



The Committee for  
**Sydney**

# SMART ENGAGEMENT

LEVERAGING TECHNOLOGY  
FOR A MORE INCLUSIVE SYDNEY



SEPTEMBER 2018

**KJA**   
engaging solutions

# FOREWORD

Our city is undergoing significant change. More than ever, it's important that we put Sydneysiders at the centre of this change.

Our city's urban footprint is growing and so is our population. Technology is evolving too. Media and communications have been transformed over just a generation, altering forever the way we engage with our family, friends, colleagues and many others. Our networks now transcend geography as we share and soak up information and ideas from around the world. Through modern Information and Communications Technologies (ICT), we interact not only with each other but with the bus we catch to work, the health and fitness devices we wear and even our fridges at home.

In these dynamic times, it is vital for decision-makers and decision-shapers to meaningfully engage citizens and bring them along on the city-making journey. Traditional engagement tools will continue to play a key role in these conversations, but business as usual will not suffice in engaging our communities. We must also harness the powers of new tools and methods to reach wider audiences, dive deeper into deliberative discussions and offer new, more palpable experiences of future possibilities. Think: online surveys, webinars and virtual reality to name a few.

In recognition of this challenge, and to help our staff and our clients leverage these new opportunities, KJA recently launched the KJA Innovation Hub. Through a range of initiatives - from new creative physical spaces, stimulus and strategic frameworks to useful databases and partnerships - the Hub assists KJA and its clients in truly understanding our challenges and opportunities, insights and the resources we can draw upon when engaging on a given project.

We believe innovation is about selecting the smartest tool for the job - not simply using technology for its own sake. Practitioners must deeply understand a project, identify measures of success, and then and only then select the appropriate tool for the job. This approach has led KJA to some exciting and meaningful solutions. For the City of Sydney's Resilient Sydney, we created a mock radio broadcast to help people visualise a future crisis. For the Greater Sydney Commission's Quality Outcomes project, we encouraged participants to get their phones out mid-workshop, using live polling to identify priorities. And with NSW Health, KJA prepared and reported on a wide-reaching online survey that gathered 2000 comprehensive responses to Palliative Care priorities.

I often think often about how exciting it is to be engagement practitioners at a time when we are increasingly connected to the world around us. Given the brilliant examples of smart engagement throughout this paper, I can see this is shared across Sydney. I encourage you all to share your successes and learn from one another and trust that this paper will be a source of knowledge and inspiration to help our city become more connected and dynamic.

**KATHY JONES**  
EXECUTIVE CHAIR, KJA



# INTRODUCTION



This report focuses on one of the core building blocks of successful smart cities – effective citizen engagement. While new technologies and infrastructure allow deployment of shared data, smart sensors and automated services, the success of smart cities will be truly determined by the degree to which these technologies improve the lives of those living and working there. To improve peoples' lives, we must understand the issues that impact them most. For Sydney to capitalise on the opportunity to be a smart city world leader, the people who live here need to be involved in the city's development from the ground up.

At the same time, our city is changing at a rate faster than any time in recent memory. The social licence to continue this progress requires the community to buy into a changing city and understand how it will benefit.

This of course is everyone's business. We are all change managers as we build a Smart Sydney. Just as organisations engage with staff early to manage changes in the workplace, so must city-makers engage with all citizens to manage change across the city.

Smart engagement means engaging early and bringing everyone along as changes take place – creating shared ownership and investment in the success of the changing city. Modern ICT provide us with opportunities to engage people in better ways. Indeed, in smart cities,

ICT has become the facilitator for creating a new type of communication environment!<sup>1</sup> The range and rapid development of ICT has given us the opportunity to experiment with new ways of engaging citizens in planning and policy development processes as the case studies in this report show.

Smart engagement allows us to build a smart city that meets the needs of its citizens. More than updating traditional consultation methods to technological solutions, smart engagement is about driving the use of co-creation and co-design.

This report provides a diverse range of case studies in how smart engagement can work in Sydney. These examples of smart engagement are exemplars in addressing three challenges we face in building a Smart Sydney:

1. Engaging diverse groups of people across the city.
2. Leveraging technology to deliver meaningful results.
3. Developing new models for shared decision making.

<sup>1</sup> Albino, V., Berardi, U. and Dangelico, R.M. 2015. "Smart Cities: Definitions, Dimensions, Performance and Initiatives", *Journal of Urban Technology*, 22(1):3-21. <http://dx.doi.org/10.1080/10630732.2014.942092> (Accessed 03/08/2018).

