NSW Smart Public Spaces Guide

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NSW
GOVERNMENT

Acknowledgement of Country

Transport acknowledges the traditional custodians of the land and pays respect to Elders past and present.

We acknowledge Aboriginal people as the traditional custodians of the lands and waterways that exist as our public spaces in communities today.

We acknowledge the continuous deep relationship and connections of Aboriginal people to their land, language, song, dance, art and story that have existed for tens of thousands of years.

We pay respect to those ancestors who defended, walked and managed these lands for many generations before us and who have left a legacy of strong cultural wisdom and knowledge embedded within Country today.

In supporting Smart Public Spaces, Transport is committed to honouring and finding new ways to represent and celebrate Aboriginal peoples' cultural and spiritual connections to the land, waters and seas, and their rich contribution to society.
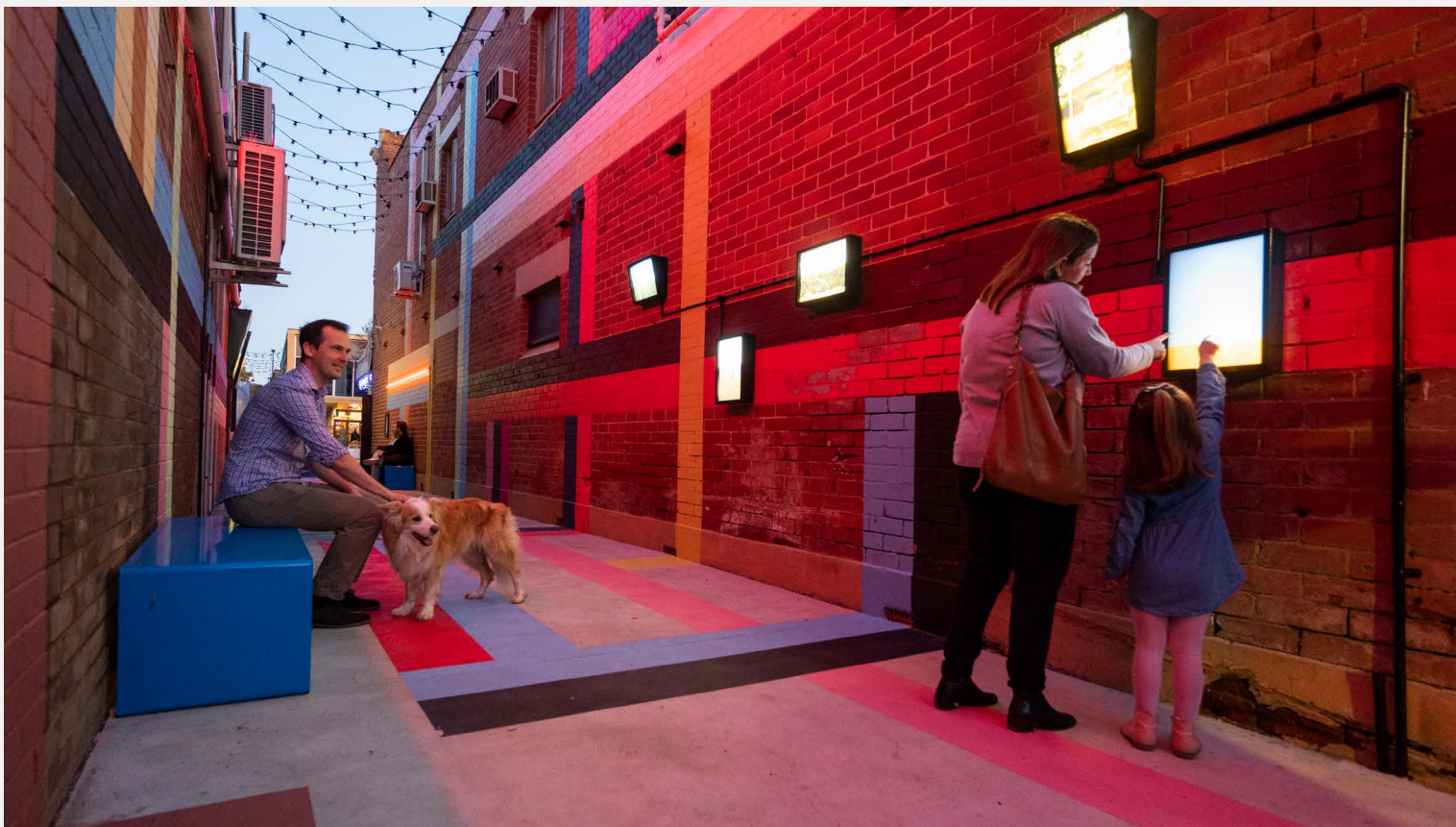
Queanbeyan-Palerang Regional Council, Yanni Pounartzis and Hilary Wardhaugh

