



**SENSING THE WEST FORUM**  
MARCH 2024  
WORKSHOP REPORT



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# Introduction

With significant population growth expected by 2040, Western Sydney is a major development opportunity for NSW and indeed Australia.

The *Sensing the West Forum* was convened to identify innovative opportunities for Smart Sensing technology to help achieve the outcomes desired for Western Sydney.

This report summarises key discussion points and the various smart sensing “solution concepts” formulated on the day.

It concludes with some additional observations and proposed next steps.

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## Western Sydney

Developing a large area such as Western Sydney is not easy and requires balancing competing needs. The community expects that this growth should occur while providing amenity, equity, health and environmental outcomes.

The complexity and increasingly interconnected nature of cities and the various organisations involved can make this a daunting prospect.

Added to this is a dynamic and evolving environmental context. We must take steps to mitigate climate change and adapt to improve our management of biodiversity and preparedness to a range of natural hazards including heat, drought and floods.

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## Smart Sensing

The basic premise underlying the *Sensing the West Forum* is that smart sensing is necessary to support place-based evidence-driven planning, decision-making and delivery of services.

*Sensors* collect localised data about the natural and built environment, people, transportation and other services. These can be deployed in the field, on vehicles, as wearables or on remote sensing platforms such as aircraft, drones or satellites.

*Smart Sensing* is a broad group of digital technologies that include sensors but also the management, processing and analysis of sensor and complimentary data. It includes technologies and products to make that data useful in the form of reports, visualisations, modelling tools and automated systems.





## Sensing the West Forum

The NSW Smart Sensing Network (NSSN) with its partners Western Sydney University and Celestino/CSIRO Sydney Science Park Urban Living Lab hosted the *Sensing the West Forum* to explore how smart sensing can benefit new developments in NSW.

This was a one-day event with a number of speakers and panel discussions, followed by interactive working sessions to explore opportunities for smart sensing in Western Sydney.

Although particular focus was given to the Western Sydney Aerotropolis, many of the outcomes will be applicable to new development areas in regional areas throughout NSW and Australia.

The primary objective of the forum was to formulate innovative solution concepts that can be progressed after the event. These are described later in this report.



## Opportunities for Smart Sensing

Throughout the forum several broad opportunities become apparent in presentations and discussions:

**Smart Sensing supports place-based approaches to planning and delivery of services.** Smart sensing allows us to understand similarities and differences between different places in terms of how people use spaces, environmental conditions, and how effective transportation and other services are delivered.

**Smart Sensing can reduce the cost of planning and approvals processes.** Sensing provides objective information to reduce uncertainty and allow automation of routine business processes within and between organisations.

**Smart Sensing can help to align stakeholders.** Sharing of sensing and other data helps to provide a common understanding of needs, plans, services, actual conditions “in the field” and measurement of progress towards goals. Provision of a common “situational awareness”.

Appendix A lists the opportunities discussed during the forum.



## Challenges

The opportunities above are significant and transformational. They improve how things are done.

Their implementation however cannot be successful without the right technical and organisational “infrastructure”. Transformation requires change in business processes to take advantage of new technology. Stakeholder engagement and change management are both crucial.

Forum participants identified a number of specific challenges that need to be dealt with to obtain the most value from smart sensing and similar technologies:

Sensing Challenges	Data Challenges	Organisational Challenges	Innovation Challenges
<ul style="list-style-type: none"> <li>Understanding what data is needed</li> <li>Patchy place specific data</li> <li>No systematic way to collect localised environmental data</li> <li>Data validation</li> </ul>	<ul style="list-style-type: none"> <li>Data sharing, ownership and trusted access</li> <li>Interoperability</li> <li>Data use and interpretation</li> <li>Lack some standardised measurements - e.g. the social environment</li> <li>Cyber security</li> </ul>	<ul style="list-style-type: none"> <li>Leadership</li> <li>Alignment of goals and progress</li> <li>‘BAU’ thinking</li> <li>Technology literacy</li> <li>Budgeting for Smart Technology</li> <li>Long term ‘whole of life’ business cases</li> </ul>	<ul style="list-style-type: none"> <li>Compliance lags innovation</li> <li>Standards lag innovation</li> <li>Procurement mechanisms not always fit for purpose</li> <li>Building community trust in new approaches</li> </ul>

## Solution Concepts

A significant part of the day was devoted to formulating solution concepts that address the opportunities and challenges outlined above.