# WHY SMART ENGAGEMENT?

Engagement is more than a box-ticking exercise. The Committee for Sydney strongly believes that involving the people who will be impacted by a change will lead to better outcomes. Practitioners test assumptions and increasingly crowd-source knowledge and ideas from the public. In turn, citizens are given the opportunity to be active participants in decision-making processes, rather than mere recipients.

Of course, meaningful engagement is challenging. People can feel like they're not heard and hard to reach segments of society can be left out of engagement exercises altogether. Increasingly, inter-connected projects make understanding the trade-offs involved difficult. Understanding sometimes requires time and energy beyond the capacity or interest of the average citizen. On top of this, we often engage communities late in planning and policy-making processes. Rather than seeking participation at the point of creation, we engage at the end of a process and present the public with a "vending machine" of options.

With Sydney's population profile significantly changing, the issue of engagement is more important than ever before. The city is projected to grow by an additional 1.7 million people over the next 20 years. In this time, Sydney will become more diverse. A changing age profile and the cultural heterogeneity that emerges from Australia's long history of immigration will necessitate different ways of engaging citizens.

NSW projections show that by 2036 one in four Sydneysiders is likely to be aged 65 years or older.<sup>2</sup> The number of people aged 80+ is projected to almost double from 162,000 to 319,000. At the same time, the number of people under 30 is projected to increase by only 36,000 and will make up a smaller share of Sydney's population

(dropping from 36% to 33%). However, age profiles differ across Sydney, with a younger age profile in North Sydney for example, and older in the Blue Mountains.

Smart engagement means responding to the engagement needs of people of different ages. A report by the McKinsey Center for Government found that cities with younger populations had greater uptake of smart city solutions.<sup>3</sup> This does not mean older populations do not want or cannot use smart solutions. Rather, it highlights that smart solutions may not be meeting the needs of older citizens. Smart engagement gives us the targeted engagement tools needed to uncover the needs of different age groups and their perceived challenges as Sydney residents.

These diverse age profiles intersect with the global network of Sydney's population from sustained overseas migration since World War II. The 2016 Census showed 41% of Sydney's population was born overseas. Top countries for immigrants were China, England, India and New Zealand. Moreover, more than four in five people living in Sydney (84%) said they have an ancestry other than Australian. The top four ancestries were English, Chinese, Irish and Indian. Sydney's cultural diversity reflects both the historic ties across the Commonwealth and the diaspora of the planet's two largest populations.

Smart engagement allows us to respond to a growing and diverse population. There are new technologies that enable translation, for example, and technology itself enables connections between people in new ways. One of the key benefits of engaging across this diversity within Sydney is that innovative solutions to key challenges are most likely to arise when different views are brought together for problem solving.

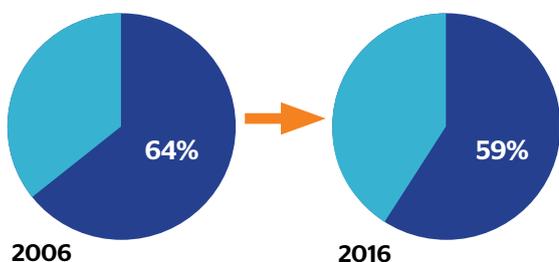


2 2016 New South Wales State and Local Government Area Population Projections. Department of Planning and Environment.

3 Woetzel, J. and Kurnetsova, E. (2018) *Smart city solutions: What drives citizen adoption around the globe?* McKinsey Center for Government. <https://www.mckinsey.com/industries/public-sector/our-insights/smart-city-solutions-what-drives-citizen-adoption-around-the-globe> (Accessed 22/07/2018).

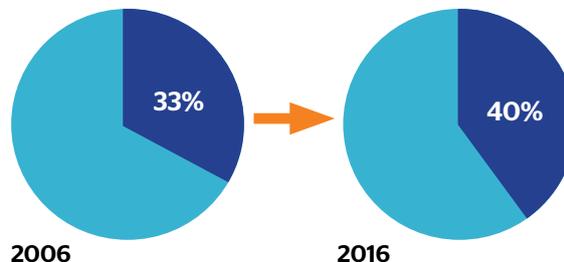
## HOW SYDNEY IS CHANGING

Proportion of Sydney's Population Born in Australia



Source: ABS, 2016

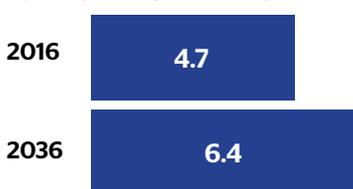
Proportion of Sydney Households that Speak a Language Other than English at Home



