095 means there is a 10% chance of flooding in any given year.

#### EXAMPLES OF POSSIBLE SOLUTIONS

Dedicated sporting parks and precincts such as a regional sports precinct of 20 ha +

Mix of sporting park and built sports facilities (such as indoor centres)

Combination of public sports parks and community access to school fields and facilities for community sport (or dual provision projects)

Combination of “green” sporting parks and adjacent synthetic fields or courts provided as dual use on other infrastructure (e.g. car park roof) in high-density areas

#### PERFORMANCE CRITERIA

<b>Connectivity</b>	Within 500 m of a public transport stop Connected to active transport networks
<b>Location</b>	Protection from dominant winds where possible (particularly for outdoor courts)  Sporting fields must be level and generally have slopes no greater than 1:100 for active use areas
<b>Diversity</b>	Facilities need to be planned across urban areas. Alternative strategies for built facilities such as pools and indoor centres can include use of floor area in multi-level development, and construction of synthetic fields and outdoor courts on roofs and car parks  Diversity can be ensured by securing well-located, highly functional, and adaptable space that can be reconfigured as participation demands change over time
<b>Shade</b>	Good solar access, but with a preferred 40% shade cover for “off-field” perimeter areas
<b>Features / facilities</b>	Public toilets and change facilities are essential Range of sporting facilities provided
<b>Min. area for OSR</b>	Minimum recommended format for any field sport site is 4 ha which allows for a multi-field unit (2 x rectangular fields with an oval overlaid) or fields and outdoor courts plus ancillary space  For synthetic sportsfields, individual fields may be located on hard spaces e.g. rooftops  Minimum space to accommodate indoor sports courts or other built facilities is 3000 m <sup>2</sup>
<b>Shape and boundaries</b>	Regular shape (square or rectangular) to allow flexibility for active recreation and sport. No boundary to be less than 150 m  Allow for north–south field and court orientation  Minimum of 50% road frontage

## 11. Dog exercise area (DEA)

### Neighbourhood-level access to an off-leash exercise opportunity for dogs

#### SUITABLE AREAS

All open space areas, provided fencing or other natural barriers are in place to limit the dogs ability to run off and to minimise disturbance of adjacent park users and users enjoying other activities.

#### EXAMPLES OF POSSIBLE SOLUTIONS

Fenced area in a large local park or district park

Multiple-use space such as a detention basin or overland flow path

Section of linear open space or waterfront designated as off-leash

Agility park provided in large, open space area

Fenced area in buffer space between residential and bushland or transport corridors

#### PERFORMANCE CRITERIA

<b>Connectivity</b>	Connected to active transport network and meets access standards
<b>Location</b>	Most public open space areas excluding conservation areas
<b>Diversity</b>	Diversity in provision of off-leash dog exercise areas can be achieved by combining linear walking trail opportunities with local fenced areas  Not all off-leash areas need to be fenced  Across a larger urban area provision should aim for local opportunities and larger destination dog-walking locations  For higher density areas where space is limited, separate areas for small dogs vs large dogs should be considered
<b>Shade</b>	Should have perimeter shade to 50% of boundary
<b>Features / facilities</b>	Areas should provide water and shaded seating areas Fenced areas need high visibility
<b>Min. area for DEA</b>	Minimum area required for a fenced off-leash area is 400 m <sup>2</sup>
<b>Shape and boundaries</b>	Shape and boundaries flexible

## Endnotes and references

### Endnotes p30–31

- 1 Endreny T, Santagata R, Perna A, De Stefano C, Rallo RF & Ulgiati S (2017), Implementing and managing urban forests: A much needed conservation strategy to increase ecosystem services and urban wellbeing, *Ecological Modelling*, vol. 360 pp 328–335.
- 2 Nowak DJ & Crane DE (2002), Carbon storage and sequestration by urban trees in the USA, *Environmental Pollution*, vol. 116(3) pp 381–389.
- 3 Akbari H, Huang J, Martien P, Rainier L, Rosenfeld A & Taha H (1988), The impact of summer heat islands on cooling energy consumption and CO2 emissions, in *Proceedings of the 1988 Summer Study on Energy Efficiency in Buildings*, American Council for an Energy-Efficient Economy, Washington, DC.
- 4 Pandit R, Polyakov M & Sadler R (2013), Valuing public and private urban tree canopy cover, *The Australian Journal of Agricultural and Resource Economics*, vol. 58(3) pp 453–470.
- 5 Pandit R, Polyakov M, Sadler R & Moran T (2013), The effect of street trees on property value in Perth, Western Australia, *Landscape and Urban Planning*, vol. 110 pp 134–142.
- 6 Gallagher E (2014), Beyond “Green” streets: Mitigating climate change through residential streetscape design, *Faculty of Architecture, Design and Planning, University of Sydney*.
- 7 Nowak DJ, Hirabayashi S, Bodine A & Greenfield E (2014), Tree and forest effects on air quality and human health in the United States, *Environmental Pollution*, vol. 193 pp 119–129.
- 8 Kardan O, Gozdyra P, Misic B, Moola F, Palmer LJ, Paus T & Berman MG (2015), Neighbourhood greenspace and health in a large urban centre, *Scientific Reports*, vol. 5.
- 9 Jiang B, Li D, Larsen L & Sullivan WC (2014), A dose-response curve describing the relationship between urban tree cover density and self-reported stress recovery, *Environment and Behavior*, vol. 48, pp 607–629.
- 10 Sugiyama T, Leslie E, Giles-Corti B & Owen N (2008), Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships? *Journal of Epidemiology and Community Health*, vol. 62(9).
- 11 Taha H (1997), Urban climates and heat islands: Albedo, evapotranspiration, and anthropogenic heat, *Energy and Buildings*, vol. 25(2), pp 99–103, doi: 10.1016/S0378-7788(96)00999.
- 12 Nowak DJ & Dwyer JF (2007), Understanding the Benefits and Costs of Urban Forest Ecosystems, in Kuser JE (Ed.), *Urban and Community Forestry in the Northeast*, Springer, Dordrecht.
- 13 Pincetl S, Gillespie T, Pataki DE, Saatchi S & Saphores JD (2013), Urban tree planting programs, function or fashion? Los Angeles and urban tree planting campaigns, *GeoJournal*, vol. 78(3), pp 475–493, doi: 10.1007/s10708-012-9446-x.

