# SMART CITY STRATEGY

Enabling Future Wanneroo

City of **Wanneroo**

# CONTENTS

**ACKNOWLEDGEMENT OF COUNTRY**

The City of Wanneroo acknowledges the Traditional Custodians of the land we are working on, the Whadjuk people. We would like to pay respect to the Elders of the Noongar nation, past, present, and future, who have walked and cared for the land, and we acknowledge and respect their continuing culture and the contributions made to the life of this City and this region.

# FOREWORD

**The City of Wanneroo are looking to the future and have developed a visionary *Strategic Community Plan* that aspires to drive a welcoming community connected through local opportunities.**

This *Smart City Strategy* is the City's response to supporting our community vision by exploring the opportunities of data, connectivity, and emerging technologies.

The City worked closely with individuals, businesses, and leaders across our community to develop this Strategy. Engaging with over 500 community members through an extensive consultation process, we thank all participants for their ideas, insights, and participation.

Technologies that connect people across the world, analyse data, and automate processes have changed how we live, work and play. This Strategy reflects our desire to not only perform our traditional City functions more efficiently and effectively, but drive new opportunities, skills, and investment for our community.

There's no better time to harness the opportunities for digital technology and innovation. Our population is growing and diversifying and with that the demand for services, infrastructure, and environmental support increases.

In this Strategy we share our vision for a Smart Wanneroo and outline our approach to driving liveability, productivity, connection, and sustainability in Wanneroo.

# INTRODUCTION

*"Digital technology is changing the way governments everywhere support their citizens."*

**Honourable Don T Punch**
*Minister for Innovation & ICT*

The City of Wanneroo (the City) is embracing this change, leveraging digital technology, data, and innovation to improve our ability to deliver community services and harness local opportunities.

Together with our community, the City has developed this *Smart City Strategy* to drive and direct activity across our broad and diverse region.

As our population grows, so do the needs, priorities and expectations of the community. We are putting our community at the centre of our smart city investment, building on the core priorities of the *Strategic Community Plan* and existing strategic frameworks.

We are prioritising modernisation and investment that will improve:

- Activation & connection
- Smarter infrastructure & planning
- Innovation & prosperity
- Liveability & sustainability
- Community confidence & empowerment
- The City as an organisation

The City is committed to leveraging the benefits of smart technologies, while proactively mitigating and addressing the risks.

In 2021 we engaged hundreds of stakeholders across the City and together they have contributed to the design of this Strategy.

We will continue to work with our community, key stakeholders, partners, and all levels of government to drive change that benefits the Wanneroo community.

## What is a Smart City?

A smart city proactively responds to the needs and priorities of its community by leveraging the benefits of data, innovation and digital technology.

A smart city gathers, analyses and shares data in a meaningful and comprehensible way. It becomes the shared language that the community can use to ask questions of the City, leading to better services and new initiatives. It is the language that empowers citizens, government, and local businesses to make informed decisions and innovate.

A smart city uses the latest technologies and innovative solutions to enhance service delivery, customer experience and support interactions between residents, visitors, businesses, and investors. Putting intelligence and connectivity into places and situations where historically it has not been used, connecting people, services and process, because to do so creates opportunities, synergies and economies of scale.

# SMART CITY VISION

The City of Wanneroo will be a place of opportunity. We will be home to an empowered community of leaders, innovators and lifelong learners. As we grow, a smart Wanneroo will embrace new opportunities and digital technology, to drive sustainability, inclusion and community connection.

The City of Wanneroo is looking to the future. We are empowering our citizens to leverage digital technology and innovation to benefit our community.

**WE STRIVE TO:**

## Enhance

community participation, collaboration, and dialogue

## Create

a culture of innovation, learning and economic opportunity

## Empower

our community to thrive in the digital economy

## Plan

our City for a sustainable future

## Support

the physical and digital connectivity and safety of our community

## Protect

and support our natural resources and environmental outcomes

## Encourage

vibrancy and activity for residents, visitors and investors

## Embed

data management practices to support decision-making & transparency

# SMART CITIES IN WANNEROO

Smart cities are built on collaboration – the sharing of knowledge and the coordination of effort between residents, business, and the City. Although technology is often the focus of smart city conversations, in Wanneroo it is a tool to support collaboration, innovation and enhanced community outcomes.

Landmark projects such as Discover Wanneroo, RailSmart Planning Wanneroo and Yellagonga Wetlands smart environmental management have built significant momentum and capacity across our region.

Going forward we will build upon these existing projects and align our smart city action with policies across the City. We will also align our effort with the work being done by neighbouring local governments, the Western Australia Government, and the Australian Government.

## SMART CITY STRATEGIC ENVIRONMENT

### Informing Strategies, Plans & Partners

- Australia Government – Smart Cities Plan
- WA Government – Digital Strategy & State Infrastructure Plan
- City of Perth, City of Joondalup and City of Swan

### Partner Strategies & Plans

- Data Management Framework

### Foundation

- City of Wanneroo Community Strategic Plan
- City of Wanneroo Corporate Business Plan

## Strategic Alignment

Successful smart cities take a holistic approach to building on the policies, plans and strategic actions already in place. This *Smart City Strategy* works with the following:

### The Western Australian Digital Strategy

The Western Australian Government have released a *Digital Strategy* to *"change the way government works and make it easier for people and businesses to interact with the WA Government"* – Honourable Don T Punch.

The *WA Digital Strategy* promotes the benefit of digital transformation for both organisations and the community, encouraging Western Australia as a whole to be at the forefront of digital change.

The objectives and aspirations in this *Smart City Strategy* have been aligned with the four strategic priorities of the *WA Digital Strategy*:

- Better Services
- Safe and Secure
- Informed Decisions
- Digitally Inclusive

## Strategic Community Plan

This *Smart City Strategy* builds on Wanneroo's *Strategic Community Plan* (SCP). The SCP guides the City's investment for the next 10 years, and provides numerous opportunities for impactful and beneficial smart city integration. The table below outlines this Strategy's alignment to the goals of the SCP.

| GOALS | SMART CITY ALIGNMENT |
|---|---|
| **GOAL 1**<br>**An inclusive and accessible City with places and spaces that embrace all** | We will explore opportunities to use new and innovative technology to make public spaces and facilities future-ready.<br><br>We will use technologies to improve accessibility and activation and create vibrancy throughout the region.<br><br>We will improve understanding of how people use places and spaces so that we can increase accessibility and activation. |
| **GOAL 2**<br>**A City that celebrates rich cultural histories, where people can visit and enjoy unique experiences** | We will enhance our ability to celebrate, experience and communicate our rich cultural histories through smart, interactive, and innovative mediums.<br><br>We will use technology to help visitors feel welcomed, informed and excited by the unique culture, history, spaces and environment of Wanneroo. |
| **GOAL 3**<br>**An innovative City with exciting local opportunities for work, business, and investment** | We will support our local businesses to thrive in the digital economy by investigating opportunities to enhance skills and infrastructure.<br><br>We will work with relevant partners to encourage education and skill development for emerging and future industries and increasing opportunities for people with disabilities through use of technology.<br><br>We will leverage our smart city and innovation capability to attract new business and industries. |
| **GOAL 4**<br>**A sustainable City that balances the relationship between urban growth, natural assets and the environment** | We will use smart technology to better monitor, manage and protect our natural environments and Noongar cultural sites.<br><br>We will leverage the benefits of data and technology to enhance sustainable, climate resilient planning and development. |
| **GOAL 5**<br>**A well planned, safe and resilient City that is easy to travel around and provides a connection between people and places** | We will promote a broad range of active and innovative transport modes to support mobility across the City.<br><br>We will leverage innovative urban design and technologies to improve the safety and vibrancy of our public spaces. |
| **GOAL 6**<br>**A future-focused City that advocates, engages and partners to progress the priorities of the community** | We will explore the benefits of innovative consultation models to encourage deliberative engagement with the community.<br><br>We will develop prosperous partnerships to support collaborative action towards our smart city aspirations. |
| **GOAL 7**<br>**A well governed and managed City that makes informed decisions and provides valued customer-focused services** | We will collect, monitor and analyse data to support informed, agile and ethical decision-making and reporting.<br><br>We will deploy technology to deliver community benefit and ensure that its use is effective and warranted. |

## Showcase Projects

The City has delivered a number of smart city projects in collaboration with the community, private sector partners and other local governments. These projects set a strong foundation for successful smart city activity in Wanneroo. Below is a snapshot of projects being delivered by the City, with many more underway.