2006

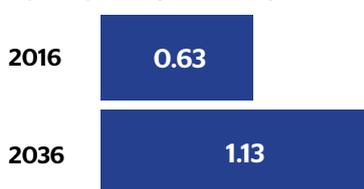
2016

Sydney's Projected Population (millions)



Source: NSW Department of Planning and Environment, 2016

Sydney's Projected Population Aged 65+ (millions)



2016

2036

# THE OPPORTUNITY

Smart engagement uses ICT tools and data to engage citizens in new ways. This is more than a process of digitising paper-based processes. New sensor networks and data sets provide opportunities to engage with citizens in ways we've not been able to before. Data can show us what people need from their city. For example, mapping where people congregate on high heat days can reveal which infrastructure is effective for heat-mitigation and where gaps exist.

With an overwhelming 91% of Australian adults owning a smartphone, the opportunities for engaging with citizens in new ways is exciting. This is particularly true for younger citizens; digital natives who have always lived in a digital-driven world and so have proven difficult to engage through traditional methods. Even for older people, simple training leads to much greater use of digital tools. An evaluation of the NSW Tech Savvy Seniors program for Culturally and Linguistically Diverse (CALD) older Australians showed that after training, two-thirds of people used digital technology daily compared to less than 20% before training.<sup>4</sup>

New technology on its own, however, will not deliver smart engagement. In some cases, using old technology in new ways delivers the results we need. Any visitor to a digital accelerator hub will be struck by the plethora of post-it notes that are essential to the design process. Indeed, the challenge is to ensure citizen engagement using new technologies does not entrench a digital divide across the city. Good practice dictates that any data from surveys or monitoring should be backed up with on-the-ground activities.

The key is to leverage all the tools available, from traditional methods to those driven by new ICT, to deliver a spectrum of engagement with all citizens. These range from being informed and consulted to being empowered to take an active role in planning and co-creating solutions.

<sup>4</sup> EY (2018) *Social Return on Investment Tech Savvy Seniors NSW CALD*. [http://www.sl.nsw.gov.au/sites/default/files/tss\\_nsw\\_cald\\_sroi\\_report\\_may\\_2018.pdf](http://www.sl.nsw.gov.au/sites/default/files/tss_nsw_cald_sroi_report_may_2018.pdf) (accessed 6 June 2018).

# SMART ENGAGEMENT IN PRACTICE

We need to bring the public into conversations on the future of the city, from the inception of ideas to the delivery of actual projects. The key challenge is shifting the conversation from asking citizens for minor input on big decisions to better framing discussions so that stakeholders and the community are providing input that is profoundly useful to decision makers. We can also enable continuous community involvement in planning and policy-making processes through the use of technology, as opposed to one-off engagement exercises. This is critical for smart city success.

Sydney currently faces a myriad of complex issues, from affordable housing and infrastructure demands to environmental sustainability. Smart engagement means more people can be involved in identifying solutions. Many smart city solutions require behaviour change, by citizens, service providers and governments. To arrive at the best solutions, including those backed by positive behavioural change, we need to address the challenges and needs of the end user.

The starting point for smart engagement is identifying what the community cares about and understanding their pain points for living in the city. This means planned engagement and consultation taking place before decisions are made. New technologies give us tools to be able to share ideas and ask questions in a way that people can respond quickly, and that are integrated with the diverse needs across the city.

Smart engagement is a key success tool for smart cities. By bringing citizens together in planning and policy-making processes, we can demonstrate transparency, improve community cohesiveness and build trust in the decisions made.

## PRINCIPLES OF SMART ENGAGEMENT

### Fit for Purpose

- Communicate with all stakeholders using a variety of tools.
- Determine the best way to engage citizens and stakeholders – find what works best for different groups.
- Use a variety of tools for different feedback opportunities throughout a project lifecycle.

### Inclusive Practice

- Start together by consulting early and often before final decisions are made.
- Empower stakeholders to make meaningful contributions to a process.
- Build and maintain relationships and buy-in towards the project.

### Informing the Process

- Plan engagement and what will be done with the information that arises.
- Inform decision making in a transparent, trustworthy and reliable way.

