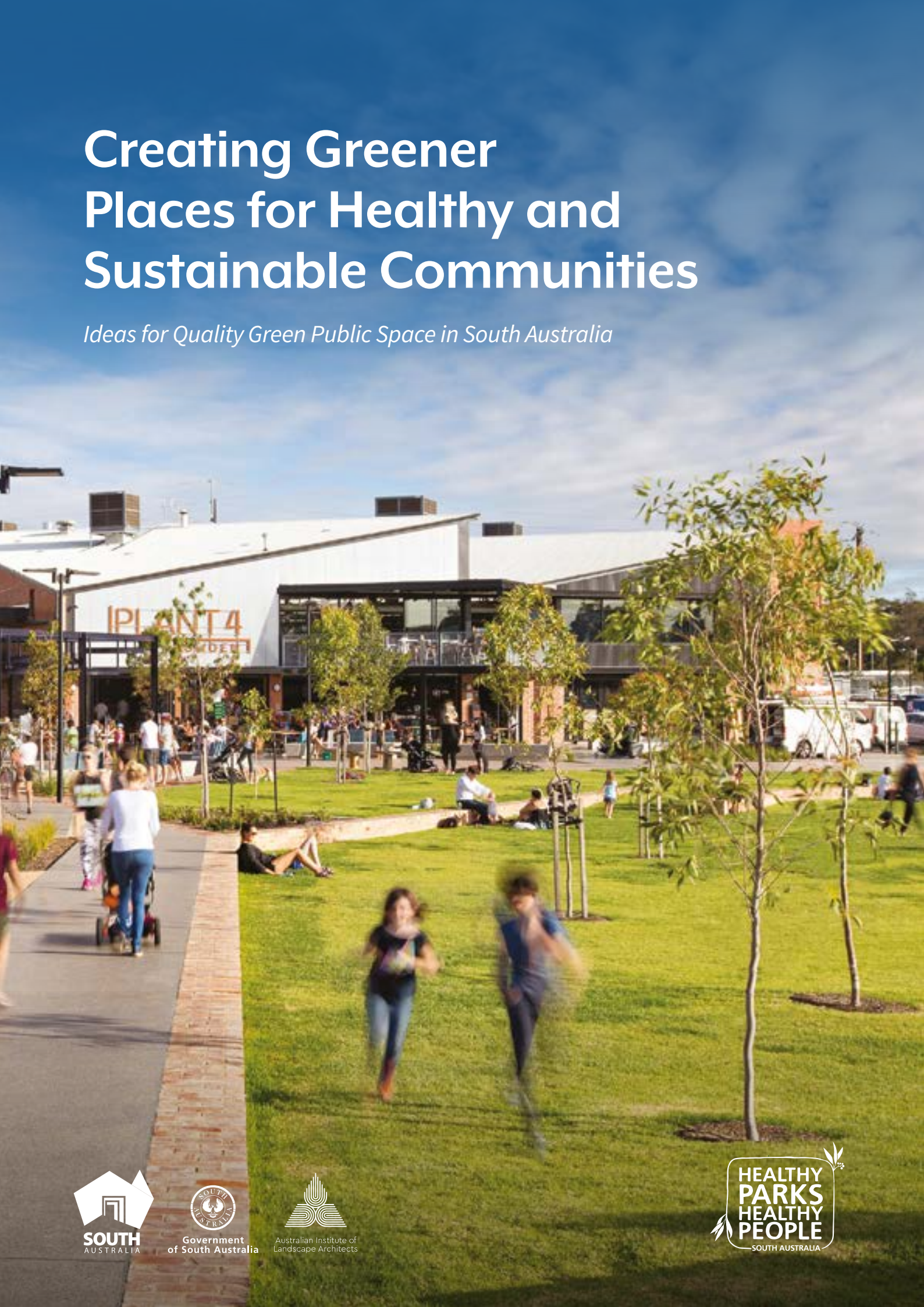
Creating Greener Places for Healthy and Sustainable Communities

Ideas for Quality Green Public Space in South Australia



SOUTH AUSTRALIA

Government of South Australia

Australian Institute of Landscape Architects

HEALTHY PARKS HEALTHY PEOPLE SOUTH AUSTRALIA

We are proud that South Australia is recognised as a healthy, liveable and sustainable place to live, work and play.

We understand the critical role our natural environment plays in supporting the health and wellbeing of our communities. Increasing the amount of accessible quality green space is one way we can ensure South Australia remains a great and healthy place to live, and a brilliant place to visit. It will also ensure that our urban landscapes are more resilient and able to perform better under the challenges of a changing climate and growing population.

This document has been developed through collaboration between our departments and the Australian Institute of Landscape Architects (SA Chapter). It provides a strong framework for community members, landscape professionals, urban planning professionals, local Councils and regional authorities to protect and enhance quality green spaces in recognition of the health, wellbeing and environmental benefits they provide.

As part of our government's focus on improving wellbeing through recreation and access to more green spaces, we are confident that the principles outlined in this document will assist all of us to play a part in achieving a greener, healthier and more liveable South Australia.

Stephen Wade MLC
Minister for Health
and Wellbeing

David Speirs MP
Minister for Environment
and Water

Well-designed and maintained parks, streets and landscapes are integral features of a liveable urban environment, improving the wellbeing of local communities through engagement with enriching, diverse and stimulating public spaces.

Ben Willsmore, Chapter President,
The Australian Institute of Landscape Architects (South Australian Chapter)

Acknowledgement of Country

We acknowledge and respect the Traditional Custodians of Country throughout South Australia and acknowledge the deep spiritual connection and relationship they have to their ancestral lands.

Contents

Both the new planning system and the update of the 30-Year Plan for Greater Adelaide provide a timely opportunity to rethink our approach to green open space and consider what quality open space means to all South Australians.

Sally Smith, General Manager, Planning and Development, Department of Planning, Transport and Infrastructure

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Introduction

Green spaces are critical for providing healthy places for people, wildlife, trees and plants. They provide many advantages including: improved physical and mental health and wellbeing, improved community and social connectedness, opportunities for sport and recreation activities, preservation of natural environments, climate change adaptation benefits, and urban stormwater management.

That is why the State Government has committed to the establishment of Green Adelaide, as a new entity for metropolitan Adelaide's environment and its community, Greener Neighbourhoods grant program to fund the greening of neighbourhoods with local government, as well as reforming the state's planning system.

The design and delivery of quality green public space is becoming a key challenge for the urban planning and design, health and environment sectors as cities grow and densify.

The Quality Green Public Space principles described in this booklet are a guide to help us recognise and support the role of quality green open spaces in changing neighbourhoods.

We all have a role to play in ensuring our neighbourhoods remain sustainable, both now and into the future. The principles can inform state and local government professionals as well as being of interest to the community and the business sector.

The Quality Green Public Space principles demonstrate the Government's commitment to greening our neighbourhoods, sustainability and encouraging happy and healthy communities. The 30-Year Plan for Greater Adelaide has a target of increasing urban green cover by 20% in metropolitan Adelaide by 2045, in recognition of the important role trees and other vegetation play in urban spaces.

To achieve this, green open space needs to be recognised and valued like other community assets and considered at all stages in planning and development processes.

Integrating quality green public space into urban development is complex. By working together – government, industry and the community – we can create a more liveable neighbourhood and enhance our urban environment.

This booklet aims to advocate for quality green public spaces and to provide inspiration and ideas on what is possible in a changing urban profile. This document is not a technical guide nor is it a manual on how to specifically create quality green public spaces. Rather, it is positioned as a catalyst to promote the importance and prioritisation of green public space and consider new and different ways of shaping our neighbourhoods.

It is hoped that the principles described in this booklet stimulate discussion and progress the dialogue on how to support the growth of Adelaide in a way that protects and enhances our green spaces alongside the creation of new open space destinations. As the new planning system in SA is developed, it offers an opportunity to embed these principles to inform decision-making processes and the delivery of quality, liveable neighbourhoods across South Australia.

Architecture and landscape architecture encompass internal and external spaces and should be considerate of permeability between the public and private realm. With increasing urban density we need to be conscious of the quality of our public open space and green infrastructure – from large parks to streetscape greenery and dedicated civic spaces.