### Yellagonga Wetlands – smart environmental management and smart partnerships

A large proportion of the Wanneroo region is made up of a complex system of interconnected wetlands. In mid-2017 the City of Wanneroo in partnership with the City of Joondalup secured funding through the Australian Government's Smart Cities and Suburbs Program to deliver a network of environmental sensors in the Yellagonga Wetlands.

The program installed buoys fitted with smart sensors into Lake Joondalup to monitor midge outbreaks, wetlands health and water quality.

The sensors and probes currently measure pH, temperature, dissolved oxygen, electrical conductivity, and oxidative reduction potential and presents real time data on an Internet of Things (IOT) platform.

### Online connection and engagement

Cultural Services at the City of Wanneroo encourage online experiences and engagement for residents and visitors including:

- experiencing Public Art Safari, Shipwreck Trail, and 10th Light Horse Trail through the Discover Wanneroo app.
- exploring virtual tours of Wanneroo Regional Museum, Buckingham House, Cockman House, and some popular past art exhibitions held at Wanneroo Gallery.
- engaging in the City's art and oral history collection online.
- participating in stakeholder engagement through the City's Community Engagement Hub using mapping tools, surveys, and AI-driven conversation technology like Hello Lamp.

### Centralised Floodlight Control

The City has implemented a program that allows sporting clubs to turn the sporting lights on and off at pre-determined times through SMS.

This has led to a reduction in power usage on grounds fitted with this technology and provides usage data that is used to further increase efficiency.

This technology will be expanded to control time locks on toilet doors and public BBQs, allowing for centralised control for permitted use.

### Free Public Wi-Fi

The City offers free public Wi-Fi at a range of local libraries, community centres and civic building and heritage houses.

The Wi-Fi services offered at Cockman and Buckingham Heritage Houses are linked to an app that provides an immersive experience to visitors.

In addition to Wi-Fi, Wanneroo libraries also offer free public computer access at all branches and digital training for the community through the Australian Government's "Be Connected" program.

## RailSmart

The City has partnered with the Planning and Transport Research Centre (PATREC) to develop a first-of-its-kind digital platform called RailSmart.

RailSmart uses big data to deliver key predictive planning insights in real time. The data is presented via an online dashboard that allows the City and community to analyse key economic, employment and transport scenarios and models.

It allows the City to optimise land use planning, maximise job creation, and identify distinct competitive advantages within its economic growth industries.

## The Wangara CCTV Project

As part of the Australian Government's Community Development Grants program, the City of Wanneroo received funding to increase CCTV infrastructure in the Wangara Industrial Area. The CCTV identifies vehicles used in offences and crimes at entry and exit points.

The City aims to support local businesses and customers by reducing antisocial behaviour and level of crime in Wangara.

## Kinkuna Smart Park

The award-winning Kinkuna Park in Eglinton, was transformed into Australia's first 'smart playground' in March 2018.

Creating a multisensory augmented reality playground, the park has become popular with residents and visitors.

Kinkuna Park includes smart parking, smart meters, smart irrigation, and smart lighting.

## Smart City Systems and Processes

The City's smart waste services include digitising waste tip vouchers, capturing real time waste tonnage and waste types in an automated weighbridge, and promoting the WA Government's RecycleRight App.

# Future Projects

The City has identified a number of future opportunities to support smart city and innovative thinking across Wanneroo, including:

| PROJECT | DESCRIPTION |
|---|---|
| Australian Automation and Robotics Precinct | The City has an opportunity to support local innovation and entrepreneurship on a global scale. The Australian Automation and Robotics Precinct, an initiative by Development WA, is a proposed world leading research and development precinct in Neerabup.<br><br>It will provide opportunities for local industry and business sectors to test a range of technologies including autonomous vehicles, drones, robotics, and automated equipment generally related to the industrial and mining sectors. |
| Smart Precincts | The City is looking to re-develop and upgrade a number of key precincts and public spaces in the region. The City will look at how smart technologies can be integrated to enhance the safety, accessibility, vibrancy, and amenity of these spaces.<br><br>The City will also consider how technologies can support community engagement in the planning of these precincts. |
| Waste Management | The City is exploring ways to leverage smart technologies to enhance waste management. For example, using bin sensors, waste data monitoring tools, in-truck route optimisation systems, and innovative waste models to increase operational efficiency, reduce waste and promote recycling. |
| Smart Irrigation | The City is exploring the wider use of smart irrigation systems to increase efficiency in our ground water use in response to changing climate conditions. |
| Storm Water Pollutant Monitoring | The City is trialling auto sampler technology to identify the possible discharge of contaminants into storm water drains within Wanneroo's industrial areas.<br><br>These devices are also being applied in testing the effectiveness of the gross pollutant traps and will inform decision making around future investment in similar infrastructure. |
| Data Sharing | The City is developing a Data Management Framework to enhance the security, collection, use, sharing and analysis of data. This Framework will help improve efficiencies in planning, service delivery and decision-making among other improvements.<br><br>This Framework will be aligned to the Customer Relationship Management System which integrates community and stakeholder information into a single common database. This system will improve the City's performance and the effectiveness and efficiency of communications. |
| Smart Services | The City is looking to explore smart processes and systems that digitise City services such as bookings, online applications, planning approvals and customer requests.<br><br>These systems will facilitate efficient and convenient in-person and digital service delivery. |
| Smart CCTV Enhancement | The City will explore expansion of the Wangara CCTV Project to deliver benefits beyond public safety. This could include using technologies to provide information on the use of public spaces and infrastructure that helps inform place design and maintenance. |
| LoRaWAN | The City is looking to implement a low bandwidth network solution, such as LoRaWAN, across Wanneroo. This network will provide the enabling connectivity to support future smart city projects and initiatives in areas such as water management, waste management, irrigation, lighting controls and citizen science. Such a network can also be used by local business, schools, utility companies, members of the community to support their own smart project. |

## Innovation Ecosystem

An innovation ecosystem is the people and connective technology, programs and culture that drive collaboration, co-design and the sharing of experience and knowledge. To accelerate Wanneroo's smart city progress, it is crucial to facilitate innovation and entrepreneurship by bringing together business, investors, local innovators, educators and passionate community members.