### Establish Trust

- Secure and, if applicable, de-identify data.
- Protect stakeholder privacy across digital platforms.
- Ensure those consulted feel they have been listened to and understand how their input impacts on the outcome.

## CASE STUDIES

We have pulled together a range of case studies to highlight new ways of engaging with citizens that are emerging across Sydney. There are many paths to smart engagement and these case studies describe the multiple ways to effectively bring the public into the city-making process. They range from using traditional methods to emerging, cutting-edge technology.

# BLENDING TRADITIONAL AND DIGITAL METHODS



## KJA

KJA is a specialist communication and engagement consultancy that design and deliver solutions across planning, transport, infrastructure, housing and development, community, health, environment and utilities sectors. To inform the strategic direction for palliative care services in NSW, KJA partnered with key health organisations to effectively execute a blended face-to-face and digital consultation strategy.

Approximately 50,000 people die each year in NSW and this number is expected to more than double by 2056, increasing the number of people that will require palliative care.

Beginning in May 2017, NSW Health and KJA hosted twelve workshops across the State to help develop a strategic direction for the palliative care services required to meet this increasing need. The focus of the workshops was on identifying what works well in palliative care, and what priorities (and corresponding solutions) exist for each Local Health District. KJA's facilitators drew out valuable insights and guided constructive conversations from a diverse mix of attendees, ranging from consumers to academics to practitioners and more. Comprehensive reports were produced out of each session and fed back to workshop participants.

Nine key themes were identified out of the roundtables and presented in a Consultation Paper that was accompanied by an in-depth survey, to provide an opportunity for the broader community to comment on the roundtable themes and inform the future of palliative care in NSW. This survey

was hosted and distributed online through NSW Health and Local Health District channels to maximise the engagement reach. The digital strategy was a success. Two thousand responses were received with all key stakeholder groups well represented. Only 78 of these respondents said they had been to the roundtables, suggesting the survey effectively engaged a new group of people.

Respondents were very supportive of the nine roundtable themes (awarding all of them at least 4.8 out of 5) and provided valuable insights into the themes and other challenges. Palliative care is an emotional and sensitive topic, full of nuance and personal stories, and so KJA diligently applied a thematic approach to analysing these qualitative survey responses. The results of this analysis were made public in a Summary Report released in early 2018.

In addition to this summary, KJA provided NSW Health with a filterable spreadsheet that included respondent comments by theme, noteworthy quotes by stakeholder group and recommended actions. This highly functional spreadsheet will assist NSW Health in efficiently revisiting stakeholder feedback when making decisions around palliative care.

Guided by stakeholder input into this process, the NSW Government recently announced its plans to invest an additional \$100 million in palliative care services over the next four years.

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## ELTON CONSULTING

Elton Consulting is a multi-disciplinary planning, policy and communications practice. In collaboration with Hornsby Shire Council, Elton recently set out to reimagine how a disused quarry with a contentious history could become a parkland cherished by the community. To achieve this, Elton utilised a mix of engagement tools. The use of digital platforms enabled Elton to generate a large amount of community content, while the use of traditional face-to-face forums, provided a sphere for feedback.

In 2017, Hornsby Shire Council announced that they would transform Hornsby Quarry and its surrounding area into a parkland. The quarry, which was formerly occupied by a mining company, had been disused for decades. Located in a picturesque bushland setting, within a kilometre of the Hornsby's CBD, the quarry represented a transformative opportunity to improve place and amenity for local residents.

In collaboration with Council, Elton Consulting designed the 'Plan your Parkland' engagement program which aimed to include people of all ages and backgrounds, and get people excited about the emerging parkland. The strategy harnessed the power of digital and face-to-face techniques to allow people to contribute in ways that were convenient to them. Many residents were reached through Council's database of approximately 40,000 email addresses. Options included completing an online survey, posting a comment on Facebook or presenting a detailed written submission. The strategy to blend traditional and digital engagement gave flexibility to present ideas in ways that most effectively communicated them. It also was inclusive of language and age. For example, many submissions came in the form of drawings, photographs and images, and were received online and through the post.