These concepts fall roughly into two categories – platforms & enablers and those that address more specific needs. They are listed here and described in more detail in the Appendix B:

Platforms & Enablers	Addressing Specific Needs
<ul style="list-style-type: none"> <li>Smart sensing sandbox</li> <li>Shared platforms for planning coordination</li> <li>Connected data for the community</li> <li>Planning for sensing</li> <li>Smart by default</li> <li>Data insights officer</li> </ul>	<ul style="list-style-type: none"> <li>Incorporating sensing and data collection into building codes</li> <li>Focus on liveability outcomes</li> <li>Reducing energy usage in buildings</li> <li>Efficient water systems to cool Western Sydney</li> <li>Cool responses to heatwaves</li> <li>Minimising biodiversity impact of new developments</li> <li>Measuring transportation demand at bus stops</li> </ul>



## Appendix A: Specific Opportunities

Each breakout group identified specific opportunities relevant to their thematic area. Note that not all of these are addressed by solution concepts. Opportunities are grouped by thematic area:

### Planning

- Faster planning processes – facilitated by smart sensing and data
- Improved coordination between all participants in planning process
- Including sensing in planning process and rules (eg: for net zero)
- Feeding sensor data into a larger data system (like **OPENAIR**)
- Opportunities to increase literacy in smart technology (including sensing)
- Relaying data from construction back into planning processes

### Building and Construction

- Smart sensing and data etc
- Smart sensing enabling more informed decisions to be made with lower risk
- Mitigating heat impact through design informed by science and data
- Water resources – including stormwater design and management

### Service Delivery

- Integrated transportation planning and operations – more efficient, better connections that increase active and public transport
- Transit oriented development (ToD) – supported by data and evidence → “Data Oriented Development”
- Increased data sharing including across “silos” in local and state government
- Ensuring equity and accessibility to services
- Increasing safety in public spaces

### People and Environment

- Smart sensing to address urban heat – for liveability, health, productivity and environmental outcomes
- Environment is experienced at very localised scales – more granular than city-scale or even LGA. Sensors can provide localised data
- Sensing to collect data to inform statutory changes to planning system



## Appendix B: Solution Concepts

Thirteen solution concepts discussed in the workshop sessions are summarised below under two headings. *Platforms and Enablers* and *Addressing Specific Needs*.

The letters after each heading denote which workshop group (*Platforms and Enablers* and *Addressing Specific Needs*) discussed each concept:

- **P** – Planning
- **B&C** – Building and Construction
- **SD** – Service Delivery
- **P&E** – People and Environment

### Platforms and Enablers

#### 1. SMART SENSING SANDBOX (P)

Sensor validation and compatibility lab, education, demonstrations

<b>Problem / Opportunity</b>	There is a generally low level of awareness and little guidance or support to help select and implement smart sensors in new developments
<b>Solution</b>	Establish a sensor validation and compatibility lab. Can be used to inform development of fit for purpose sensor specifications, evaluation criteria and procurement guidance. Education, demonstrations will help raise awareness and literacy in smart technology
<b>Next Steps</b>	Develop a business case for a sensor validation and compatibility lab and the outcomes it would provide to industry and government.
<b>Collaborators</b>	Celestino, UTS, DPHI Others: developers