Our innovation ecosystem includes:

**RESEARCH**
- Schools
- Local TAFEs & Universities
- National & International institutions
- Students & Researchers

**IDEATION & CO-DESIGN**
- Traditional Owners
- Community Leaders
- Community Groups
- Sport & Recreation clubs

**THE WANNEROO COMMUNITY**

**OPEN DATA**
- WA Government
- Australian Government
- City of Wanneroo
- Nearby Councils
- Volunteers

**COLLABORATION**
- Entrepreneurs
- Local Businesses
- Potential Investors
- Developers

**SHARED DATA & KNOWLEDGE**

A smart Wanneroo will embrace new opportunities and digital technology, to drive sustainability, inclusion and community connection.

## Active Partnerships

The Wanneroo innovation ecosystem has many influential actors. Here we highlight three current partners the City is building strong, dynamic relationships with. These relationships are expanding the capacity of the City to deliver innovative projects in Wanneroo.

### CITY OF JOONDALUP AND THE CITY OF SWAN

The City of Joondalup and the City of Swan are neighbours and key partners of the City of Wanneroo.

We have worked closely with the City of Joondalup across a number of successful projects, including Yellagonga Wetlands smart environmental management project, and are looking to continue this fruitful partnership.

As the City of Swan also embarks on its smart city journey, we also plan to work closely with them to share knowledge, collaborate on projects, and deliver better outcomes for our closely tied communities.

### EDITH COWAN UNIVERSITY AND THE UNIVERSITY OF WESTERN AUSTRALIA

Universities, TAFEs, and other education institutions will be key partners in Wanneroo's smart journey.

We already have a strong partnership with Edith Cowan University through the Yellagonga Wetlands project, as well as with the University of Western Australia through the Rail Smart Program led by its Planning and Transport Research Centre.

As Wanneroo develops as a smart city, leading to increased data gathering, more complex projects and greater demand for skill development (in the City and the community), we will continue to work with researchers and educators to drive smart city outcomes.

### WESTERN AUSTRALIA POLICE

Across the Wanneroo community we are forming partnerships to increase local safety.

This includes partnering with Police, community groups and individuals. For example, the City recently deployed technology that monitors and gathers evidence to prevent illegal activity using CCTVs cameras in Wangara.

The Police have direct access to the CCTVs, which have been used to identify vehicles used in offences. Benefits of such projects are being assessed and options to adapt and scale are also being explored.

We invite community members and organisations to co-design further community safety projects as we continue to make our community safer.

# SMART CITY, SMART GROWTH

Wanneroo is one of Australia's fastest growing local government areas and is predicted to reach a population of 350,000 by 2040[1]. Population growth at this scale is both an opportunity and a challenge. The City's goal is to leverage information and communication technology, to better plan and adjust for this change.

## Median age

**WANNEROO**

33.9

**GREATER PERTH**

36.7

**WESTERN AUSTRALIA**

37.2

## Forecast population
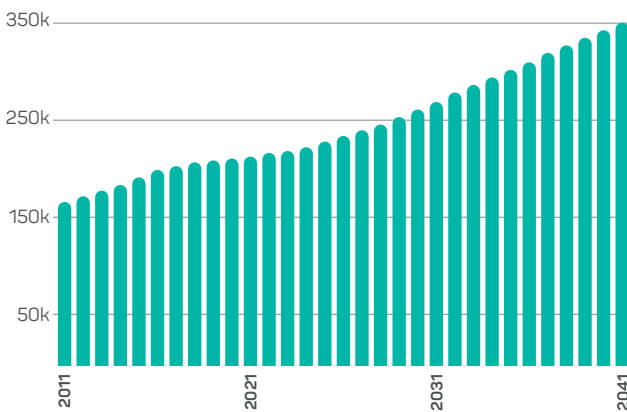


## Public Spaces

In Wanneroo infrastructure and technology will be brought together to improve liveability. The City is looking to invest in public spaces and is investigating how smart parking, public Wi-Fi, smart bins, intelligent irrigation and more can improve user experiences. Not only could this save ratepayers money and provide data to inform better decision making, but our aim is to bring people together in more vibrant parks, town squares and main streets.

## Smart Development

The City's influence over development is one of its key policy levers. Through standards, collaboration and regulation, the City is committed to working with developers to ensure Wanneroo's growth is sustainable. Just a few of the opportunities being explored are smart water and energy meters, solar energy and micro grids, tree canopy cover and urban heat mapping, shared bikes and smart public transport, and smart waste management. The emergence of new neighbourhoods and the redevelopment of existing streets is the perfect time to leverage new technology, data and innovation to increase liveability, productivity and sustainability.

## Protecting Natural Environments

Our community is shaped by the rich natural ecosystems that surround and permeate our neighbourhoods. As Wanneroo's population grows, smart technology will be used during planning and incorporated into new and existing areas to support natural systems. For example, GIS mapping will support urban greening and water sensitive design. By purposely planning for green-blue infrastructure that achieves multiple objectives, Wanneroo can accommodate its growing population without losing its natural assets.
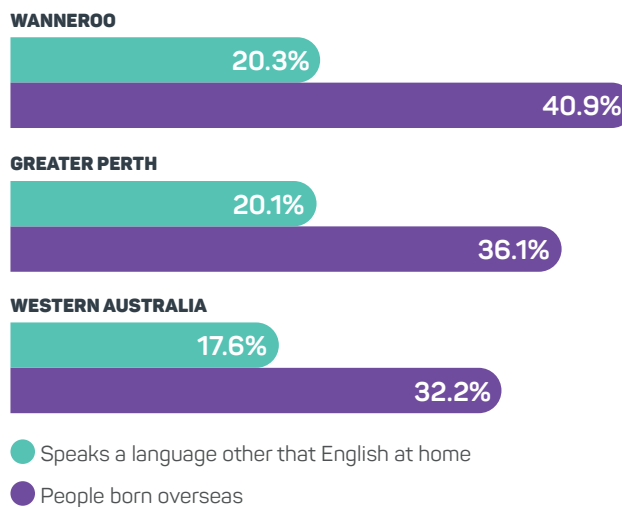
1.  .id (informed decisions) , 2021

## Diversity & Inclusion

Wanneroo is a wonderfully diverse community. This diversity can be leveraged to drive innovation by bringing together different connections, perspectives, and knowledge.[2] The City is committed to identifying the broad needs and priorities of our community and exploring ways to support the inclusive application of digital technology, including digitising, and translating key City services. We aim to pursue opportunities such as expanding our free public Wi-Fi network, targeted delivery of digital literacy programs, provision of allowing screen reading technologies and more.

## Future Work

The nature of work is changing. Whether you are working from home, in co-working spaces, using video conferencing, or are in the gig-economy, technology is revolutionising the 9 to 5. To meet this challenge, the City is exploring opportunities to support skills and knowledge growth in the community. Initiatives are being developed to increase access to life-long learning opportunities, remote work capacity, employment opportunities and the growth of innovative business in Wanneroo.

**WANNEROO**
20.3%
40.9%

**GREATER PERTH**
20.1%
36.1%

**WESTERN AUSTRALIA**
17.6%
32.2%

● Speaks a language other that English at home
● People born overseas

### Tertiary education

**WANNEROO**
57.5%

**GREATER PERTH**
61.9%

**WESTERN AUSTRALIA**
61.9%



## Smart Cities

Smart cities are learning cities. Learning cities are actively involved in building a skilled labour force in the information economy. With limited education policy leavers, the City's role is to ensure the necessary infrastructure is in place to empower schools, lifelong learning institutes, TAFEs and universities. The City is committed to engaging with local educators and students, and then advocating on their behalf. The City is working to create the programs and implement the projects that Wanneroo needs to become a learning City.