Community feedback was overwhelmingly positive about the project; both about the commitment to transform Hornsby Quarry into parkland, and the ease with which they could contribute their ideas. Residents submitted hundreds of ideas ranging from sporting activities, ways to showcase the unique local ecosystem, and commercial opportunities such as cafes and restaurants. Feedback highlights included:

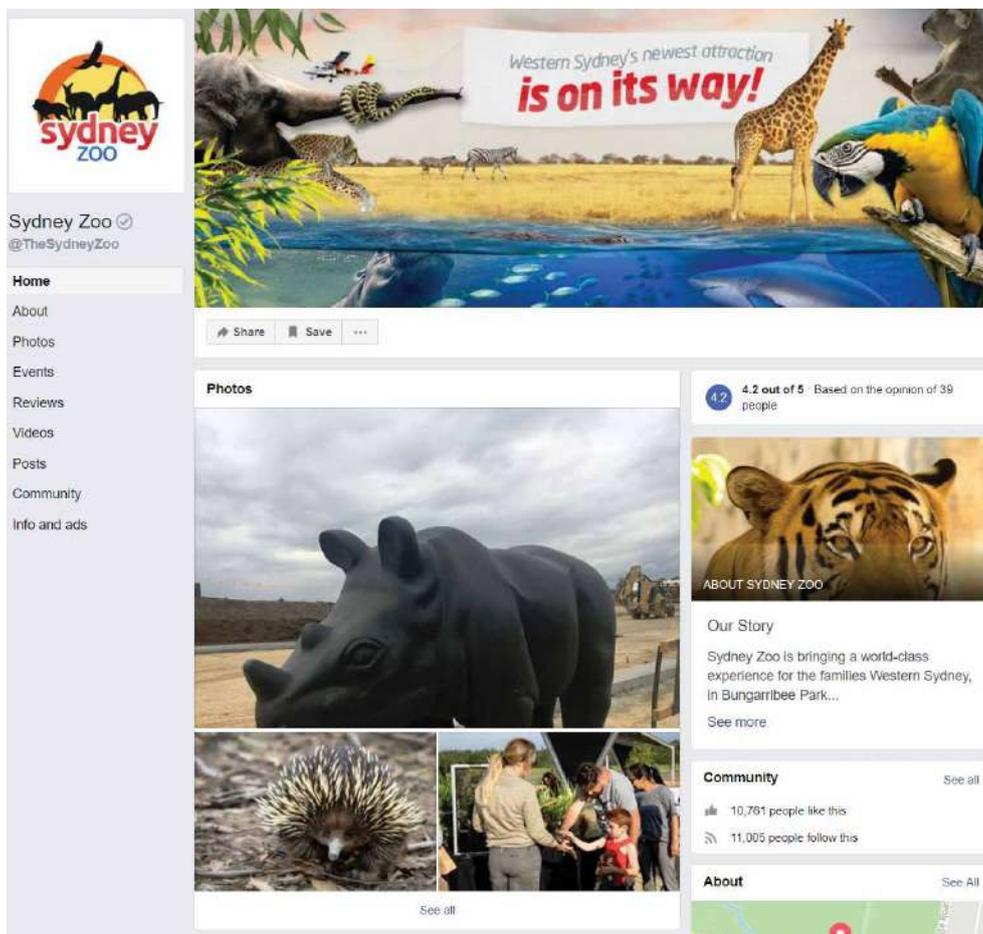
- Over 1,200 online survey responses
- 118 written and email submissions
- 20 Facebook comments
- A Year 3 class submission, presenting their vision for the parkland.

The use of digital communication tools generated a large amount of community content to consider and provide feedback. Elton wanted to ensure that the community knew how their crowd-sourced ideas were being used and integrated into a vision for the quarry. To achieve this, Elton used traditional community information drop-in sessions as forums for Council to 'report back' to the community on what they had heard and to sense-check their findings. This proved to be very successful. Over 600 people attended the two sessions held at Hornsby Mall, expressing excitement and pride about the future of the quarry, and their role in designing it.

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## ETHOS URBAN

Ethos Urban is an urban solutions company that blends design, economics, engagement and planning. Tasked with raising awareness and engaging the wider community about the proposed Sydney Zoo in Western Sydney, Ethos Urban employed both traditional engagement tools and ICT tools. Social media platforms were particularly effective at broadening the reach of key messages and providing timely feedback to the public.

In 2015, Ethos Urban provided stakeholder and community engagement services for the proposed Sydney Zoo project – a \$36 million tourist attraction to the Bungarribee Precinct in the Western Sydney Parklands. Engagement activities responded to the high level of stakeholder and community interest in the project at the local, regional, and international level. The diversity of stakeholders, including State Government Agencies and Ministers, metropolitan media, community groups, and school and university students, meant that multiple engagement tools were necessary to facilitate targeted and effective engagement.