Kirsteen Mackay, SA Government Architect, Office for Design and Architecture SA

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Quality Green Public Space principles

The six principles have been developed as part of the work package under the Healthy Parks Healthy People SA Quality Green Public Space Action Plan. It is envisaged that the principles will serve as a strategic reference point to champion the delivery of quality green public open spaces across all sectors. They can be used as a practical framework to guide public green open space initiatives and practices to better support liveability outcomes in our neighbourhoods.

The principles aim to guide the delivery of quality outcomes when planning, designing, and implementing green public spaces in South Australia. The objectives of the principles are:

- **To support** the protection and enhancement of South Australia's green public open spaces and increase greening in our neighbourhoods.
- **To advocate** for quality green public space, especially in the context of higher density development and urban infill.
- **To promote** awareness of the importance of green open spaces and the multiple benefits that greening provides to society.
- **To strengthen** the delivery of well-designed green space that meets the needs of the community.
- **To connect** with South Australia's planning system to help shape the delivery of liveable places through the provision of quality green public spaces.

The principles demonstrate a holistic approach to greening and landscape practice that takes account of the social, environmental and economic value of green infrastructure. The aspirations or design responses associated with the individual principles are not intended to be an exhaustive list but give readers an indication of the possibilities for improving the quality of our public green spaces.

To be successful, green open space initiatives and designs must engage many people. Green open space systems should be planned and implemented involving input from a diverse range of stakeholders, including the community. These principles add to the support for shared responsibility for better quality green public spaces in South Australia.

Adelaide is changing

The way we live in Adelaide and across South Australia is changing, particularly in Greater Adelaide. There is an increasing demand for new housing within the existing fabric of our cities, neighbourhoods and regional towns. Apartment living, small lot housing and increased urban density offer more housing choice which reflects population trends and changing lifestyle demands.

The increase in housing density means services and infrastructure can be used more effectively. A more compact urban form supports better access to public transport, employment and entertainment, and creates more walkable and connected communities.

With these changes to our cities, towns and suburbs, comes the challenge of ensuring that access to public green spaces such as parks, gardens, reserves and sporting grounds is maintained and that they are functional and safe places that meet the needs of our diverse community.

It is also about creating an interconnected network of high-quality green spaces that join destinations, streets, public transport and residential areas to support comfortable and pleasant neighbourhoods and maximise quality of life and wellbeing.

As more people choose to live in neighbourhoods with small or no backyards, quality green public spaces are becoming a vital component to ensure South Australia remains liveable, healthy and sustainable.

> *Many studies have demonstrated the numerous positive health effects of urban green spaces. Benefits include reduced depression and improved mental health, reduced cardiovascular morbidity and mortality, and reduced rates of obesity and diabetes through physical activity.*
>
> ***Professor Paddy A Phillips,***
> ***Chief Medical Officer & Chief Public Health Officer,***
> ***Department for Health and Wellbeing***

What do we mean by green open space?

Adelaide and its surrounding regions have a diverse array of landscapes from the foothills and plains to our coastal estuaries, wetlands, beaches, rivers and cliffs. These landscapes provide unique settings for green open spaces across our cities, towns and neighbourhoods.

Green open spaces are areas of public and private land that contain trees, watercourses and other landscape elements that make up resilient ecological systems. They include areas we traditionally see as open space such as parks, gardens and sports ovals.

Green open spaces may also include other areas of public land such as streets and highways, other infrastructure corridors, water courses, nature conservation reserves, National Parks, community gardens, school grounds and buildings with green walls, facades, veneers and roofs. On private land, green open spaces include residential gardens, golf courses, agricultural lands and planting treatments (greening) on and around private buildings.

The principles for quality green spaces described in this document focus on public open spaces.

Why do we need Quality Green Public Spaces?

As Greater Adelaide continues to grow and develop, the quality of its green public space will become increasingly important. The challenge is to balance the competing demands for building development and infrastructure with the need for open spaces within our neighbourhoods. The following facts[1] highlight the recent changes we are experiencing in our neighbourhoods:

- The population of Greater Adelaide is expected to grow by over half-a-million people in the next 30 years, with over 80% of South Australians forecast to live within Greater Adelaide.
- 85% of all new housing in metropolitan Adelaide will be infill in established urban areas (by 2045) which will limit opportunities to provide new green open space.
- Increased urban infill, including medium and high-density developments, will significantly reduce the amount of private open space available to residents across Greater Adelaide.
- 1 in 4 people living in South Australia are born overseas, adding greater cultural diversity, interpretation and expectations for quality open spaces.
- South Australia is the driest state, in the driest country in the world, and
- A changing climate will place increasing pressure on the biodiversity, amenity, accessibility, comfort and resilience of green open spaces across our cities, towns and neighbourhoods.

Green space loss

Evidence shows that most of Adelaide's metropolitan areas have experienced a decline in the quality of its green space. Adelaide's tree coverage is amongst the lowest of Australia's capitals. Its proportion of tree canopy is 27% - less than half of Hobart's, which is the highest at 59%. There are also marked variations between Adelaide suburbs. A 202020 Vision report[2] assessed the amount of green space in Adelaide's 19 metropolitan council areas. The study found tree canopy ranges from 44% in the Adelaide Hills to 12% in Port Adelaide Enfield. There was also a reported increase in hard surface. The loss of green space is a trend being experienced across most Local Government Areas (LGAs) in Australia, declining by 2.6% from 2009-2016.[2]

South Australia experienced a 2.6% reduction in public green open space. For the City of Adelaide, this is equal to the loss of Victoria Square/Tarntanyangga every seven years[3]

Green space will play an increasing important role as the density of our cities and the diversity of housing types is increased. There is a need for a mixture of green open spaces to cater for different users, including small, local green spaces very close to where people live and spend their day, as well as large green spaces, offering formal provisions such as playing fields, and opportunities to experience contact with nature and time away from the stresses of city life. Urban greening that extends beyond traditional park based infrastructure will need to be considered and increased greening in streetscapes will become vital to enable the multiple benefits of green spaces to be harnessed.

> *Quality Green Public Space provides an accessible means for people, especially those living in urban areas, to connect to the natural environment. They are also a part of the solution to addressing the environmental challenges associated with urban growth and improving health and wellbeing.*
>
> ***John Schutz, Chief Executive, Department for Environment and Water***

A shared responsibility for public green spaces

The principles are intended to help shape the plans and decisions that influence the development, revitalisation or management of open spaces across Greater Adelaide. Our open space network is recognised to be the responsibility of State and Local Government in the policy, budgeting and management decisions that affect the quality of our open spaces, as well as the wants and needs of our local communities. The responsibility stretches from regional planning to individual redevelopment sites, and includes:

State Government agencies

(Metropolitan focus)

The government's reform of the planning system provides an opportunity to embed these principles. Greater interdepartmental cooperation is also required to respond to the values associated with the provision of quality green public spaces across Greater Adelaide. At a metropolitan scale, government departments can work collaboratively to integrate strategy, policy, funding and assessment to better manage the quality and the expansion of public spaces across Greater Adelaide.

The government's commitment to establishing Green Adelaide, as a new body for metropolitan Adelaide will provide a key strategic, coordination role to deliver outcomes across seven priority areas, including the greening of public spaces for the benefit of the whole community. It will achieve this through collaboration and partnerships with government and non-government entities.

State and Local Government

(Regional focus)

The value of regional networks of public green spaces requires greater coordination and collaboration between state government and local government, as well as neighbouring Local Government Authorities (LGA's) to achieve more integrated planning, knowledge sharing and communication. A regional focus expands the co-ordinated provision of services to wider regions, and ensures a strategic focus on quality provision, and scale of impact.

Local Government

(Suburb or Neighbourhood focus)

As the custodians of suburban open spaces and co-ordinated networks, the aspirations for the long term planning, design, development and management should primarily respond to the needs of the local community and the impact on their quality of life, and balance against the limitations of maintenance regimes or asset management plans.

Developers

(Site focus)

The Development Industry is driving the transformation of our suburbs typically with more compact housing type, with limited private open space. Greater opportunity exists for local developments to make a positive contribution to the neighbourhood revitalisation of public open spaces and streets, as well as help define the long term identity, lifestyle and land values of local communities.

A number of other key stakeholders are involved in the design, delivery and management of public green open spaces, including:

- The community
- Landscape architects, urban designers, architects and design professionals
- Planners
- Engineers
- Businesses
- Builders
- Land and asset owners and managers
- Peak industry bodies in urban planning, recreation, leisure, and the landscape industry.