2.  ABS, 2021

# COMMUNITY INSIGHTS

To develop a people-first *Strategy*, the City has worked closely with individuals, businesses, and leaders across our community. We were able to tap into the unique knowledge and insights of the Wanneroo community through a multifaceted engagement process.

We will continue to leverage the experience and expertise of our community to design key services and set forward priorities.
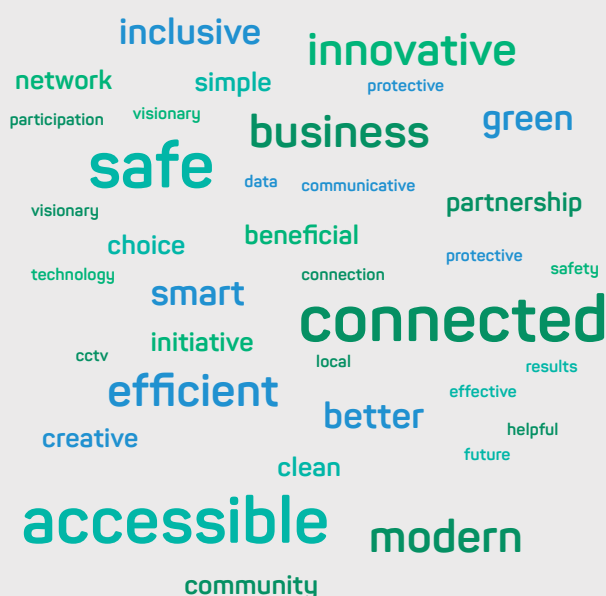
## Process

In 2021, the City of Wanneroo collected smart city insights and ideas through both dedicated smart city engagement as well as the *Strategic Community Plan* engagement process:

- 484 community members responded to smart city survey questions through the *Strategic Community Plan* engagement and dedicated smart city engagement
- Residents, key stakeholders, and City staff also had an opportunity to contribute through numerous workshops, plenaries, and forums

In Three Words or Phrases How would you summarise your vision of Wanneroo as a smart City?[3]

Across engagement the participants' vision for a smart Wanneroo focused on accessibility, connectivity, safety and creating a modern and innovative place to live.
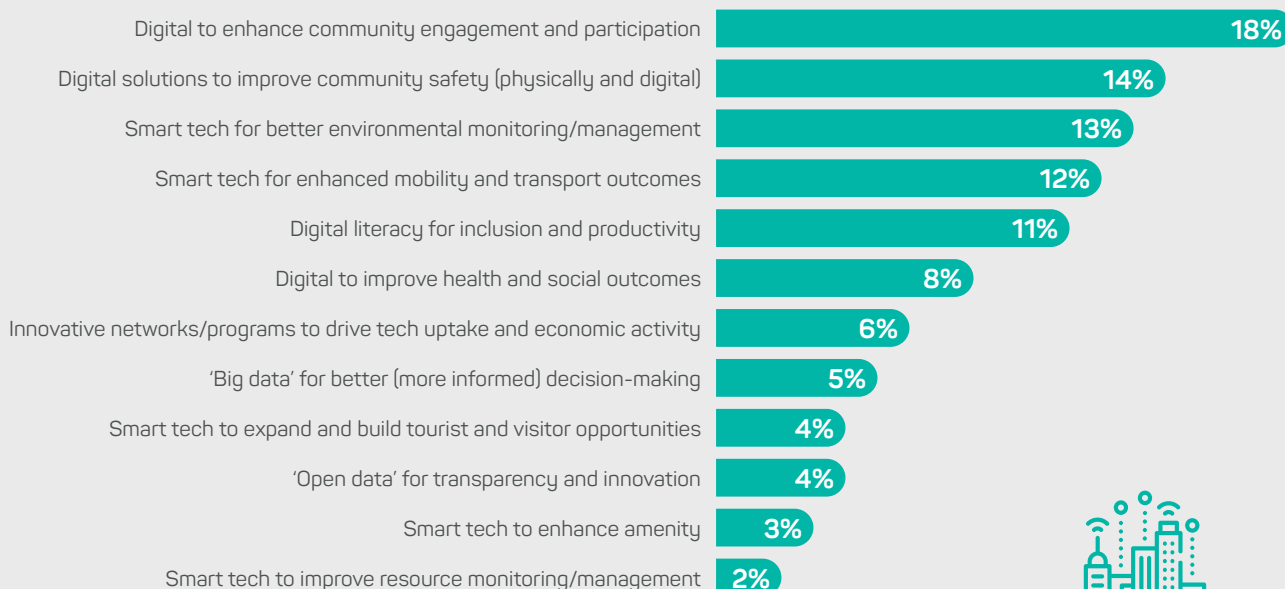
inclusive network simple innovative protective participation visionary green business safe data communicative visionary choice beneficial partnership technology connection protective safety smart connected cctv initiative local results efficient effective better creative clean helpful future accessible modern community

## Key Insights

Across the consultation platforms, engagement revealed the following key insights.

| Leadership | Collaboration | Safety | Environmental Sustainability | Community | Prosperity |
|---|---|---|---|---|---|
| Participants were supportive of the City's ambitions of becoming a smart city and had a desire for Wanneroo to be a smart city leader. | Participants want to be involved in the co-design of City services and are eager to enhance community engagement and participation through digital technology. | Community participants' top priority is improving community safety and security. Community participants considered smart technology a means to create a safer, more cohesive Wanneroo. | Participants recognise that smart technology can improve environmental management and protection, reduce pollution and degradation, waste, and resource inefficiency. | Participants are worried about social disconnection, and want public spaces, online communities, and diversity of cultures to be empowered by smart investment and action. | Participants want to create a resilient, vibrant community, leveraging data and technology to better manage community assets and increase economic opportunity. |

3. Smart City Community Engagement. Respondents = 98

## What smart city strategies or objectives offer the highest-value to the City of Wanneroo?[4]
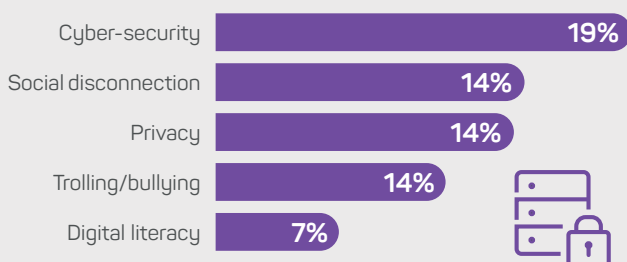
| | |
|---|---|
| Digital to enhance community engagement and participation | 18% |
| Digital solutions to improve community safety (physically and digital) | 14% |
| Smart tech for better environmental monitoring/management | 13% |
| Smart tech for enhanced mobility and transport outcomes | 12% |
| Digital literacy for inclusion and productivity | 11% |
| Digital to improve health and social outcomes | 8% |
| Innovative networks/programs to drive tech uptake and economic activity | 6% |
| 'Big data' for better (more informed) decision-making | 5% |
| Smart tech to expand and build tourist and visitor opportunities | 4% |
| 'Open data' for transparency and innovation | 4% |
| Smart tech to enhance amenity | 3% |
| Smart tech to improve resource monitoring/management | 2% |