Ethos Urban took an innovative approach by coupling traditional engagement tools including information sessions, factsheets and face-to-face briefings, with ICT tools such as a project website and social media channels (including Facebook, Instagram and Twitter). Multiple engagement tools enabled proactive, two-way communication, and targeted engagement with a diverse range of stakeholders. ICT tools were particularly effective for their broad reach, accessibility and potential for interaction. Whereas more traditional forms of engagement typically reach an older demographic, social media platforms have greater potential to capture a younger demographic that is often less engaged with planning matters.

ICT tools gave the team a platform to provide timely project updates and gave users the opportunity to provide feedback in real-time. Short, simple messages combined with imagery set the tone for discussion and helped to boost community awareness and enthusiasm. During the five-month process, the Sydney Zoo Facebook page attracted 4,721 followers, and has since reached 11,000.

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# AUGMENTING THE PUBLIC SPHERE



## LAING O'ROURKE

Laing O'Rourke is an internationally focused engineering, construction and asset management enterprise. As part of the Novo Rail Alliance, Laing O'Rourke delivered an integrated and innovative communication and stakeholder engagement strategy to support the construction of the Wynyard Station upgrade. The strategy included the development of an award-winning smartphone app that utilised the power of augmented reality technology.

The upgrade of Wynyard Station presented several challenges in managing the public interface during the construction process. As one of Sydney's oldest and most heavily used rail stations any changes or disruptions to the layout of the station would have a significant effect on customer and commercial amenity. Familiar walking paths, signage and visual cues would be altered, which can significantly impact those customers who have mobility or navigation requirements. Facilitating public engagement with the project was a key requirement from the client due to these concerns. To address these concerns, Laing O'Rourke created Novoview, a free, publicly available mobile application that used augmented reality technology.

Augmented reality blends digital information with the real world. Laing O'Rourke has found it to be an extremely useful technology for communicating complicated and sophisticated information in ways that are immediately understandable by the user. This made it very applicable for the Wynyard Station upgrade work, where a very diverse range of users wanted to engage with high level design information around the project.

The Novoview mobile application allowed users to experience high resolution, fully spherical panoramic images of the completed station from several key areas. Users could simply move their phone about in space to take in the whole panorama, transforming the device into a 'window into the future'. This allowed users to become familiar with the layout, access points and visual style of the new station as construction activity, and the associated disruption, progressed. The Novoview application could also be used as a messaging service, proactively notifying users regarding upcoming construction activities and the impacts these will have. Novoview also acted as a central point of contact for general information surrounding the project.