The delivery and management of quality green public spaces is subject to a complex interaction of factors including multiple stakeholders, governance, economics and community needs. Public green open spaces are managed at multiple scales and require considerations for various socioeconomic and cultural influences, adding an additional layer to the complexity of issues. As urban areas continue to grow, the challenge will be to identify how best to achieve the activities needed to support quality green public spaces in a coordinated and more effective way.

The principles and case studies highlight the importance of constructive partnerships across tiers of government, and between public and private partners to share the necessary roles and responsibilities to achieve quality outcomes for the community. They also emphasise that the provision of quality green public spaces requires a long term vision, and an ongoing commitment to realise the true benefits of open spaces for our community and the natural environment.

Physical inactivity is a risk factor for heart disease but only 38% of adults meet the recommended 150 mins of activity per week. Streetscape greenery, shady tree canopy and landscaping create walking-friendly neighbourhoods, where residents are likely to be more physically active and have better heart health.

Imelda Lynch, CEO, Heart Foundation

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The benefits of Green Space

There is a growing recognition of the benefits that green space has on a community's health and wellbeing, as well as biodiversity and ecosystem services. Understanding how best to achieve and sustain these benefits is particularly important today. Our cities are growing. We are seeing increasing populations, greater housing density, rising temperatures, growing rates of obesity, diabetes, stress and depression, and declining native biodiversity.

Health benefits can be delivered through diverse pathways, such as mental relaxation, stress reduction and enhanced physical activity. Studies that support this show that:

- Physical activity in or near green space has been linked to important health outcomes including obesity reduction, lower blood pressure and extended life spans.[4 - 5]
- Residents living in neighbourhoods with more urban green space are more likely to participate in leisure-time physical activity than those living in areas with less urban green space.[6]
- There is accumulating evidence that physical activity in green space ("green exercise") is more restorative and beneficial for health than physical activity in non-natural environments.[7- 8]
- Access to natural landscapes, through nature experiences or even views of nature, can assist physical healing (e.g. faster surgical recovery and patient healing).[5]
- From a mental health perspective, the quality of public open space within a neighbourhood appears to be more important than the quantity of public open space.[9]
- Adding green space to people's neighbourhood environment can improve the trajectory of their mental health. For example, greening is associated with a reduction in feeling depressed and worthless.[10] Walking past green space has also been associated with reduction in heart rate, one marker of acute stress.
- Green spaces provide children with unique opportunities such as discovery, creativity, mastery and control, which are all thought to influence different aspects of brain development.[11]
- Research has also shown that when children are engaged in green settings, childhood attention disorder symptoms are reduced.[12-14]
- Green space can play an important role in fostering social interactions and promoting a sense of community that is essential for social cohesion.[15]

Increasing urban heat and climate change create major challenges for urban living. The densification of urban areas is associated with the Urban Heat Island Effect. Green open space can mitigate exposure to excessive heat, air pollution, and noise and deliver **benefits for ecosystem services**. Studies that support this show that:

- Green spaces provide a cooling effect. Green spaces can reduce temperatures by 1-4[C],[16] enhancing human comfort and reducing energy demand.[17]
- Planting trees in parks, public gardens or streets can slow stormwater runoff and increase water infiltration into soils,[18] which is important for sustainable and resilient landscapes in our cities and towns.
- Noise pollution from continuing urbanisation, increasing traffic volumes, industrial activities, and a decreasing availability of quiet places in cities is a threat to human health and wellbeing.[19] Green spaces provide noise reduction services by serving as natural sound buffers with vegetation belts 1.5–3m wide thought to significantly reduce noise.[5]
- Poor air quality can lead to increased occurrences of cardiovascular and respiratory disease.[20] Vegetated areas in cities can filter air pollution.[21]

Planning and managing urban landscapes is an increasing priority to ensure our biodiversity resources are safeguarded. Habitat loss and fragmentation due to urbanisation and land-use change make it especially important to consider conservation outcomes in the design and delivery of green spaces. Green spaces provide a unique landscape that supports a diversity of flora and fauna and provides communities with direct access to nature. A number of studies show the green space **benefits for biodiversity and conservation:**

- Many species are dependent on green spaces to survive in cities, providing habitat for plants and animals.[22]
- The use of native plants in urban green spaces has been linked with the diversity and abundance of Australian animals. In particular, several studies have shown that native bird species benefit from the presence of native plants in streets, parks and gardens.[23]
- Environments rich in biodiversity are also good for human health. For example, reduced contact between people and the naturally biodiverse environment can reduce diversity in human microbiota, which can lead to immune dysfunction and disease.[24] This suggests that immune systems benefit from direct exposure to natural environments or through contacts with certain factors in the green space.

Quality green public spaces provide multiple health benefits including relaxation and stress reduction, improved social cohesion, immune system benefits and enhanced physical activity. In addition, green spaces also provide ecosystem services associated with reduced exposures to noise, air pollution, and excessive heat.

What shapes the benefits provided by green spaces?

The benefits green spaces provide are also influenced by local context:

- Climate
- Level of urbanisation
- Inequity and social disadvantage
- Culture
- Resident/user age
- Resident/user gender.

The social environment is an important predictor of the provision of green space and the benefits it provides. Green space is not equally available or accessible to all population groups, with low-income communities often having less green space or being exposed to poorly maintained or unsafe green areas.[25] A national study showed that Adelaide has the least equitable distribution of green space, with approximately 20% greenery in the most affluent areas versus 12% availability in the least affluent areas.[4]
There are potentially large benefits in greening disadvantaged areas. For example, there is accumulating evidence showing that disadvantaged groups tend to benefit the most from improved access to green space.[26, 27]

This highlights that greening solutions are not simple and careful consideration of contextual variables is necessary. However, if green spaces are well designed with community input, these local factors can provide opportunities to maximise impact. Well-designed and good quality public green open spaces can attract more people and cater to a greater range of activities than poor quality spaces.


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Adapted from *NSW Greener Places: Establishing an urban Green Infrastructure policy* for New South Wales. (2017).[28]

What is the value of trees?

A particular tree or group of trees are often one of the most recognised features of popular parks or iconic local streets. However, the benefits trees provide are often under-appreciated. In particular, street trees are seen more as a cost rather than an opportunity to improve the liveability of our cities.

Increasingly, studies show that when the costs of managing trees are compared with the social, environmental, health and economic benefits they provide, it is clear that urban trees can deliver an overall net benefit to cities.[29] For example, in California, street trees provide $1.0 billion in services annually, with a return of $5.82 for every $1 spent on tree management.[30] These findings indicate that investing in the long-term health of street trees and urban forests can provide positive returns.

Tree-lined streets provide health benefits including lower blood pressure,[31] reduced stress and improved mental health,[32, 33] and quicker recovery times after surgical procedures.[34] In addition, the presence of street trees is a positive factor in the level of physical activity undertaken such as walking and cycling.[35, 36] Trees also offer shade and a cooling effect from evapotranspiration which may reduce the incidence (especially in summer) of heat stroke and other heat-related problems.[37]

People who live in neighbourhoods with a higher density of trees on their streets report better health perception and fewer cardio-metabolic conditions compared with residents in areas with lower street tree density.[38]

Trees provide many ecosystem benefits[39], including mitigating the Urban Heat Island Effect, capturing and storing carbon, improving air quality, protecting from wind, absorbing water during intense rainfall events, and providing habitat for wildlife.

Trees provide economic benefits, including saving energy by shading homes, increasing property values and reducing stormwater management costs.

In the greening hierarchy, trees are the 'powerhouses'. Trees are potentially the most important component of green space in terms of having beneficial effects.[40]

The benefits of trees, however, are proportional to their size, canopy area and length of the growing season, meaning that saplings – while crucial to ensuring the future generations of trees – do not provide the same benefits as more mature trees.

A 2015 study in Canada[38] found that having 10 more trees in a city block, on average, improves health perception in ways comparable to an increase in annual personal income of $10,000 and moving to a neighbourhood with $10,000 higher median income or being 7 years younger.

The study also suggests that street trees seem to have more beneficial effect than private or backyard trees, which may be explained by the fact that they are more accessible to all residents in a given neighbourhood.

Trees enhance quality of life and are the keys to urban sustainability. The future role of trees in our neighbourhoods will need to be redefined as cities grow and develop.