#### 2. SHARED PLATFORM FOR PLANNING COORDINATION AND INTEGRATION (DEMOCRATISED TOOLS) (P)

<b>Problem / Opportunity</b>	Opportunity to improve coordination between all participants in planning of new developments such as the Aerotropolis.
<b>Solution</b>	Shared data platforms for government, industry & community stakeholders engaged in a new developments to help get everyone on the same page. Enables integration of business process. Results in improved quality, streamline planning and approvals.
<b>Next Steps</b>	Workshops to identify specific datasets, use-cases and data access tools.
<b>Collaborators</b>	Celestino, University of Sydney, Western Sydney University, Western Sydney International Airport, CSIRO, GME Others: IoT Alliance, WPCA, DPHI, Transport for NSW, Western Sydney Planning Partnership, Depat of Customer Service



### 3. CONNECTED REAL-TIME DATA FOR THE COMMUNITY (SD)

<b>Problem / Opportunity</b>	A lot of real-time data is collected but there is no consistent way to provide it (services, environment, social KPIs) back to the community. Datasets are siloed. No consistency in presentation.
<b>Solution</b>	Shared data platform and access UI(s) specifically for citizens. Includes a data catalogue and federated access to local and state govt datasets. Includes tools to help users interpret data.
<b>Next Steps</b>	Stakeholder engagement, data audit, develop standardised APIs/formats/best practises.
<b>Collaborators</b>	Local government, state government (Transport, Environment, Planning, Customer Service)

### 4. “PLANNING FOR SENSING” → “SENSING FOR PLANNING” (P)

<b>Problem / Opportunity</b>	Smart Sensing should be integral to planning. Requires planning of smart sensing in very early stages to collect data to baseline and inform planning  How do we use data to increase productivity for all stakeholders (and use cases) from the design onwards?
<b>Solution</b>	Determine sensing strategy to baseline measure new areas (environmental – soil, water, air, biodiversity, heat, noise), people and surrounding areas (people movement, transport etc). Use remote and in-situ sensing. Optimise sensor placement.
<b>Next Steps</b>	Identify stakeholders and collaborators.  Define data requirements and sensor procurement specifications.
<b>Collaborators</b>	

### 5. SMART BY DEFAULT (P)

<b>Problem / Opportunity</b>	Data required to efficiently construct, operate and maintain infrastructure is not considered during the planning and design stages.
<b>Solution</b>	Incorporate “smart/digital by default” into planning and design rules for new developments and infrastructure. Includes smart sensing and digital infrastructure.  Incorporate lifecycle technology costs in business cases and ongoing finances.
<b>Next Steps</b>	Develop business cases for “digital by default”
<b>Collaborators</b>	Western Sydney Planning Partnership, universities, council

### 6. DATA INSIGHTS OFFICER (B&C)

<b>Problem / Opportunity</b>	Smaller organisations struggle to understand the value of the data they own or have access to. They cannot afford to have a dedicated “Data Insights Officer” role.
<b>Solution</b>	Offer a “Data Insights Officer” potentially as a shared role for smaller organisations such as some councils and SMEs.
<b>Next Steps</b>	Validate market interest and opportunity  Develop business case for such as role / service
<b>Collaborators</b>	Jacobs, Macquarie Uni, FAAC Australia  Others: educational providers



## Addressing Specific Needs

### 7. INCORPORATING SENSING AND DATA COLLECTION INTO BUILDING CODES (B&C)

<b>Problem / Opportunity</b>	Using smart sensing to monitor building performance provide valuable insight into design and construction. Will only happen if incorporated into building codes.
<b>Solution</b>	Define mandatory data requirements from all new buildings (commercial, residential). Industry can work with innovators to find the most cost-effective smart sensing solutions
<b>Next Steps</b>	Identify required data
<b>Collaborators</b>	

### 8. FOCUS ON LIVEABILITY OUTCOMES (P&E)

<b>Problem / Opportunity</b>	Insufficient focus on liveability outcomes such as health, cultural values
<b>Solution</b>	Formalised approach to baselining and monitoring liveability outcomes
<b>Next Steps</b>	Analysis of existing projects and data Identify metrics and KPIs, measure current state and set targets all in collaboration with community and first nations groups Engage with policy makes to incorporate into planning and other instruments
<b>Collaborators</b>	Health and social inclusion researchers, NSW OCSE Others: indigenous environmental scientists, DCCEEW