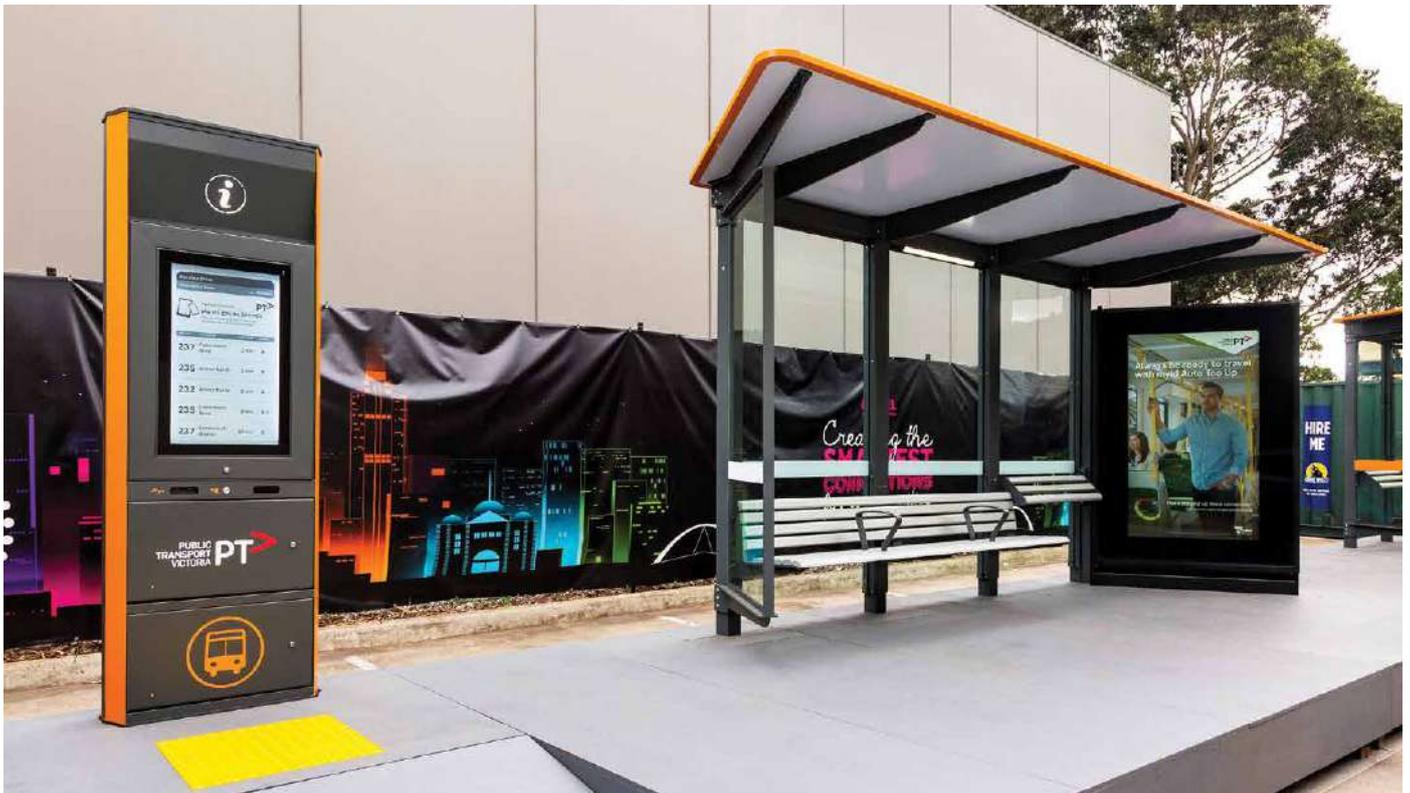
Ease of accessibility was a core requirement of this application due to the extremely diverse population that uses Wynyard Station. The application was designed to be usable on any mobile device, was freely available on the Apple and Google app stores and was designed to be visually accessible and with minimal user input required. Information Kiosks promoting the use of the app were present at Wynyard Station throughout the construction process. At the kiosks, users could be guided through the download process and the basic functionality of the Novoview application. These requirements were developed in close consultation with Transport for NSW.

The Novoview application was very successful as an engagement tool and was awarded the *2016 International Award for Champions of Innovation in Engagement* by IAP2. Between January and April 2016, the smartphone app was downloaded more than 2000 times. Novoview has since formed the basis of similar community engagement platforms for many of Laing O'Rourke's ongoing projects.

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## ADSHEL

Adshel is the leading provider of advertising-funded street furniture solutions in Australia and New Zealand. Tasked by Public Transport Victoria to develop the guidelines for the *Bus Stop of the Future*, Adshel undertook a rigorous prototyping process that balanced user-friendly design with digital connectivity.

In mid-2017, Adshel was tasked by Public Transport Victoria to develop the guidelines for the Bus Stop of the Future. As an integral piece of street furniture that citizens utilise each day, bus stops present a useful touch point to engage with communities and provide amenity to commuters. There are opportunities to integrate wayfinding technology, interactive displays, network infrastructure and connected devices, and create value for citizens in real-time. However, the tremendous potential of digitally connected street furniture needs to be grounded in user-experience.

In creating a modern bus shelter, Adshel sought to integrate smart cities infrastructure as well as comprehensively understand the needs of commuters. Their design process was iterative, involving several rounds of engagement and user testing. Through testing and incorporating feedback loops into the design process, Adshel uncovered design requirements that hadn't previously been identified, and created a user-friendly and digitally responsive bus shelter design.

Adshel's prototype includes connected displays and devices that can support emergency messaging, last mile connectivity solutions, smart sensors for data capture, and even two-way flows of communication between authorities and the public. Similar technology has recently been rolled out in the United States, with the City of Chicago using digital displays at bus stops to enable citizens to initiate dialogue with elected city officials and provide input on policy issues. This means that citizens don't need to seek out the opportunity to participate in policy-making processes. Instead, digitally connected street furniture enables citizens to express views and share ideas as part of their everyday routine.

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# NEW & EMERGING TOOLS



## COX ARCHITECTURE

Cox Architecture is a multidisciplinary Australian practice which integrates architecture, planning, urban design and interior design. Wanting to find a way to make building and planning information more publicly accessible and easy to understand, Cox Architecture teamed up with UNSW Built Environment to develop an app that shares information between the public, private and community sectors on urban issues.