## How should we adopt technology in Wanneroo?

Participants want the City to be a leader, exploring proven and cutting-edge technology!
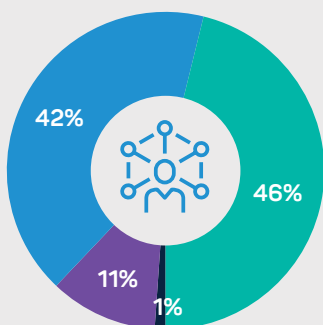
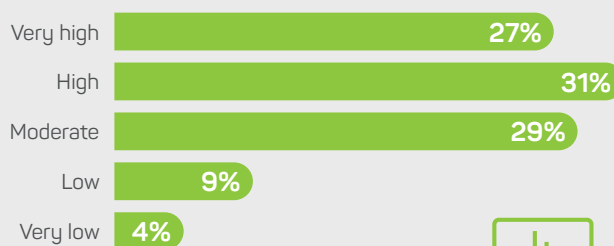- 46% — We should be a leader and explore cutting edge technology
- 42% — We should adopt technology only once there is a proven benefit
- 11% — We should be an early adopter only for targeted services areas
- 1% — We should focus only older, proven technology

## What are your main concerns with using new technology in Wanneroo?[5]

| | |
|---|---|
| Cyber-security | 19% |
| Social disconnection | 14% |
| Privacy | 14% |
| Trolling/bullying | 14% |
| Digital literacy | 7% |

## How would you rate your digital literacy – technology skills and understanding?[6]

| | |
|---|---|
| Very high | 27% |
| High | 31% |
| Moderate | 29% |
| Low | 9% |
| Very low | 4% |

## Community Quotes

*Smart technology in buildings to reduce electricity and water wastage*

*Responsibility, accountability and the public interest needs to determine how technology, data and smart city initiatives are delivered*

*Smart reporting of community issues*

*Digital speed signs & smart traffic monitoring to keep the roads safe*

*Monitoring tree cover and concrete to ensure cooler temperatures in urban areas*

*Get on to smart tech, it's the way of the future!*

4. Strategic Community Plan Engagement. Respondents = 386
5. Smart City Community Engagement. Respondents = 98
6. Smart City Community Engagement. Respondents = 98

# STRATEGY ON A PAGE

## INPUTS

Community | Global and Australian best practice | Local Trends | Global Trends

## VISION

*Wanneroo will be a place of opportunity.*

We will be home to an empowered community of leaders, innovators and lifelong learners. As we grow, a smart Wanneroo will embrace new opportunities and digital technology, to drive sustainability, inclusion and community connection.

### PRINCIPLES

- People First
- Sustainability
- Safety & Security
- Communication
- Inclusion & Accessibility
- Empowered

### STRATEGIC THEMES

- Activated & Connected
- Smart Infrastructure & Planning
- Innovative & Prosperous
- Sustainable & Liveable
- Empowered & Confident
- Well Governed & Managed

## DELIVERY

| Project Prioritisation | Accountability & Responsibility | Develoment & Community Codesign | Piloting | Measurement & Evaluation | Review, Adaption & Scaling |
|---|---|---|---|---|---|

# PRINCIPLES

The Wanneroo community, key stakeholders and the City have worked together to develop a set of principles that will guide smart city planning and action.

## People First

A smart Wanneroo will be people focused. The City will enhance the liveability of Wanneroo through data-driven and collaborative decision making. We will build on the vibrancy of our region through innovative approaches to planning, mobility and digital and physical connectivity.

## Sustainability

A smart Wanneroo will develop sustainably, meeting our current needs and securing an even brighter future. In Wanneroo, from our coastal plains to pristine wetlands, market gardens to residential homes, thick bushland to urban developments, we will balance environmental, economic, and social demands.

## Safety & Security

A smart Wanneroo will be both physically and digitally safe. Smart technologies and data will be used to proactively improve physical safety across the Wanneroo community. The City will imbed in our policies and process steps to mitigate digital security risks and protect the privacy of our community.

## Communication

A smart Wanneroo will increase community connection and discussion. The City will be transparent to support engagement and trust. Ongoing conversations with and amongst the community will be built using new technologies, supporting the sharing of experiences and knowledge.

## Inclusion & Accessibility

A smart Wanneroo will work to ensure all members of our community have the skills and opportunity to participate and engage in City activities. We will support access to technology and greater self-sufficiency within our community. We will continue to deliver services that meet the changing needs of Wanneroo.

## Empowered

A smart Wanneroo will empower the community to ask questions of government, design and deliver smart initiatives, and shape the City's priorities. We welcome new ideas, and we will continue to learn and improve with the community as we deliver for Wanneroo.

# STRATEGIC THEMES

**Through community engagement and research the City have identified seven key themes to guide smart city activity. These themes are aligned to the SCP and support the City's vision of a welcoming and connected community.**

Associated with each theme are a number of strategies and opportunities we will explore and pursue over the next four years. These strategies and opportunities include but are not limited to technology, data and collaboration projects and encourage community-driven activity.

# Activated & Connected

The City will work with residents, community groups, business, and key stakeholders to create more vibrant spaces. These spaces will facilitate improved safety, greater accessibility, enhanced mobility, and digital connection. We aim to invest and innovate to enhance safety, convenience and liveability now and into the future.

## OBJECTIVES

- To increase physical and digital safety in Wanneroo
- To improve liveability and vibrancy in Wanneroo
- To improve mobility and connection within Wanneroo

## MEASUREMENT

- Community Satisfaction Surveys
- Crime rates and perceptions of safety
- The Australian Digital Inclusion Index
- Public Transport Data

Located just 20 minutes from the CBD, the City of Wanneroo is the ultimate day trip location. The Discover Wanneroo website and mobile app connects visitors to stunning beaches, walking trails, Crystal Cave as well as various kid friendly activities. It also highlights local businesses such as luxury day spas, boat charters, and wineries. We will continue to develop Discover Wanneroo to improve visitor and residents' experiences in Wanneroo and connect them to local activities and business.

## Strategies and opportunities we will explore and pursue include:

1. Improving public safety by investing in solutions, such as smart street lighting and systems that combine video surveillance and incident response, in high priority areas as identified by the community and data.

2. Connecting the community and visitors to the local area by investing in accessible interactive signage solutions that provide information and business communication, wayfinding, translation services, public transport information etc in high-traffic areas.

3. Addressing mobility issues by working with industry and the Western Australia Government to progress transport innovation, including addressing the first/last mile challenge, active and public transport and traffic management systems.

4. Leveraging digital technology to modernise public spaces for all age groups, including smart benches for greater amenity, safety, and activation.

# Smart Infrastructure & Planning

The City will work with communities and developers to increase liveability in Wanneroo. We aim to embed standards and expectations in planning process that ensure developments are sustainable and support life in a modern economy. From fibre internet connection environmental sensors, Wanneroo's development will pursue smart innovations and technologies.

## OBJECTIVES

- To increase services in line with population growth
- To future-proof new developments
- To connect new and established areas of Wanneroo

## MEASUREMENT

- Resource consumption in new suburbs
- Wanneroo service self-sufficiency
- Social connection between new and old suburbs

Wanneroo is growing, fast! But how can we manage growth, protect our environment, and maintain a sense of community?

A smart Wanneroo will collect, analyse and share data from multiple channels to 'sense' the City's environment and inform decisions. For example, using real-time water use data to help detect leaks, visual analysis of transport routes to ease congestion, digital community forums and more to help citizens, developers and government connect and innovate.

## Strategies and opportunities we will explore and pursue include:

1. Enhancing community input into the design/ planning processes by exploring the use of innovative tools and data sharing including the RailSmart Project.