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Helping urban trees thrive

Established shade trees are an enormous value to local communities. However, our changing urban environments pose a number of challenges to the health of existing and new trees. For example, increased paved areas around the base of trees will compact the soil and limit the amount of rainfall to be absorbed into the roots. Trees in parks and other open public spaces maximise the multiple benefits to the neighbourhood when a greater proportion of open space can be provided for the health of the tree.

Principles for Quality Green Public Space

The six principles for Quality Green Public Space aim to drive a shared understanding of the value of green open space. Each principle seeks to advocate for early integration and collaboration between design, planning and governance of quality green public spaces. The principles intend to foster long-term, coordinated decision-making to help shape our urban environments, so they are healthy, liveable, sustainable and resilient places for current and future generations.

The principles have been developed based on best practice green space design and delivery, and research evidence showing the benefits of green open space in higher density development areas and in general.

It is important that the principles are read and understood in their entirety to be able to deliver the multiple benefits which quality green public spaces can provide. They recognise that to deliver high quality open space, solutions need to be responsive to local or regional circumstances to maximise the community benefits of public green space.

Each principle is explained in an overarching statement that highlights its importance. Also, further detail is provided including:

- **OBJECTIVES** – which highlight a range of approaches and their benefits in support of individual principles;
- **DESIGN RESPONSES** – which provide further direction towards achieving quality open space outcomes;
- **SUPPORTING CASE STUDIES** – showcase how the aspirations of the individual principles have been applied in different settings in South Australia.

The case studies presented in this booklet are broad to represent different greening practices. They highlight the strategic value of the principles in varied settings. As infill development in South Australia continues to take shape, there will be increased opportunities to demonstrate local best practice examples of green open space solutions in denser urban environments.

Quality Green Public Spaces in their design, delivery and management respond to these key principles:

1. Promote community health and wellbeing
2. Connect with nature
3. Build stronger communities
4. Deliver connectivity and access for all
5. Contribute to neighbourhood character
6. Support resilient neighbourhoods

Design response:

- Accessible
- Bicycle friendly
- Supports community
- Connection to nature
- Water sensitive urban design
- Playspace and wellbeing
- Reinforcing local character and cultures

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Principle 1: Promote community health and wellbeing

Quality green public open spaces support and sustain the physical and mental health of our communities by providing inviting, welcoming and safe settings for outdoor pursuits, relaxation and social interaction.

OBJECTIVES

- Provide spaces that supports a range of outdoor activities for people of all ages and abilities.
- Provide spaces for rest and relaxation that allow for the interaction with the natural environment.
- Ensure that green spaces contain a variety of areas, plants and trees that add to the beauty and identity of the local area.
- Promote the establishment of shade by trees to encourage greater usage by communities.
- Encourage greater cycling and walking through open spaces with connected, enjoyable path networks and seating.
- Enhance views of the natural landscape and nature experiences to promote the mental health benefits of contact with nature.
- Provide green open spaces that increase opportunities for interaction, play and social inclusion.
- Promote rich, biodiverse environments that can improve human health and wellbeing.

DESIGN RESPONSES

- Develop spaces that encourage people to meet and interact through the design of footpaths, adequate provision of open space and facilities, which also incorporate the creation of shade.
- Create a range of flexible seating areas that are easily accessible, supported by park facilities and maximise views to trees, landscapes and open space.
- Locate footpaths and cycle paths to provide efficient connections into, through and around open spaces.
- Develop inviting play spaces and facilities that encourage healthy activities and being active.
- Design landscapes that maximise, enhance or return natural qualities to open space including; waterbodies, flowering plants, large trees and high canopies.


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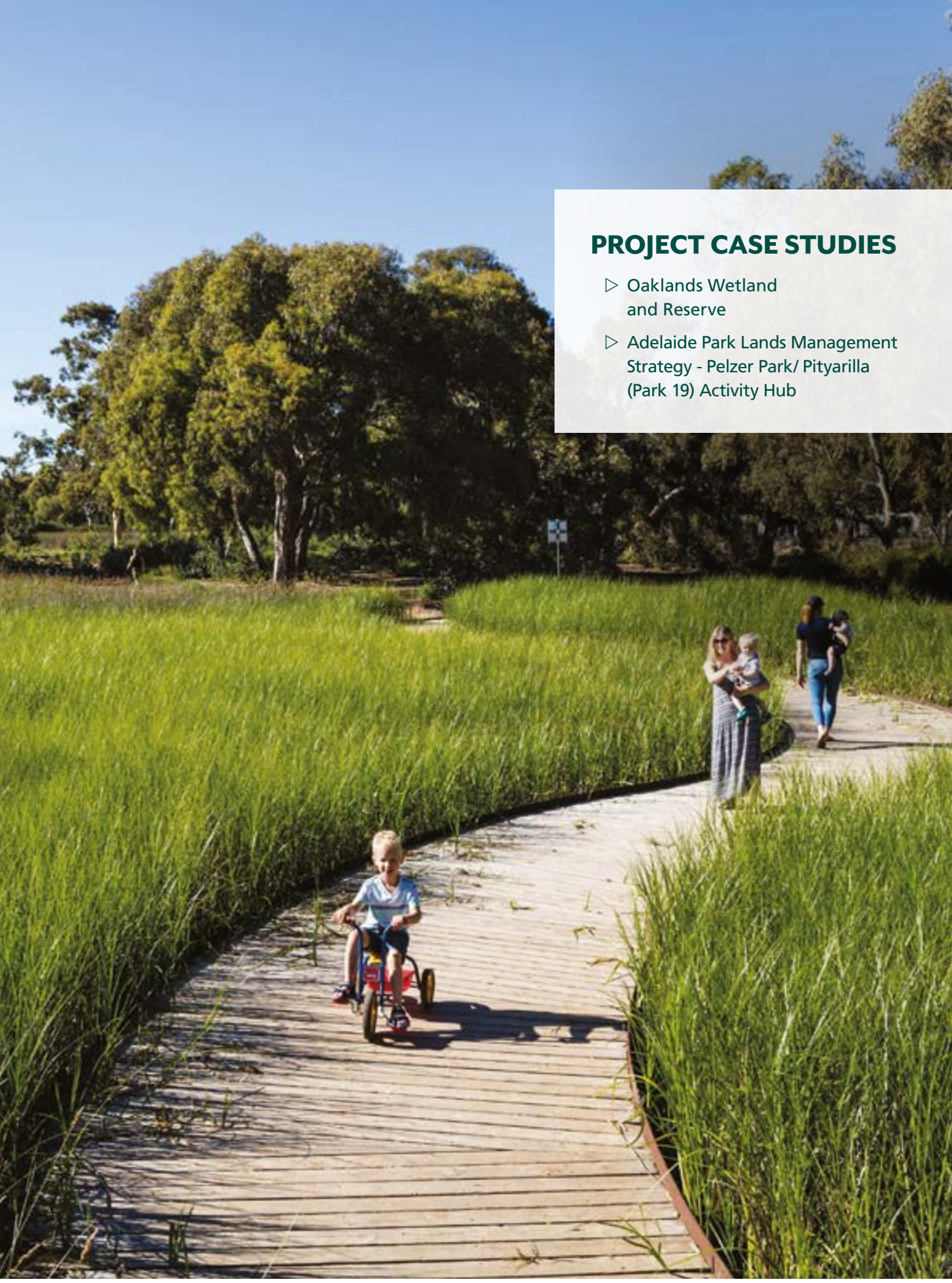

PROJECT CASE STUDIES

- Oaklands Wetland and Reserve
- Adelaide Park Lands Management Strategy - Pelzer Park/ Pityarilla (Park 19) Activity Hub

Oaklands Wetland and Reserve

The wetland is the centrepiece of the reserve and provides visitors with a range of immersive experiences. The landscape character of the park is defined by multiple ways to interact with the water's edge. There is a mix of formal and natural edges that encourage people to interact with water, through the meandering low bridges, weir bridges, and stepping stone pathways that allow people to walk out over the water.

The connecting circuit around the wetland forms an extended link to the adjacent linear trail for dog walkers, cyclists and general users alike.

The wetland offers numerous opportunities for landscape integration; supporting permanent water levels to be much closer to the wetland edges and enabling user's greater connections with nature. The wetland cleans stormwater from the Sturt River, it is then stored before being used to irrigate up to 30 council reserves.