Contents

Introduction

The NSW Smart Public Spaces Guide introduces the role of technology in delivering better public space outcomes for communities.

Technology contributes to great public spaces

The community highly values public spaces for the central role they play in our experience of living in urban centres and the way they support our journeys on a daily basis.

People are also more connected than ever before. The rise of digital solutions and new technologies has helped us participate in civic life in new ways.

This guide brings these 2 big shifts together. It is designed to spark ideas and encourage you to harness innovative new approaches to delivering quality public spaces for our communities. It showcases the ways you can use connected technologies to enhance the quality of public spaces and measure quality outcomes.

This guide forms part of the NSW Great Public Spaces Toolkit and can be used alongside other guides and resources.

The NSW Smart Places Playbook provides more information on the steps needed to harness the power of data and smart technologies to deliver more resilient places that respond to the community's needs. The playbook also includes helpful links to technical guidelines, policies and standards.

For more resources to help you deliver Smart Public Spaces, please see page 16.

Image: Connected Garden, The Royal Botanic Garden Sydney
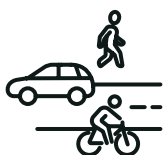
What is public space?

Public spaces are all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive. They include:

Public open spaces
parks, gardens, playgrounds, public beaches, riverbanks and waterfronts, outdoor playing fields and courts, and bushland that is open for public access

Public facilities
public libraries, museums, galleries, civic/community centres, showgrounds and indoor public sports facilities

Streets
streets, avenues and boulevards; squares and plazas; pavements; passages and lanes, and bicycle paths
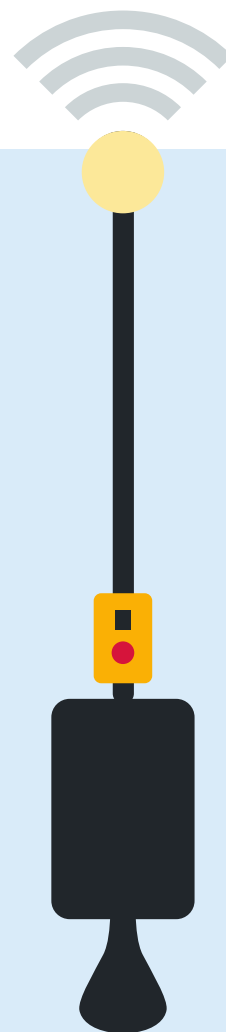
What are smart public spaces?

Smart public spaces are streets, public open spaces, and public facilities using technology to improve the quality of life of our communities.

Technology can support a better public space experience by increasing accessibility (can I get there?), engagement in activities (can I play and participate?), sociability (can I connect?), and comfort (can I stay?).

The data generated by smart public spaces helps improve the visitor experience; informs the way they are planned, managed and maintained; and drives innovation and business opportunity.

The quality of a public space makes people feel safe, welcome and included. Quality is not only reflected in a public space's physical form – how it's designed, maintained and integrated with its environment – but also through the activities it supports and the meaning it holds. Consistent with the NSW Evaluation Tool for Public Space and Public Life, public space quality can be evaluated in 4 ways:

They are accessible	Am I able to get there?
People can in engage in activites there	Am I able to play and participate?
It is a sociable place	Am I able to connect?
The space is comfortable and has a good amenity	Am I able to stay?