2. Promoting community connection and activation in new and existing developments and precincts by advocating for greater digital connectivity throughout the region.

3. Ensuring a foundation of digital infrastructure for smart service delivery by working with local planners, experts, and developers to implement smart and sustainable development and building guidelines for new developments.

4. Supporting the rollout of smart technologies as standard and the upgrading of existing assets by developing a smart city asset framework and accompanying smart asset management system.

Across Australia smart technology is improving the liveability and productivity of new and existing developments. The City will leverage the learnings of suburbs like Footscray where the Maribyrnong City Council partnered with Victoria University to develop the *SC2 project*. This smart tech roll out has helped expand free Wi-Fi, place interactive signage, address traffic congestion, measure air quality and improve environmental health .

# Innovative & Prosperous

The City is looking to support innovation, in turn creating greater economic opportunities and outcomes in Wanneroo. By sharing data, we aim to support decision making by business, through technology investment we aim to support innovation, and through partnerships with educators, government, and industry, we aim to create the conditions and remove the barriers to expand opportunities for young people and the wider Wanneroo community.

## OBJECTIVES

- To create a dynamic innovation ecosystem in Wanneroo
- To enhance local skills, training opportunities and data resources that support innovation
- To increase economic opportunities and youth attraction

## MEASUREMENT

- Business entries
- Containment rates (percentage of Wanneroo residents that work in Wanneroo)
- Tertiary education enrolment and attainment
- Youth retention and attraction rates

Governments have oceans of data stuck in service units and never shared with other teams or the public. But this is changing, the open data space is blossoming. Local government, the WA and Australian Government are publishing data online. The City already contributes to Data WA and we are looking to share more data. Our aim is to support government and community decisions with up-to-date information that is comprehensible – not buried in reports, understood only by data scientists.

## Strategies and opportunities we will explore and pursue include:

1. Encouraging a collaboration, partnership, and knowledge-sharing network in Wanneroo by actively engaging with and creating joint-venture opportunities for business, innovators, education institutes and government.

2. Supporting flexible and remote work in Wanneroo by partnering with community groups, developers and innovators to create co-working spaces and enhance home working conditions.

3. Addressing barriers to innovative business development such as infrastructure gaps and skill/training limitations by partnering with employers and key community stakeholders to deliver a *Business Innovation Roadmap*.

4. Creating avenues for local innovators by collaborating with City of Joondalup, Western Australia education institutions and Wanneroo Business Association to expand the Joondalup Innovation Challenge to feature students and business from Wanneroo.

5. Working with the Automation & Robotics Precinct to explore opportunities to develop a local living lab that tests and trials smart solutions to local problems

# Sustainable & Liveable

The City will work with communities, the West Australian Government, and the private sector to increase Wanneroo's economic, social, and environmental resilience. We aim to design policy, projects, and regulation for the health of our people, community, and environment, balancing the current needs of our residents, with the future needs of our diverse natural environment.

## OBJECTIVES

- To be a circular and climate-resilient economy
- To create a City that adapts to the environment and the needs of our community
- To improve health and wellbeing outcomes in Wanneroo

## MEASUREMENT

- GHG emissions
- Urban tree canopy coverage
- Mental health outcomes in Wanneroo
- Physical Health outcomes
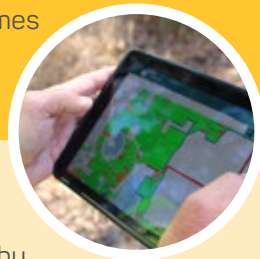
In cities, a lack of vegetation creates "'heat islands", caused by air becoming trapped between buildings and other infrastructure. Wanneroo can learn from established smart cities who are combating this phenomenon using the latest in planning and mapping technology. For example, the Cooling and Greening Melbourne Interactive Map brings together three main datasets: vegetation cover, urban heat, and the heat vulnerability index. The map is now used to plan where trees are planted, what types are planted, and how buildings are designed to minimise the likelihood of dangerous heat waves.

## Strategies and opportunities we will explore and pursue include:

1. Supporting the health of our green spaces and reducing water consumption/waste by developing and implementing a smart water program – expanding the use of smart irrigation, increasing the uptake of smart water meters, and more.

2. Combating heat Island effects, reducing pollution and protecting the natural environment by scaling up our environment mapping, monitoring and data sharing – including, for example, expanding the Yellagonga Wetlands project and mapping greenspaces access in Wanneroo.

3. Increasing active and sustainable transport options/uptake in Wanneroo by working with WA start-ups, planners and local innovators to trial and test solutions in Wanneroo.

4. Expanding smart waste management program through the use of smart bins in high-traffic areas and smart waste collection trucks that monitor and measure waste.

# Empowered & Confident

The City seeks to empower and inspire families, businesses, and visitors to get involved in community groups and events, build local networks, participate in cultural exchange and co-design local policies. The City will explore opportunities to invest in our diverse communities and empower everyone to participate in our City's smart transformation

## OBJECTIVES

- To increase community participation and inclusion
- To create an inclusive community that lifts up our most vulnerable people
- To design Wanneroo with the community, around the needs of our residents and visitors

## MEASUREMENT

- Survey data – inclusion and participation
- Community group growth
- Volunteer numbers

Like to help shape future projects in the City of Wanneroo? Your Say is our online community engagement hub where you can review our plans, activities. Through our smart cities program we aim to also share information to help the community engage with local priorities and involve the community in design! In Hobart, for example, this was done to great effect during their Hobart Bus Shelter & Integrated Digital Interface Design Competition. A creative challenge for the community to share their most innovative and exciting ideas to help transform Hobart's public transport services and make waiting for the bus reliable, safe, accessible and socially connective.

## Strategies and opportunities we will explore and pursue include:

**1** Encouraging greater participation and increasing vibrancy in the community through events that support collaboration and creativity.

**2** Enhancing our democracy by developing a collaboration and sharing platform that supports community connection and organisation and enhances digital democracy online digital voting, co-design of City projects, innovative engagement, and online streaming of Council meetings.

**3** Increasing online safety and digital autonomy by implementing a digital inclusion and accessibility agenda for the City of Wanneroo.

**4** Expanding life-long education pathways and increasing opportunities for young residents by building research and education partnerships.

# Well Governed & Managed

The City aims to be a leader, facilitator, and participant in the local innovation ecosystem. We will explore opportunities to invest in digital and physical infrastructure, embody innovative thinking, modernise our services, and unlock the potential of our community through collaboration. We will pursue opportunities to create simple, seamless customer experiences when interacting with the City.

## OBJECTIVES

- To use data for improved forward planning, service delivery and City operations
- To enhance consultation and co-design with the community
- To increase open data accessibility and City transparency

## MEASUREMENT

- Satisfaction with the City's services
- 'Have your say' engagement
- Data published by the City
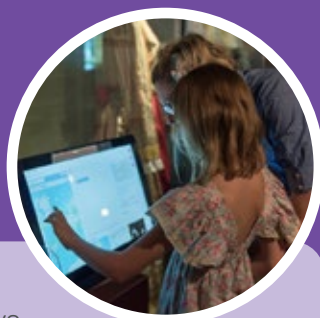
At the City of Wanneroo, we strive to deliver service excellence and provide the best possible customer experience. Our Customer Service Commitment outlines our 'Customer First' approach. Our four overarching objectives that underpin the delivery of our services are responsiveness, ease, accessibility, reliability.