- **Encourages healthy lifestyles by offering recreational opportunities in a beautiful green setting**
- **Provides a space for the community to come together to socialise**
- **Promotes mental wellbeing benefits of nature contact such as reduced stress and anxiety**

Client: City of Marion
This project was developed in partnership between:

- Australian Government's Water for the Future initiative through the National Urban Water and Desalination Plan
- Adelaide and Mount Lofty Ranges Natural Resources Management Board
- Government of South Australia, Department for Environment and Water (then Department for Water)

Landscape Architect:
TCL (Taylor Cullity Lethlean)

Location: Oaklands Park, Marion

Completion: 2014

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Adelaide Park Lands Management Strategy

Pelzer Park/ Pityarilla (Park 19) Activity Hub

Pelzer Park/ Pityarilla (Park 19) is an exemplary community park in the southern Adelaide Park Lands, providing a variety of recreation and play opportunities serviced by high quality facilities and amenities. The park has a strong connection to the wider Adelaide community, attracting visitors from across the state.

Custom play equipment incorporating climbing structures, rocks and logs, encourages imaginative play. Thoughtful details encompass the site, including ideas that were shared by the community during the consultation process for the project. The park is designed to be a multi-generational space to be enjoyed by all ages and cultures.

There are pedestrian and cycle connections in and around the site, and the park is close to public transport, enabling a wide range of visitors to access the park.

The redesign of Pelzer Park integrates the park's heritage and culture creating a vibrant and inspiring multi-use destination in the Park Lands for all to enjoy.

- **Promotes active and passive recreational opportunities, supporting healthy lifestyles**
- **Creates inclusive and accessible open space for all ages and abilities**
- **Delivers innovative activities and spaces for learning in an outdoor setting**

Client: State Government, Office for Design and Architecture (ODASA) and the City of Adelaide

Landscape Architect: ASPECT Studios

Location: South Park Lands, Glen Osmond Road, Adelaide

Completion: 2018

Principle 2: Connect with nature

Quality green public spaces support natural processes and place value on local flora and fauna. The provision of public green open space provides us with the opportunity to connect with nature through well established, resilient, attractive and accessible landscapes.

OBJECTIVES

- Reinforce the value of nature within green open spaces.
- Promote and integrate botanical, topographic, and hydrological systems to increase the natural value of green open spaces.
- Create biodiversity sites and habitats for native flora and fauna.
- Promote green open space that maximises seasonal opportunities for shade and access to sunlight, cooling breezes, protection from cold winds and shelter from the rain.
- Encourage the management of natural environments to ensure their longevity.
- Encourage and promote recreational use of natural environments and National Parks.
- Extend natural system networks and ensure the enhancement of biodiversity and habitat value.

DESIGN RESPONSES

- Plant and establish large trees and shrubs to increase canopy cover, shading and habitat value.
- Retain and protect existing natural features within open spaces to increase ecological value, especially mature trees including Regulated and Significant trees.
- Develop habitats to increase wildlife and biodiversity opportunities such as creeks, ponds, long grass, log piles and bee hotels.
- Establish space for healthy root and canopy growth to support the longevity of trees and shrubs.
- Plant species selection should consider climate adaptation, drought tolerance, provision of shade, amenity value, seasonal variations, significance to local fauna including birds, amphibians and insects.
- Deliver ongoing management to maintain the resilience, health and biodiversity of green open space and natural landscapes.

PROJECT CASE STUDIES

- ▷ Mukanthi Nature Play Space (Morialta Conservation Park)
- ▷ Torrens Linear Park

©Department for Environment and Water

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Mukanthi Nature Play Space

The play space complements and integrates seamlessly into the beautiful natural setting of Morialta Conservation Park. The existing landscape setting provides natural experiences that support nature play and discovery.

The nature play space is not constrained or prescribed, but inspires children to explore independently and aims to evoke imagination and creativity. Mukanthi fosters outdoor activities and connections to nature.

The play space has a series of nodes influenced by nature and Aboriginal cultural themes. These interactive elements are scaled and graduated to encourage children to interact through active and sensory play, nurturing inquisitive minds to support positive childhood development and an understanding of cultural and environmental values.

- **Capitalises on existing natural assets and delivers exposure to natural settings**
- **Offers engaging structures, cubbies and natural materials to support play opportunities and outdoor learning**
- **Provides local cultural and environmental themes that prmote learning experiences for children**

Client: Government of South Australia, Department for Environment and Water (then Department of Environment, Water and Natural Resources)

Landscape Architect: Peter Semple Landscape Architects (PSLA) & Climbing; Tree creations in collaboration with Indigenous artist Allan Sumner

Location: Morialta Conservation Park

Completion: 2017

Torrens Linear Park

The River Torrens Linear Park and Flood Mitigation Scheme was the first linear recreation park developed in Australia. Stretching for 30 kilometres, running from the Adelaide Hills to the coast, the project has seen the transition of the degraded storm water drain into a major linear park of national and international quality. The project was conceived and delivered over a period of nearly three decades.

The project was a joint state and local government venture involving, at the time of the initiative, 12 metropolitan councils and SA Water. The design of linear park integrated a diverse range of uses including storm water management, recreation use, habitat recreation, flood mitigation, transportation corridors and dual use bicycle and walking paths. The River Torrens Linear Park is recognised as a major conservation and recreation project that fulfils open space objectives for multiple stakeholders and users.

It is a multi-functional, regional open space corridor that offers recreational opportunities for people, a biodiversity network and essential drainage and flood management to the Adelaide metropolitan area.

The linear park project integrated existing reserves into the corridor to provide a linked open space network, which connects into surrounding residential areas and provides opportunities for active and passive recreational activity within a natural landscape setting.

- **Integration of riverine corridors and residential open space into a single linear park providing 30 kilometres of access to nature**
- **Use of natural waterways and wetlands to mitigate flooding while providing recreation and amenity value**
- **Development of active and passive recreation destinations within a natural landscape setting**

Client: E&WS
This project was a State and Local Government venture involving 12 LGA's (now 8) and SA Water (formerly E&WS).

Landscape Architect: Hassell

Location: River Torrens

Completion: 1979

Principle 3: Build stronger communities

Well-designed public green open spaces create unique settings that respond and adapt to demands and aspirations as our communities change socially, culturally, physically or environmentally. These spaces build a sense of belonging, encouraging greater social interaction, enjoyment and positive behaviours by providing a welcoming, safe and inclusive setting that can be enjoyed by people of all ages, needs, abilities and cultures.

OBJECTIVES

- Promote a 'people-centric' planning and design approach which supports individuals, communities and neighbourhoods.
- Involve the community in the design, maintenance and enhancement of green open space.
- Create spaces that are intergenerational, gender equitable, inclusive and multicultural.
- Create safe and welcoming quality green public spaces that encourage community to access and use.
- Promote green open space as urban commons and encourage the sharing of our cities, towns and neighbourhoods.
- Respond to changes in age profile, community size and cultural values.
- Encourage green open space designs that allows for adaptive reuse by the community in the future.
- Promote opportunities to integrate new open space and improved streetscapes within existing neighbourhoods and areas of urban infill.
- Promote inclusion and minimise conflicts between different user groups and individuals.

DESIGN RESPONSES

- Design flexible green space facilities to enable adaptation (e.g. flexible seating, lighting, planters, interactive public art and play and facilities that encourage physical activity).
- Implement sustainable, multi-functional spaces using robust materials, enduring designs and on-going management.
- Ensure that the rights of children and youth to play are considered and maintained within open space.
- Incorporate quality lighting to encourage evening use and promote safety.
- Deliver universal design standards (eg. furniture, path widths, ramps, surface treatments, and signage).
- Undertake reviews to ensure green open space is able to adapt and evolve in response to social and environment changes.

PROJECT CASE STUDY

Bowden Main Park and Square

The site is an oasis of green – a unique urban park integrated with the adjacent Plant 4 food markets and community use facilities, as well as the surrounding street network.

Designed and delivered through a process of engagement and collaboration between State and Local Government as well as the local Bowden community, the Square comprises a park, community hub and a market precinct at the centre of the Bowden redevelopment.

The Square contains a water fountain, located in a central point adjacent to Plant 4. Surrounded by custom seats, the water feature offers opportunities for play with a variety of water displays creating an ever-changing attraction in the heart of the park.