Benefits of smart public spaces

When digital connectivity and technology solutions are used in public spaces, they provide new information and insights. This can help us to quantify and improve the quality of public spaces and the experience of people using and visiting them.

A smart public space:

Connects people, both to the public space and to each other

Increases inclusivity and accessibility for everyone

Engages visitors to invite more feedback on their experiences in a public space

Increases resilience and efficiency, supports management and informs programming of public space

Supports the planning and maintenance of equipment, street furniture, and infrastructure to meet the needs of communities

Supports the health and wellbeing of visitors and users and makes it safer to stay after dark

Drives economic activity and supports local businesses

Generating and collecting

What happens:
Technology generates data

Tools to make it happen:
- sensors
- GPS
- social data
- pedestrian counting

Housing and protecting

What happens:
Data is transmitted, stored, shared and managed by data custodians.

Tools to make it happen:
- data platforms

Analysing and sharing

What happens:
Data sources are brought together. Data is de-identified, cleansed and shared. Data is analysed to generate insights that are shared.

Tools to make it happen:
- machine learning
- artificial intelligence tools
- open data APIs

Informing and acting

What happens:
Insights are communicated to inform decisions and drive actions – machine to human or machine to machine.

Tools to make it happen:
- public display boards
- connected street furniture
- watches, phones, tablets
- internet dashboards
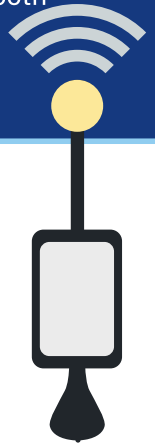- speakers, alarms/alerts
- digital twin visualisations

Connecting

What happens:
Data and insights are moved through the value chain

Tools to make it happen:
- power and fibre
- 4G/5G mobile networks
- Internet of Things Networks
- wi-fi
- Bluetooth

Smart public spaces – open spaces

Connecting public spaces

A Fibre and power to street furniture and multi-function poles

B Mobile coverage, wi-fi and Internet of Things networks

Generating and collecting

C Network of multi-function poles to house devices, small cells and sensors to collect data - like speakers, CCTV, movement-activated lights, emergency safety buttons, noise monitors to detect anti-social behaviour, and sensors on local environment (including air quality, temperature), pedestrian counts and movement

D Ground moisture sensors

E Sensors on play equipment, sanitising stations and BBQs monitoring utilisation

F Sensors monitoring waste levels in bins, making collection more efficient and reducing litter

G QR codes inviting feedback, engaging with community, linking to interactive hybrid play

Informing and acting

G Live information boards on street furniture and multi-function poles, providing local information on park bookings, transport, weather, shade, events and culture

H Data and insights to governments to measure activity, keep places safe and tidy and maximise use of park infrastructure

I Benches equipped with charging stations and speakers for people to hear local history, news and information

J Live information direct to customers and community to help them plan visits

K Online dashboards with live community information to help customers plan visits

L Live air quality and/or heat alerts to subscribers' phones or smart device triggered by GPS

M Smart irrigation system triggered by weather data and ground moisture sensors.

Smart public spaces – streets

Connecting public spaces

A Fibre and power to street furniture and multi-function poles

B Mobile coverage, wi-fi and Internet of Things networks

C Electric vehicle charging station

Generating and collecting

D Network of multi-function poles to house devices, small cells and sensors to collect data - like speakers, CCTV, movement-activated lights, emergency safety buttons, noise monitors to detect anti-social behaviour, and sensors on local environment (including air quality, temperature), pedestrian counts and traffic movement

E Ground moisture sensors monitoring tree health

F GPS tracking transport for live-transport data

G Sensors monitoring waste levels in bins, making collection more efficient and reducing litter

H QR Code invitation to provide feedback and engage with community

Informing and acting

I Interactive pavement marking, giving pedestrians priority in peak times

J Live information boards on street furniture and multi-function poles, providing local information on transport, weather, events and culture

K Loud speakers to help relay emergency information

L Data and insights on activity to businesses to help them design services and customer offerings

M Data and insights to governments to measure activity, keep places safe and provide services to customers

N Online dashboards with live community information to help customers plan visits.