## Strategies and opportunities we will explore and pursue include:

**1** Developing smart city specific policies to compliment this Strategy, including:
  - Establishing smart city governance
  - Implementing a process to proactively and regularly modernise regulation and policy to enable innovation and protect privacy and security
  - Developing a smart city project prioritisation framework and planning process

**2** Upgrading our policy development and service delivery processes by:
  - Adapting our processes to allow for greater community feedback and co-design
  - Embedding innovation and smart thinking into the procurement process and long-term contracts
  - Digitising City services for greater accessibility and expanded multilingual offerings to create a seamless customer experience, which can adapt to individual needs

**3** Organisational Capability
  - Tailoring best practice policies developed by other governments, such as a Data Management Framework to ensure data is collected, stored and used in a safe and highly effective manner.
  - Delivering a City performance dashboard to enhance accountability and transparency of decision-making and objectives
  - Developing our organisation's data collection, sharing and presentation to help break down internal silos, improve City services and share information with the community.

# MEASURING OUR PROGRESS

A key element of a smart city is measuring progress. The City will consistently and regularly measure the success of the *Smart City Strategy* and its initiatives. This ensures the City is accountable for meeting the aspirations and objectives of the Strategy.

The following table sets out the areas that the City will measure a diverse range of performance indicators to be measured over the short, medium, and long-term.

| | INPUTS | OUTPUTS | IMPACTS | OUTCOMES |
|---|---|---|---|---|
| | *Resources, funding, capabilities* | *Programs, policies, projects and partnerships* | *Direct effects or results of outputs* | *Long term improvements to Wanneroo's liveability, economy and sustainability* |
| **TIME** | Short term (0–12 months) | Short/medium term (13–24 months) | Medium/long term (3–4 years ) | Long term (4+ years) |
| **INDICATORS** | • Smart city investment<br>• City resources allocated to city projects<br>• Time allocations to smart city initiatives | • Adoption and updating of internal and external smart city initiatives<br>• Participation in projects and programs<br>• Number of partnerships and collaborators<br>• Internal & external digital capacity within Wanneroo | • Community awareness, use and satisfaction surrounding smart city indicatives/services<br>• Data collected and analysed<br>• People across sectors using smart city services | • Liveability – measured by results in survey data<br>• Economic innovation and performance – indicators including employment levels, flexible working environments and increased gross regional product<br>• Education attainment<br>• Pattern application<br>• Improved safety – measured through crime statistics and safety perception survey questions |
| **EXAMPLES** | **Opportunity 2.1 – Enhancing community input into the design/planning processes by exploring the use of innovative tools and data sharing including the RailSmart Project.** | | | |
| | • Number of sessions delivered<br>• Total duration of community consultation | • Number of participants in engagement sessions<br>• Number of stakeholders engaged with | • Community involvement in planning and development | • Community perceived involvement in decision making – "have your say" engagement surveys<br>• Best outcomes for the community – measurable through survey results |

# BUILDING OUR SMART CITY

Smart cities and the technology, data and innovative procedures that drive them are complex. Here we outline some of the benefits the City is seeking to leverage and the active steps we are taking to manage risks.

## Benefits

| | ASPECTS TO LEVERAGE | LEVERAGE |
|---|---|---|
| **Transparent & inclusive decision-making** | Digital technology improves government services by enabling community input in decision making and supporting greater transparency. For example, 'Report It' on the City's website is a platform that supports community issue reporting to enable faster response by the City; the 'Have Your Say' website enables community engagement with policy to help tailor it to local priorities; and the 'MyCouncil' website strengthens local government accountability by sharing information about their revenue and spending. | This Strategy will increase data sharing and the community's access to information. The City will use data obtained by digital technologies to drive internal decision making and city-wide innovation. The City will continue to leverage data, real-time technology, and collaborative solutions to produce positive outcomes for Wanneroo. |
| **Data** | Digital technology enables the City, residents, and businesses to harness data to inform decision-making, service delivery and product exploration. Innovators and local businesses, for example, can leverage data insights to anticipate consumer demands and trends. | The City will work to create network that facilitates collaboration, partnerships, and knowledge-sharing in Wanneroo. The City will work towards developing a dynamic innovation ecosystem that allows innovators and businesses to collaborate and access information. |
| **Innovative solutions** | Digital technology opens new ways of doing things, making traditional activities more efficient or even reinventing what is possible. In Wanneroo it may be possible to transform how waste is sorted and collected, how parks are looked after or even integrate a new energy source into the grid; the possibilities are endless. | The City is constantly exploring new opportunities to use innovative smart technologies to improve efficiency and deliver better outcomes for our community. We will work with start-ups and local innovators to find new solutions to real community problems across Wanneroo. |

## Risks[7]

| ASPECTS TO MITIGATE | MITIGATE |
|---|---|
| **Security & Privacy** Cyber-security and privacy protections are essential considerations for any smart city. As more processes are automated and digitised, and greater amounts of data are collected, strategies are needed to mitigate cyber security threats protect individual privacy. The success of a smart Wanneroo relies on an ability to collect, store and use data in a secure and safe manner. | Wanneroo will adopt a comprehensive privacy and security policy that will meet the increasing security demands of a smart city. We will continue to proactively update and address new and emerging privacy and security risks to safeguard the privacy of our residents, visitors and staff. Additionally, we will work with our community to ensure they have the skills and knowledge to safely interact digitally. |
| **Digital Exclusion** Within our City there is varying levels of digital literacy. As Wanneroo looks to innovate and advance using technology there may be members of our community who do not have the skills or access required to participate digitally. | This Strategy encourages diverse involvement, access and inclusion across cultures, experiences, abilities and ages. We will advocate and work to increase access to technology and build up the skills of our community. We will continue to deliver services that meet the changing needs of our City, working to ensure people are not left behind while looking for ways to innovate. |
| **Social Disconnection** Advancements to digital frameworks and technologies can come with an increased risk of reduced or distorted human interaction. This can lead to social disconnection within the community. | Smart Wanneroo will create new ways to connect and engage within the community. The Strategy will create an online presence that supports community connection and organisation, particularly for community events and services. |

7.  (Deming, 2021) (Hamilton, 2016 )

## Building our Capability

A strong foundation is needed to accelerate Wanneroo's smart city transformation. To build this foundation, the City is developing a dedicated *Data Management Framework*, and a *Smart City Governance Framework*, in addition to this *Smart City Strategy*. These three policy documents will work together to guide smart city initiatives and planning.

The following priorities have been identified to support the digital maturity of the City and the wider community, and ensure consistent, effective outcomes for Wanneroo:

- Active smart city leadership, within the City and community
- Smart city awareness/understanding – improving digital skills, forming an innovative culture and continuing to engage with our community
- Investment in smart, innovative and customer first services/infrastructure
- Data sharing – supporting City and community decision making and innovation
- Collaboration and partnership networks – encouraging smart city activity across the city
- Smart city policy foundation – project prioritisation matrix, business case framework and a clear process for building smart projects into the City's long-term financial plans

### Marketing Smart Wanneroo – A partnership approach

The City is committed to forming mutually beneficial partnerships with stakeholders from both the public and private sectors. Partnerships provide funding, technical know-how, and new ideas. They help the City to question old ideas and implement better policy and more effective services.