A network of pathways provides access from the surrounding streets and reveal recycled red bricks in the pavement that reflect Victorian workers cottages, which once lined the streets prior to the building of the Clipsal factory (the factory occupied the site before it was redeveloped by Renewal SA).

Opportunities for play are evident through the gardens along the northern edge of the park, creating unique play spaces consisting of jetty timbers, sand pits and plants.

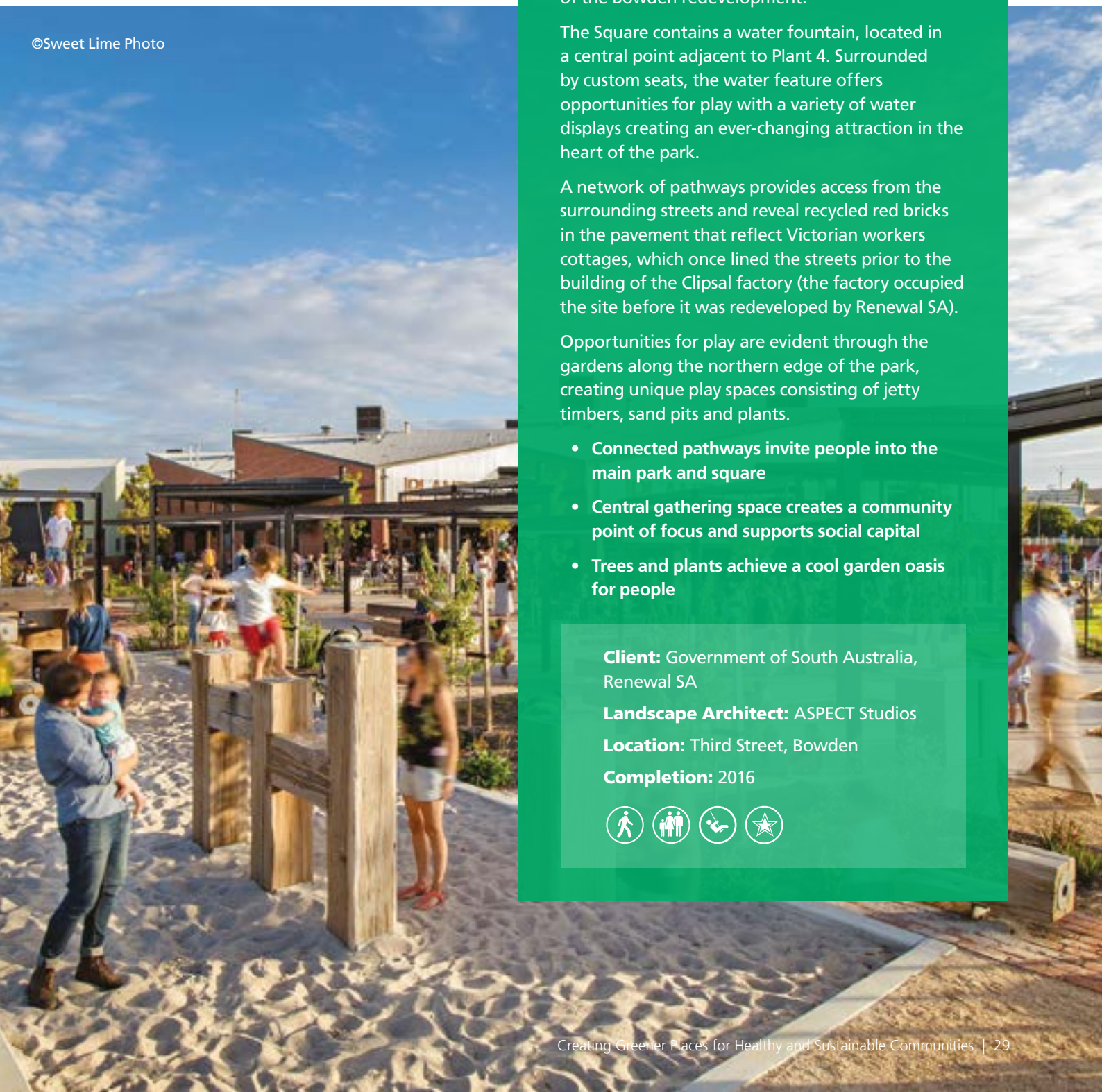
- **Connected pathways invite people into the main park and square**
- **Central gathering space creates a community point of focus and supports social capital**
- **Trees and plants achieve a cool garden oasis for people**

Client: Government of South Australia, Renewal SA

Landscape Architect: ASPECT Studios

Location: Third Street, Bowden

Completion: 2016



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Principle 4: Deliver connectivity and access for all

Well planned green open spaces are easily accessible for everyone and contribute to wider open space networks and landscapes. Accessible green open spaces enable people to move, stay and play.

OBJECTIVES

- Ensure that networks of local green open spaces are accessible, equitable, unambiguous, inclusive and highly legible to everyone as part of a diverse range of green open space experiences.
- Promote greener, shadier streetscape networks that better accommodate pedestrians and cyclists.
- Connect parks, schools, main streets, community facilities and adjoining land uses with open space networks in the area to maximise access to green open space for the community and visitors.
- Provide multi-use trails that are safe.
- Ensure strong links and/or public transport routes that enable connections with other district and regional open spaces and destinations.
- Seek to understand and respond to the needs of the community when planning for green open space through meaningful and inclusive public participation in engagement processes.

DESIGN RESPONSES

- Design for all ages and abilities with rest stops, paths, ramps, signage and wayfinding.
- Meet universal access and mobility standards and consider lighting, street furniture, path widths, surface materials and signage.
- Undertake community engagement to ensure design responses are reflective of community values and needs.

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PROJECT CASE STUDIES

- ▷ Henley Square
- ▷ Hendrie Street Reserve

Henley Square

Henley Square is the major coastal focal point and node within the City of Charles Sturt. The public profile of Henley Square defines the character of the local area. The Square is one of Adelaide's iconic seaside destinations creating an accessible 'village' feel which has been established through its unique development, taking account of the local heritage and history.

The Council and community recognised the value and potential that the Square plays within the wider Henley Precinct. The Square has evolved over time to respond to the changing needs of the community. The present design of the public open space has enabled a new level of connectivity, which encourages people to stay, play, congregate and interact.

The Square has a renewed sense of vibrancy. The reinvigorated open space caters for people to connect to each other and their environment. The combination of outdoor dining, water features, lawns, seating areas, as well as the accessibility of the plaza combine to enhance the village atmosphere, which supports social interaction and community connectivity.

- **Supports connectivity and permeability through and around the square**
- **Creates effective and innovative connections with the foreshore, jetty, henley surf life saving club, main street, commercial properties and residential developments**
- **Encourages social integration through different open spaces and land uses**

Client: City of Charles Sturt
Delivery partners also included Federal Government and State Government (Places for People)

Landscape Architect: TCL (Taylor Cullity Lethlean)

Location: Seaview Road, Henley Beach

Completion: 2015

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Hendrie Street Inclusive Playspace

Hendrie Street Reserve in Park Holme is the first inclusive play space for the region. The City of Marion developed a purpose built inclusive play space that caters for children and adults of all ages and abilities.

The reserve includes elements for a broad range of special needs such as mobility, vision and hearing impairments as well as spectrum disorders such as autism. By integrating play equipment, seating areas, access paths and ramps with trees and plants, the Hendrie Street Reserve responds to the specific needs of users, providing a green equitable play experience.

The inclusion of unique public artworks adds to the character of the reserve and reinforces the inclusive and accessible nature of Hendrie Street Reserve.

- **Delivers an inclusive and equitable play experience**
- **Encourages equitable social interaction and accessibility for all**
- **Integrates greening and public art to enhance community activation**

Client: City of Marion
This project was developed in partnership with the Touched by Olivia Foundation (TBOF) and in collaboration with the State Government. Additional funds were received from Arts SA and the Rotary Club of Edwardstown.

Landscape Architect: City of Marion

Location: Park Holme

Completion: August 2018

Principle 5: Contribute to neighbourhood character

Well planned public green open spaces respond to, support and enhance their surroundings and create positive relationships between natural landscapes, existing open spaces, building edges, neighbourhood character and other community infrastructure.