Smart public spaces – public facilities

Connecting public spaces

A Fibre and power

B Mobile coverage, wi-fi and Internet of Things networks

Generating and collecting

C Environmental sensors – thermal comfort

D Plant health moisture sensors

E People counters, online booking systems

F Interactive displays

Informing and acting

G Live booking system – information to visitors on how busy the facility is

H Data to facilities managers to help predict resourcing needs

I Remote building management, maintaining thermal comfort for visitors

J Responsive dripper system for plant health

K Data and digital literacy programs increasing citizen capability and inclusion

L Augmented and virtual reality immersion experiences

M Public connectivity – supporting equity and remote working opportunities

N Collaborative innovation using live local data

Am I able to get there?

For public space to be inclusive, it must be culturally, physically and socially accessible. Technologies already play a large part in helping us to travel around and through our communities, providing live information on transport, traffic, and parking. There are big opportunities to use technologies to support walking and cycling to connect people to public spaces.

- Accessible
- Rideable
- Walkable
- Proximity

- Legible
- Connected
- Equitable

Case Study: Digital Smart Kerbs

Digital Smart Kerbs in Campbelltown and Penrith are providing data insights about the use of footpaths and kerbside lanes to councils. This helps councils make decisions about street design and local land use.

When the system is coupled with dynamic parking signs, councils can also adapt kerbside parking to meet local needs at different points in time.

The pilot is part of the Smart Places Acceleration Program, part of the Digital Restart Fund.

Case Study: Staying safe on your journey

Transport for NSW is developing innovative solutions to help keep its customers safe.

It is exploring:

- connected CCTV to detect threatening behaviours and alert an operator to quickly respond
- a passive surveillance index to predict the safety of a route using information about open businesses and available lighting. This will be useful in customer wayfinding apps.

New smart solutions like these are helping people to get to public spaces safely. The same approaches can be used in public spaces as well to help people to feel safe and secure while they visit.

Image: Transport for NSW

Am I able to play and participate?

Public space plays a crucial role in building sustainable and healthy communities by supporting social interaction and connection, and providing play and active recreation opportunities. Smart public spaces are all about blending the real with the virtual, and using technologies to make public spaces inclusive and fun for all.

- Active
- Diverse
- Vibrant
- Creative
- Cooperative
- Fun
- Loveable

Case Study: Night Galleries light up places after dark

The City of Newcastle chose underlit, and underutilised public spaces in their CBD to be activated by digital lighting and interactive displays with works of art drawn from local artists and the Newcastle Art Gallery. The modular and relocatable Night Galleries are completely solar-powered, encourage play, discovery and interaction using smart sensors, sound, light, and augmented reality.The initiative is part of Council's Newcastle After Dark: Night-Time Economy Strategy, providing an innovative solution to activate public spaces, create passive surveillance and increase perceptions of safety.

Case Study: ChillOUT and connect

Georges River Council installed smart ChillOUT hubs that offer people a free, comfortable place to meet, work and play. The data collected through the hubs also helps councils to monitor utilities, visitation and the microclimate. Each hub is right for its community. The Kogarah Hub site is just outside the library. Kogarah is a culturally diverse and dense area. Its hub offers a place to take a break along a busy thoroughfare or work outdoors using the free wi-fi and charging points. The Hurstville Hub is in a suburban park, offering a place for family gatherings and parties.

Case Study: Interactive play

The play equipment in Kinkuna Park in Eglinton is kitted out with augmented reality 'markers'. The interactive players are linked to a free smartphone app, giving parents access to games to engage children of all ages and abilities in energetic, imaginative play. Children can spot digital butterflies near the swings or climb ladders in search of runaway robots. It's blending the physical and virtual worlds of play for kids. The technology collects data to help councils better understand how, when, and why their community is using the playground.

Image: Newcastle Night Galleries, Newcastle City Council

Am I able to connect?

Public spaces bring people together and build strong, connected and resilient communities. For smart public spaces, connectivity is about more than wi-fi, fibre and mobile coverage. Technologies can also create connections between communities, and between people and places, their history, culture and heritage.