### Image references p10

Public parks and community sportsgrounds: Sydney Olympic Park Athletic Centre. Source: Simon Sees [www.flickr.com/](http://www.flickr.com/). <https://creativecommons.org/licenses/by-cc/2.0/au/legalcode>

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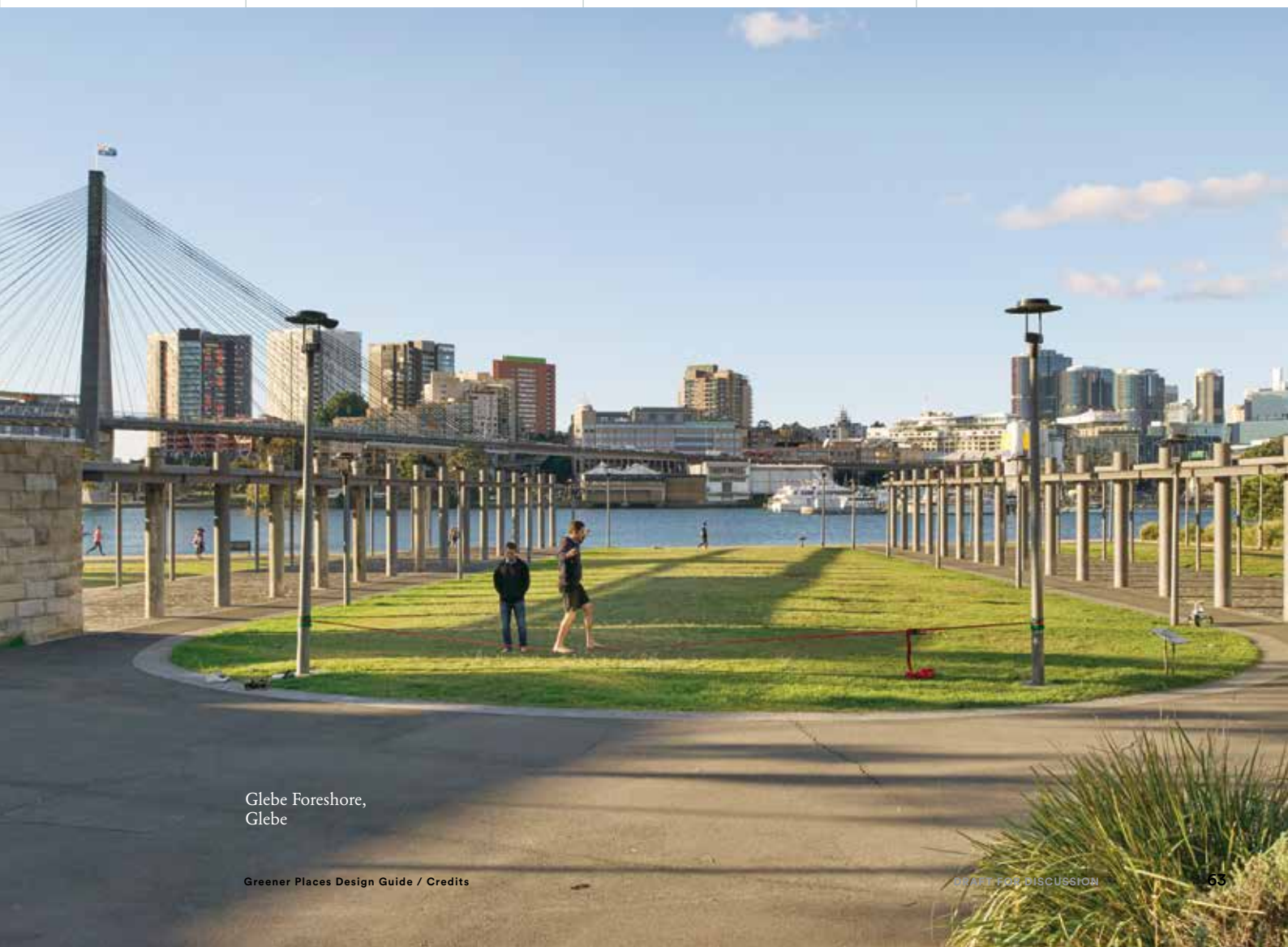
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