OBJECTIVES

- Ensure that green open spaces interact, respond and integrate with surrounding land uses and building contexts.
- Promote contextual design responses that support and promote neighbourhood character and community values.
- Protect cultural values associated with neighbourhoods and open space.
- Promote planting designs that respond to the ecology, soil type, micro-climate, local landscape character and cultural values.
- Promote green open space, streetscapes and other spaces that increase the amenity, landscape value and community benefit of our neighbourhoods.
- Encourage the retention and maintenance of existing open space, trees and valued community assets.

DESIGN RESPONSES

- Identify neighbourhood values and elements that contribute to the development and reinforcement of overall neighbourhood character.
- Design in response to local landscape, cultural and climatic conditions.
- Develop landscape responses that capitalise on the varied spaces that are created by the fabric of our cities, towns and neighbourhoods.

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PROJECT CASE STUDY

Willunga Main Street

Willunga has a rich history that is reflected in the buildings, streets and open spaces as well as the people and communities that live in the town. The upgrade of High Street and Main Road reinforced the character of Willunga, in particular the heritage, culture and local environment.

The unique history of Willunga was reflected in the paving, street furniture and garden beds. The streets are embedded with historical narratives and influenced by the community. Slate gutters and rain gardens reflect the creek lines of the Willunga escarpment. The paving patterns use historical survey references while the gardens reflect the King of the Mountain status that Willunga Hill has for cyclists around the world.

The character of the town is captured in the artefacts contained within the street furniture and the brass interpretative signage. The trees and gardens provide significant levels of amenity for the town, whilst providing shade and cooling.

- **Open spaces and streets that reflect the character of the town**
- **Use of local materials to reinforce a sense of place**
- **Retention of existing trees and careful integration of new landscapes**

Client: City of Onkaparinga

Landscape Architect: WAX Design

Location: Willunga Main Street, Willunga

Completion: 2017

Principle 6: Support resilient neighbourhoods

Well-planned public green open spaces mitigate the adverse effects of development in our cities and neighbourhoods. These open spaces improve the resilience of our communities, offset impacts of climate change and provide health, environmental and economic benefits.

OBJECTIVES

- Ensure that the distribution of green open space resources and facilities are equitable and unbiased based on provision, needs and demand.
- Integrate Water Sensitive Urban Design (WSUD) principles without impacting on open space provision and quality.
- Promote safe green open space.
- Improve air and water qualities through the design of quality green open spaces.
- Ensure that green open spaces are resilient to the progressive effects of climate change.
- Encourage green open spaces that reduce and mitigate the effect of Urban Heat Islands.
- Encourage streetscapes and open spaces with large trees that increase the attractiveness of neighbourhoods and harness potential economic benefits.
- Improve energy conservation through microclimate control.
- Promote resource efficiency, durable and sustainable materials, and low maintenance planting strategies.
- Increase exposure to green open space and associated community health and wellbeing benefits.
- Explore new 'smart city' technologies, 'soft' engineering approaches and whole-of-life-cycle cost and energy evaluation to encourage responsive and resilient open spaces.

DESIGN RESPONSES

- Design and plan green open space to manage stormwater to improve water quality and facilitate Water Sensitive Urban Design (WSUD).
- Select trees, shrubs and other materials that improve air quality and provide reductions in atmospheric pollution.
- Select trees, shrubs and other materials that respond to climate change and mitigate the impacts of extreme weather.
- Maximise areas of vegetation cover and irrigated grass to reduce the effect of Urban Heat Islands.
- Select species that reduce maintenance, including irrigation, and that support vegetation health.
- Apply Crime Prevention Through Environmental Design (CPTED) principles to the design and implementation of quality green open space.
- Deliver an optimum level of irrigation to maintain the establishment of green open spaces.
- Allocate resources and maintain all open space to a high level to reflect demand and provision.
- Undertake tree management and garden maintenance to ensure the health of green open space.
- Develop an asset renewal program that is consistent with demand and open space provision.

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PROJECT CASE STUDY

Tonsley Innovation District

Tonsley is Australia's first innovation district bringing together leading-edge institutions and companies to connect with start-ups and business incubators. The former manufacturing park has become a sustainable centre for business, providing a collaborative environment that supports high value industry.

The site is unique and vast. An 11 hectare sawtooth roof is prominent and encapsulates the Main Assembly Building, which is the heart of the precinct and the focus of retail activity. This sits amid a larger site - formerly the Chrysler and then Mitsubishi car factory. Raw materials, including weathered steel, timber and concrete, are used as part of the Main Assembly Building and reflect the existing character of the site. 'Cut out' sections of the roof have enabled trees and gardens to be planted within the industrial structure, allowing the natural landscape to emerge from the framework.

The open space transforms a post-industrial brown field site into a place for people and communities. The landscape architecture celebrates the physical, social and cultural history of the site and surrounding areas and creates an environment that encourages social interaction. The development brings together the disciplines of commerce, technology, research, and education. It is a multipurpose facility that aims to be a major employment hub for the southern areas of Adelaide. A dedicated residential area also features as part of the mixed-use precinct.

This project is the first in Australia to be awarded the 6-Star internationally recognised Green Star Communities Certification, recognising the project's commitment to sustainable outcomes in a mixed-use development.

- **Sustainable reuse of a post industrial site**
- **Focus on social interaction that promotes commerce, research and education**
- **Trees and plants create green spaces and urban forests**

Client: Renewal SA, Department of State Development (Formerly DMITRE): Development Strategy, City of Marion: Local Government

Landscape Architect: Oxigen

Location: 1284 South Road, Clovelly Park

Completion: On-going

Conclusion

As more and more people live in high-density environments with no backyards, quality public green open space is of critical importance. Green open spaces have a broad value to society – offering a triple bottom line (social, environmental and economic benefits) that serves to cater for the diverse needs of our community.

Coordinated state-wide action that is underpinned by governance and support and guidance is necessary to ensure new approaches for greening are developed and implemented, and support greening strategies more broadly. The new planning system in South Australia offers a viable framework to improve the quality of our public green open spaces in development; in particular in urban infill development in established areas, urban renewal areas, growth areas, priority precincts and in neighbourhoods where there is a deficiency in green cover.

The six principles are intended to recognise and support a greater focus on quality green public spaces, and the important role they play in creating more liveable neighbourhoods. It is envisaged that these principles will guide the long-term planning, design, development and management of Greater Adelaide's green open spaces within our changing urban environment.

The Principles for Quality Green Public Space set out to guide decision-making on greening practice, advocate for improved open space provision, and support an integrated approach to making our city, regions and neighbourhoods greener.

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- Australian Institute of Landscape Architects (AILA), SA Chapter
- Department of Planning, Transport and Infrastructure, including;
  - Planning and Development Division
  - The Office for Design and Architecture SA
  - The Office for Recreation, Sport and Racing
- Heart Foundation (SA Division)
- Department for Environment and Water
- Department for Health and Wellbeing
- Water Sensitive SA
- City of Adelaide

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- Sponsors of the HPHPSA Quality Green Public Space Action Plan
- HPHPSA Leadership Team
- Quality Green Public Space Reference Group
- AILA SA Chapter Membership Group
- Case study authors and their respective organisations

Research

The evidence used to inform the principles was largely drawn from a literature review undertaken by the University of Melbourne and RMIT University,[41] which was commissioned to support the collaborative work of the HPHPSA Quality Green Public Space Action Plan.

Definitions

Density	A measure of the population (persons) or the number of dwelling units in a given area.
Greater Adelaide	Encompasses an area of 9000km^2, a population of 1.43 million and contains 84% of SA's population.
Green Infrastructure	The network of green spaces and water systems that delivers multiple environmental, social and economic values and services to urban communities
Green open space	Areas of public and private land that contain trees, watercourses and other landscape elements that make up resilient ecological systems.
Green public space	Vegetated land freely available for the public to access including parks, public gardens, playgrounds, sporting fields, waterways, lakes, wetlands, conservation areas, civic squares and plazas, accessible school grounds, some community gardens and rooftop gardens in the public realm, greenways and many streetscapes.
Infill	The rededication of land in an urban environment to new construction. Infill also applies within an urban area to construction on any undeveloped land that is not on the urban fringe.
Infill housing	The development or construction of additional housing units into an existing subdivision or neighbourhood. These can be provided through the division of existing land or homes into multiple units or by creating new residential lots by further subdivision or boundary adjustments. Units may also be built on vacant lots.
Local Government Areas (LGAs)	Local Government Areas are an ABS approximation of officially gazetted Local Government Areas as defined by each State and Territory Local Government Department.
Public open space	Open space is any piece of land that is undeveloped and is accessible to the public. Open space usually refers to green space ie. land that is partly or completely covered with grass, trees, shrubs, or other vegetation.
Quality green public space	Public accessible open space and urban realms that promote human health and wellbeing and enable a strong connection to nature through the establishment of sustainable and resilient landscapes (including trees, shrubs and vegetation).
Regulated and Significant Trees	Legislation protecting large trees across the Greater Adelaide region
Rest stops	Areas of landscape and street furniture located at regular intervals in the order of 300m and including seating, paths, shade trees and shrubs.
Seating	Benches and seats with backrests and arms to facilitate comfortable seated rest and increase accessibility for older aged people.
Tree Canopy	Health establishment of a typical branching structure, foliage and crown of the tree.
Urban Heat Islands	Urban areas that are significantly warmer than surrounding rural or natural areas due to human activities and land uses.
Water Sensitive Urban Design (WSUD)	An urban planning and engineering design approach which integrates the urban water cycle, including stormwater, groundwater and wastewater management and water supply into urban design to minimise environmental degradation and improve aesthetic and recreational appeal.