- Authentic
- Welcoming
- Inclusive
- Interactive
- Stewardship
- Character
- Sociable

Case Study: Connecting open spaces

Sydney's Royal Botanic Gardens and The Domain have a network of multi-function light poles equipped with mobile small cells. The poles also have wi-fi capability, and when enabled, this provides visitors with free internet connectivity and access to information about the garden and the area.

The multi-function poles also include 'ranger assist' push buttons, general-purpose power points, electric vehicle charging points and sensors to provide data on visitation. Housing all this equipment and infrastructure in the pole reduces clutter.

Every pole has power and fibre, so there is limitless capacity for future digital services.

A similar approach on a smaller scale has also been adopted by Wollondilly Shire Council in Telopea Park.

Case Study: Connecting to Country

The language and heritage of First Nations' Australians is being highlighted through smart city technology in Newcastle.

In 2018, interactive signage was introduced to celebrate the traditional names of 8 landforms across the city.

The signs help bring the language and heritage of the Awabakal and Worimi peoples to a broader audience as part of a dual-naming project.

Newcastle City Council has also developed virtual and augmented reality experiences to immerse community members and visitors in the landscape of Newcastle before European settlement, including an augmented reality Welcome to Country at the Newcastle Visitor Information Centre.

Case Study: Sharing local stories

Storybox Parramatta was installed in Parramatta Square in October 2020 and was Australia's first interactive digital storytelling box created by Esem Projects.

The two-metre solar-powered cube used high-resolution LED panels to stream visual stories and interactives created by program partners and community members, as well as local footage from the ABC Archives.

The initiative connected people with real-life stories and artworks about the City's past, present and future, and included an interactive MoodRing that allowed members of the public to share their sentiment about the space.

Image: Kids enjoy Oran Park Library, Transport for NSW

Am I able to stay?

Public spaces should be considered as places that invite people to visit and stay, not just as places to move through. Planned well, smart public spaces reduce clutter and litter and improve amenity outcomes. Connected technologies can make public spaces safer and greener, and the data generated can improve the visitor experience.

- Attractive
- Comfortable
- Seating
- Safe
- Clean
- Affordable
- Shaded

Case Study: Better amenity, byte by byte

The City of Unley uses smart technologies in Heywood Park to improve safety and amenity and reduce operating costs. This includes predictive lighting, apps to help people check the availability of car parking, sensors to monitor water use, environmental sensors, pedestrian counters and digital information kiosks. Smart bins alert Council when they need to be emptied, reducing litter and making waste collection more efficient.

The smart technology is almost entirely invisible, and the use of multi-function poles reduces the number of poles, pits, distribution boards and enclosures in the park.

The project was delivered with a Smart Cities and Suburbs Program Grant from the Federal Government.

Case Study: Safer crowded places

Ten million people visit Sydney Olympic Park annually, including surging numbers for major events like the Royal Easter Show.

Sydney Olympic Park Authority has been exploring how new technologies can make every visit to the Park an enjoyable one. A trial of advanced data analytics technology combines de-identified footage from existing CCTV cameras, environmental data, social media feed and other data sources to provide near real-time insights to the precinct operations team, flagging any safety risks from overcrowding or crowd congestion so they can intervene.

The system applies privacy-enhancing safeguards and is coupled with signs to ensure transparency and enable people to engage with the technologies being used.

The project is part of the Smart Places Acceleration Program, funded through the Digital Restart Fund.

Case Study: Staying safe on your journey

Transport for NSW is developing innovative solutions to help keep its customers safe.

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New smart solutions like these are helping people to get to public spaces safely. The same approaches can be used in public spaces as well to help people to feel safe and secure while they visit.

Image: Sydney Olympic Park Authority

Improving quality of public spaces

Quality public spaces are accessible, engaging, comfortable, and sociable. Connected technologies can help you to achieve quality outcomes and better experiences for people in public spaces.