## Getting Involved

Wanneroo is made up of a number of key sectors, industries and community groups. A smart city is one of collaboration and shared leadership and action. Opportunities for our community to be involved include:

### AGRICULTURE
- Encourage the use of data and other smart technologies
- Build networks and communities of practice to support agricultural innovation
- Partner with WA Government to innovate and support growers to overcome water shortages

### BUSINESS
- Continue to build strong, coordinated and collaborative business networks
- Build skills and capacity to integrate digital technology and innovative practices into businesses
- Investigate opportunities to improve service/ customer experience through smart technologies

### DEVELOPMENT/CONSTRUCTION
- Embed digital technology from planning through to construction
- Implement smart city best practice
- Invest in smart city capacity building and training

### EDUCATION
- Build skills and knowledge to support smart city growth
- Develop programs to enhance digital literacy and learning
- Encourage the use of data and other smart technologies
- Use smart city data and tools in education and learning

### TOURISM
- Promote Wanneroo as a place of innovation and entrepreneurship
- Include digital elements in service offerings
- Encourage innovative ideas and offering diversification

### YOUTH
- Share ideas and solutions to local issues
- Participate and co-design smart projects
- Provide feedback on current initiatives and projects

# IMPLEMENTATION & NEXT STEPS

**The Wanneroo *Smart City Strategy* establishes a vision for leveraging digital technology and innovation to benefit our community.**

We are already making significant progress in implementing the Strategy, with major initiatives being delivered or committed to by the City. Building on this, we will use the Strategy to progress detailed planning for specific initiatives, consider funding and delivery options and track our performance in delivering community outcomes.

We will continue to engage with the community and stakeholders to ensure our actions are responsive to new challenges and opportunities.

## Continuing to engage with the community

The Wanneroo *Smart City Strategy* is a living plan that will grow with our community as new priorities, technology and innovators emerge.

This means we will continue to reach out and engage closely with the community and stakeholders, including Western Australian Government, neighbouring LGAs and local businesses. This is important for ensuring that local insights inform more detailed planning and implementation.

## Collaborating across the City

Collaboration across the City is essential for smart city planning and delivery. Smart city action will be coordinated and driven across directorates, taking advantage of economies of scale.

## Progressing our Strategy

The Wanneroo *Smart City Strategy* is just the first step in planning for the future. To ensure we are delivering the best outcomes for the community, we will undertake detailed planning and feasibility studies for specific initiatives.

## Prioritisation

A critical next step to guide the above process is prioritisation. Prioritisation will be based on:

- Alignment with Wanneroo's *Strategic Community Plan* and *Smart City Strategy* Priorities
- Alignment with WA Government committed initiatives
- Initiatives supporting long-term community driven smart city progress
- Better use of existing capabilities/infrastructure/projects – including integration, coordination and scaling up
- Operational capacity requirements

# SMART CITY GLOSSARY

**Smart City:** *A city that applies digital technology, data and innovative practices to improve liveability, sustainability, collaboration and economic opportunities*

### Big Data
The use of technology (especially sensors and networks) to collect, manage, analyse and utilise large volumes of data.

### Artificial Intelligence
AI or machine learning is the programming of technology to analyse information and take 'human-like' action such as problem-solving or pattern identification.

### Circular Economy
A system of production and consumption designed to eliminate waste through recycling, re-use and reduction.

### Citizen-centric
Approaching City service delivery from the perspective of the community to ensure their needs and expectations are met.

### Co-Creation/Co-Design
Working with clients, communities and customers to design and create services/solutions that meet user expectations and needs.

### Connectivity
The breadth, depth and quality of telecommunications and internet infrastructure, networks and services.

### Co-working
The mode of working where a mix of individuals, innovators and organisations work in the same physical location, sharing space, ideas, technology and motivation.

### Digital Democracy
The use of digital technology to modernise democratic processes and institutions and facilitating participation in debate and decision-making.

### Digital Literacy
The skills and capabilities to effectively and confidently use digital technology.

### Smart Technology
Digital networks, sensors and systems that support the delivery of smart services and assets

### Entrepreneur
A person who creates, innovates, invests and takes on risk aiming to commercially profit.

### Innovation
Doing something different with the aim of improving processes and outcomes.

### Innovation Ecosystem
The network of people, institutions, programs, regulations, culture and resources that work to promote innovation

### Internet of Things
The millions of physical devices around us connected online, sharing data - from tiny weather gauges up to super computers –this is the fabric of the digital world around us

### Liveability
The general perceptions of the quality of life living in a particular area. Take into account accessibility, safety, inclusion, local services, and the environment.

### Local Services
Public services provided by the local government (e.g., Parks, parking, planning, rubbish collection).

### Open Data
Making data more accessible and useable to enhance transparency, innovation and community outcomes. *Note sensitive, confidential and private data will remain secure.*

### Place Activation
Integrating new and innovative enterprises and projects to attract and retain people to underutilised public spaces.

### Red Tape
Inefficient legislation, regulation or business processes that inhibit innovation and place undue cost on the economy.

### Sustainability
Ability to balance benefits and negative impacts on the environment by optimising and maintaining our natural environmental systems, economic productivity, community connection and the built environment as well as the governance systems, accountability, and financial viability of the City.

Source: Delos Delta

# REFERENCES

- .id (informed decisions) . (2021, June 1). *Forecast. id*. Retrieved from .idCommunity: https://forecast.id.com.au/wanneroo

- ABS. (2021, June 1). *Region Summary (Wannero, Greater Perth, Western Australia)*. Retrieved from Data by Region : dbr.abs.gov.au

- Alibašić, H. (2018). *Sustainability and Resilience Planning for Local Governments: The Quadruple Bottom Line Strategy.* Springer.

- CSIRO. (2020). *Australia's innovation catalyst.* Canberra.

- Deming, D. (2021, February 19). *Balancing Privacy With Data Sharing for the Public Good.* Retrieved from The New York Times: https://www.nytimes.com/2021/02/19/business/privacy-open-data-public.html

- Department of the Premier and Cabinet Office of Digital Government. (2020). *Digital Strategy for the Western Australian Government 2021-2025: Convenient, smart and secure services for all Western Australians.* Retrieved from https://www.wa.gov.au/sites/default/files/2021-06/Digital-Strategy-for-the-Western-Australian-Government-2021-2025-mulitpage.pdf

- Dovers, S., & Hussey, K. (2013). *Environemnt and Sustainability: A policy handbook.* Federation Press.

- Halegoua, G. R. (2020). *Smart Cities* . MIT Press.

- Hamilton, E. (2016 , October 31). *The Benefits and Risks of Policymakers' Use of Smart City Technology*. Retrieved from Mercatus Centre : https://www.mercatus.org/publications/urban-economics/benefits-and-risks-policymakers-use-smart-city-technology

- Johnson, K. (2018). *Environmental benefits of smart city solutions.* Retrieved from FORESIGHT The CMCC observatory on climate policies and futures: https://www.climateforesight.eu/cities-coasts/environmental-benefits-of-smart-city-solutions/

- Lisdorf, A. (2020). *Demystefying Smart Cities: Practical Perspectives on How Cities Can Leverage the Potential of New Technologies.* Apress.

- Sudmeyer, R., Edward, A., Fazakerley, V., Simpkin, L., & Foster, I. (2016). *'Climate change: impacts and adaptation for agriculture in Western Australia'.* Perth: Department of Agriculture and Food, Western Australia.

- The Department of the Prime Minister and Cabinet. (2016). *Smart Cities PLan.* Canberra.

- Tierney, B., & Kelleher, J. D. (2018). *Data Science.* MIT Press.

City of Wanneroo