### 9. REDUCING ENERGY USAGE IN BUILDINGS (B&C)

<b>Problem / Opportunity</b>	Existing commercial building energy monitoring systems are limited to reporting only
<b>Solution</b>	Integration of occupant needs and behaviours, energy loads, PV production and grid offtake and feeds to minimise energy consumption.
<b>Next Steps</b>	Use existing data (eg: from Mamre Road) to model relationships between temperature, water consumption, energy and characteristics of the built environment. Present this information to planners and policy makers incl DPHI, councils and others
<b>Collaborators</b>	UNSW, UTS, WSU, Digital-X Others: builders (new and retrofit), building owners





## 10. EFFICIENT WATER SYSTEMS TO COOL WESTERN SYDNEY (B&C)

<b>Problem / Opportunity</b>	Although water can be used in different ways to effectively mitigate urban heat this knowledge has not been incorporated into planning and design processes.
<b>Solution</b>	Develop policy guidance, best practises and improved building codes for how water can be used in greenfield developments to mitigate heat. Link these to DCPs and rating tools.
<b>Next Steps</b>	Use existing data (eg: from Mamre Road) to model relationships between temperature, water consumption, energy and characteristics of the built environment. Present this information to planners and policy makers incl DPHI, councils and others
<b>Collaborators</b>	Sydney Water, NSW Dept of Regional NSW, Charles Sturt University, Western Sydney University, University of Newcastle Others: Infrastructure NSW, Infrastructure Sustainability Council, Green Building Council of Australia

## 11. COOL RESPONSES TO HEATWAVES (P&E)

<b>Problem / Opportunity</b>	Misting systems and irrigation using recycled water can be used to cool public spaces during extreme heat events. There is low awareness of how and when to use these interventions.
<b>Solution</b>	Develop integrated heatwave response systems for communities
<b>Next Steps</b>	Evaluate available data on different responses Develop scenario planning tools, integrated response plans and systems monitored by smart sensing, Educate councils and communities
<b>Collaborators</b>	DCCEEW, NSW Regional Growth Development Corporation, Macquarie University, ICT International, UTS

## 12. MINIMISING BIODIVERSITY IMPACT OF NEW DEVELOPMENTS (P&E)

<b>Problem / Opportunity</b>	New developments often impact wildlife directly and through ecosystem damage. No one organisation is responsible.
<b>Solution</b>	Use smart sensors like cameras to identify and monitor wildlife corridors and diseased wildlife requiring care. Use this data to inform design of new developments through wildlife corridors, retaining remnant vegetation, increasing tree canopy in key areas and mitigation measures to protect wildlife (such as tunnels and bridges).
<b>Next Steps</b>	Investigate existing datasets, review coverage and identify gaps Work with researchers, innovative companies, wildlife groups to develop smart sensing solutions
<b>Collaborators</b>	Universities, OCSE, wildlife groups, first nations groups, developers

## 13. MEASURING TRANSPORTATION DEMANDS AT BUS STOPS (SD)

<b>Problem / Opportunity</b>	Matching bus size and frequency to demand
<b>Solution</b>	Sensors at bus stops to monitor demand, real-time info to users, optimise bus services and then track changes in user behaviour
<b>Next Steps</b>	Engage with Transport for NSW
<b>Collaborators</b>	Transport for NSW, bus companies, councils, telcos



# Next Steps

## The *Sensing the West Forum* was an engaging and productive event.

As a research innovation network, the NSSN's role is to facilitate dialogue and connection between industry, government and the research community in NSW.

The NSSN will work with participants and other stakeholders to prioritise and assist with development of the solution concepts identified in the workshop.

*“Western Sydney can be a beacon for the rest of the world about how a smart city is built.”*



### CONTACT

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