	Am I able to get there?	Am I able to play and participate?	Am I able to connect?	Am I able to stay?
Free wi-fi, mobile connectivity and Internet of Things networks connect communities and transfer data and insights.	✓	✓	✓	✓
Multi-function poles and connected street furniture provide power and fibre connections to devices and house equipment and technology, ensuring good amenity.	✓	✓	✓	✓
Public charging stations charge electric mobility aides, laptops and mobile phones.	✓		✓	✓
Online booking systems provide live information on availability of public spaces and assets.				✓
Predictive and responsive watering and water management systems keep places cool and green, and waterways clean.				✓
Responsive building management use thermal sensors to keep indoor public spaces energy efficient.				✓
Flexible, connected kerbs collect data on kerb use and parking to maximise kerbsides for parking, loading and active transport.	✓			
Movement-activated lighting, safety buttons, noise monitoring and connected CCTV improve safety, making footpaths and cycleways accessible all the time.	✓			✓
Transport, travel and parking apps use real-time data across our transport and parking networks to help people plan their journey.	✓			
QR codes and markers link visitors' real experience in public spaces to an online experience, and also provide information and insights to the visitor or invite feedback.		✓		
Virtual and augmented reality experiences make the inaccessible accessible to all, as well as add elements of play to public spaces.		✓		
Live and interactive signs with visual and sound displays on street furniture and in public spaces can boost culture, accessibility and inclusivity by: • sharing local cultural and heritage information in many languages • providing real-time information on local weather and air quality, and use of equipment like picnic tables to reduce overcrowding • providing wayfinding on the coolest or fastest route using live data • bringing art outdoors.	✓	✓	✓	✓

Measuring progress in public spaces

As well as helping us achieve quality outcomes for our communities, connected technologies can help us gather data and generate insights to measure how well we are achieving those quality public spaces outcomes.

You can generate insights using data generated through:

- pedestrian counts at entries to public parks and facilities and along high streets
- interactions with QR codes and markers or interactive signage
- environmental sensors and equipment sensors
- traffic and parking data

- openly available transport data
- sensors on equipment
- public wi-fi connections
- use of charging stations.

Image: Melrose Park, Parramatta City Council

Putting it into practice

Putting people at the centre

Smart places need to be built for people and designed to generate trust and human connection.

Steps need to be taken to involve communities in the design of smart places and to ensure ethical, transparent and safe use of new technologies.

The Smart Places Customer Charter includes principles to help you build trust.

Connectivity is critical

Fast, reliable and comprehensive digital connectivity is the key to creating smart public spaces. It allows people to connect and participate in education, work and civic life and is required regardless of whether you are deploying an individual sensor or lots of different solutions. Good connectivity is needed to move the data from the sensors collecting the information to the platform you use to house the data and generate insights. It is also needed to share the insights and information in the public space.

If you are designing a new public space, or upgrading an existing public space, you should install multi-function poles and connect light poles and street furniture with power and fibre, or at a minimum install conduit to facilitate connections, when you are in the construction stage. This will give you freedom to rollout smart solutions whenever you are ready without expensive retrofits.

Designing for great amenity outcomes

When rolling out new technologies in public spaces like streets and parks, there is a risk that the devices will create clutter, impacting the amenity of the space. Multi-function poles provide a neat and contained home for devices like speakers, CCTV, sensors and small cells.

For more information check out the Technical Guidance for Deploying Multi-Function Poles.

Buddy up

The best smart public space projects happen when you team up with other people and learn from their experiences. Engage early and often with other public space managers, your community, businesses and industry.

The NSW Government has published the Smart Places Playbook as a resource to guide your smart places journey and link you with great resources and case studies.

Resources

- SmartNSW guides and tools The NSW Government is developing technical guides and tools to support you to use smart technologies.
- The Great Places Toolkit helps bring the principles of the NSW Public Spaces Charter to life with a collection of free resources
- The Smart Places Playbook takes a 'place-based' and people-first approach to smart cities and connected infrastructure
- The Smart Places Customer Charter will help you build community trust and confidence in smart public spaces
- The SmartNSW Case Study Library can provide you with up to date information on initiatives using smart technologies. It is fully indexed and searchable.

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