References

1. Government of South Australia (2017) The 30-Year Plan for Greater Adelaide. 2017 Update. http://livingadelaide.sa.gov.au/ [Accessed 17 August 2018].
2. Amati, M. et al (2017) *Where should all the trees go? Investigating the impact of tree canopy cover on socio-economic status and wellbeing in LGA's.* Prepared for Horticulture Innovation Australia Limited by the Centre for Urban Research, RMIT University. Available at: http://202020vision.com.au/help-hub/the-research-hub/detail/?id=4059. [Accessed 17 August 2018].
3. City of Adelaide: Adelaide Park Lands: https://adelaideparklands.com.au/parks-and-squares/ [Accessed 17 August 2018].
4. Astell-Burt, T., et al. (2014). *Do low-income neighbourhoods have the least green space? A cross-sectional study of Australia's most populous cities.* BMC Public Health 14(1): 1.
5. Wolf, K. L. and A. S. Robbins (2015). *Metro nature, environmental health, and economic value.* Environmental Health Perspectives 123(5): 390-398.
6. McMorris, O., et al. (2015). *Urban greenness and physical activity in a national survey of Canadians.* Environmental Research 137: 94-100.
7. Barton, J. and J. Pretty (2010). *What is the best dose of nature and green exercise for improving mental health? A multi-study analysis.* Environmental Science & Technology 44(10): 3947-3955.
8. Bodin, M. and T. Hartig (2003). *Does the outdoor environment matter for psychological restoration gained through running?* Psychology of Sport and Exercise 4(2): 141-153.
9. Francis, J., et al. (2012). *Creating sense of community: The role of public space.* Journal of Environmental Psychology 32(4): 401-409.
10. South, E.C., et al. (2018). *Effect of greening on vacant land on mental health of community-dwelling adults: A cluster randomized trial.* JAMA Network Open; 1(3):e180298. https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2688343. [Accessed 10 December 2018].
11. Bowler, D. E., et al. (2010). *A systematic review of evidence for the added benefits to health of exposure to natural environments.* BMC Public Health 10: 456.
12. Taylor, A. and F. E. M. Kuo (2011). *Could exposure to everyday green spaces help treat ADHD? Evidence from children's play settings.* Applied Psychology: Health and Well-Being 3(3): 281-303.
13. Amoly, E., et al. (2014). *Green and blue spaces and behavioral development in Barcelona schoolchildren: the BREATHE Project.* Environmental Health Perspectives. 2014; 122 (12): 1351-1358.
14. Dadvand, P., et al. (2015). *Green spaces and cognitive development in primary schoolchildren.* Proceeds Natural Academy of Science USA 112(26): 7937-7942.
15. Kim, J. and Kaplan, R. (2004). *Physical and psychological factors in sense of community: new urbanist Kentlands and nearby Orchard Village.* Environment and Behavior 36(3):313-340.
16. Derkzen, M. L., et al. (2015). *REVIEW: Quantifying urban ecosystem services based on high-resolution data of urban green space: an assessment for Rotterdam, the Netherlands.* Journal of Applied Ecology 52(4): 1020-1032.
17. Armson, D., et al. (2012). *The effect of tree shade and grass on surface and globe temperatures in an urban area.* Urban Forestry & Urban Greening 11(3): 245-255.
18. Nouri, H., et al. (2013). *A review of ET measurement techniques for estimating the water requirements of urban landscape vegetation.* Urban Water Journal 10(4): 247-259.
19. World Health Organization, Regional Office for Europe (2016). Urban green spaces and health. Copenhagen: WHO.
20. Marchant, C., et al. (2013). *Air contaminant statistical distributions with application to PM10 in Santiago, Chile.* Reviews of Environmental Contamination and Toxicology Volume 223, Springer: 1-31.
21. Nowak, D. J., et al. (2006). *Air pollution removal by urban trees and shrubs in the United States.* Urban Forestry & Urban Greening 4(3): 115-123.

22. Sadler, J., et al. (2010). *Bringing cities alive: the importance of urban green spaces for people and biodiversity.* Urban ecology. Cambridge University Press, Cambridge: 230-260.

23. Ikin, K., et al. (2013). *The influence of native versus exotic streetscape vegetation on the spatial distribution of birds in suburbs and reserves.* Diversity and Distributions 19(3): 294-306.

24. World Health Organization and Convention on Biological Diversity (2015). Connecting global priorities: Biodiversity and human health; a state of knowledge review.

25. Forsyth, A., et al. (2005). Designing small parks: a manual for addressing social and ecological concerns, John Wiley & Sons.

26. Mitchell, R. J., et al. (2015) *Neighborhood environments and socio-economic inequalities in mental well-being*. American Journal of Preventive Medicine 49:80-84.

27. Mitchell, R. and F. Popham (2008). *Effect of exposure to natural environment on health inequalities: an observational population study.* The Lancet 372(9650): 1655-1660.

28. NSW Greener Places (2017): Establishing an urban Green Infrastructure policy for New South Wales. Draft for discussion.

29. AECOM. A brilliant cities report: Green Infrastructure (2017). https://www.aecom.com/brilliantcityinsights/brilliant-cities-insights-greening/. [Accessed 11 December 2018].

30. McPherson, EG et al (2016) *Structure, function and value of street trees in California, USA*. Urban Forestry & Urban Greening 17 (2016) 104–115.

31. Hartig, T., G. W. Evans, L. D. Jamner, D. S. Davis, and T. Gärling (2003). *Tracking restoration in natural and urban field settings.* Journal of Environmental Psychology 23:109–123.

32. Jiang, B., et al. (2014). *A dose-response curve describing the relationship between urban tree cover density and self-reported stress recovery.* Environment and Behavior 48(4):607-629.

33. White, M., et al. (2013). *Would you be happier living in a greener urban area? A fixed-effects analysis of panel data.* Psychological Science 24:920–8.

34. Ulrich, R. S. (1984). View through a window may influence recovery from surgery. Science (New York, N.Y.) 224:420–421.

35. Forsyth, A., et al. (2008). *Design and Destinations: Factors Influencing Walking and Total Physical Activity.* Urban Studies 45(9), 1973-1996.

36. Lee, C. (2007). *Environment and active living: The roles of health risk and economic factors*. American Journal of Health Promotion 21(4), 293-304.

37. Lafortezza, R., et al. (2009). *Benefits and wellbeing perceived by people visiting green spaces in periods of heat stress.* Urban Forestry & Urban Greening 8(2): 97-108.

38. Kardan, O. et al. (2015). *Neighborhood greenspace and health in a large urban center.* Scientific Reports. 5, 11610; doi: 10.1038/srep11610.

39. Jennings, V., and C. J. Gaither. (2015). *Approaching environmental health disparities and green spaces: An ecosystem services perspective.* International Journal of Environmental Research and Public Health 12:1952–1968.

40. Donovan, G. H., et al. (2013). *The relationship between trees and human health: Evidence from the spread of the emerald ash borer.* American Journal of Preventive Medicine 44: 139–145.

41. Davern, M., Farrar, A., Kendal, D. & Giles-Corti, B. (2016). *Quality Green Public Open Space Supporting Health, Wellbeing and Biodiversity: A Literature Review.* Report prepared for the National Heart Foundation. University of Melbourne: Victoria.