The built environment is designed and constructed by multiple, diverse entities that span academia, government, industry and the community. While successful outcomes rely on effective collaboration between these entities, successful collaboration is challenging. Competing goals mean that many planning decisions are politically contested, and this is exacerbated by the difficulty of describing the built environment comprehensively. The legal context of a site needs to be described and represented, as do its economic and demographic aspects.

In response to these challenges, COX Architecture and UNSW Built Environment, as part of a collaborative research program with the Urban Development Institute of Australia (UDIA) and technical partner AAM Group, developed Urban Pinboard. Urban Pinboard is an integrated digital platform that enables the public, private and community sectors to connect by contributing ideas, comments and proposals on all planning issues in a single platform.

There are many ways in which the app can be used, but one of the most promising is for displaying and interacting with information relating to development proposals. Urban Pinboard presents a browser-based 3D representation of the physical city, including buildings and terrain, on which layers of data can be uploaded. This includes 3D visualisations of proposed developments, and site-specific data relating to planning controls, transport accessibility and demography. Users can therefore better understand buildings in their 'data context'. That is, all the physical and nonphysical information that is meaningful to evaluating a project's suitability.

Furthermore, Urban Pinboard enables the public to browse proposals, and comment and vote on them, providing feedback to the developer as well as the government directly through the platform.

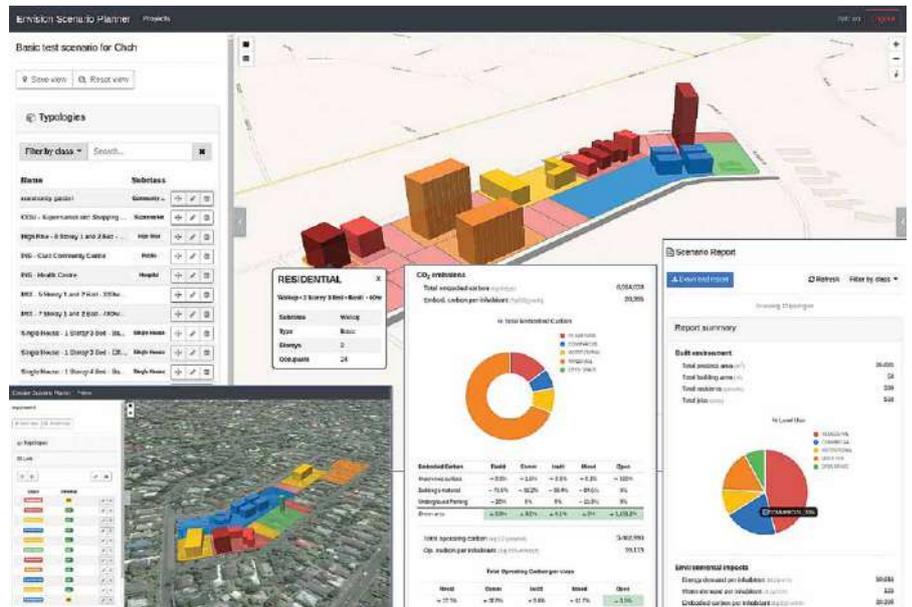
Moving away from 2D drawings and a swathe of disparate datasets, Urban Pinboard presents an opportunity to improve the understanding of proposed developments, and in turn produce more informed decision making and smart city transformations.<sup>5</sup>

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*Urban Pinboard presents a browser-based 3D representation of the physical city, including buildings and terrain, on which layers of data can be uploaded.*

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<sup>5</sup> This article draws from the following conference paper: Haeusler M, Asher R and Booth L, 2017, *Urban Pinboard Development of a platform to access open source data to optimise urban planning performance*.



## CITY FUTURES RESEARCH CENTRE

The City Futures Research Centre at the University of New South Wales produces scholarly applied urban research. In collaboration with the Cooperative Research Centre for Spatial Information and other university partners, City Futures has developed the Envision Scenario Planner; a tool for planners and citizens alike to design, assess and communicate redevelopment options. It is currently being used to support an urban renewal project in Blacktown.

ESP (Envision Scenario Planner) is a web-based 3D scenario planning and assessment tool for urban planning projects. It was designed and developed as a tool that would be able to converge scenario visualisations and easily generate assessment reports. These scenarios supply end-users with the capability to compare options for redevelopment sites. In addition to providing end-users a 3D volumetric virtual world to design their precincts, the system also reports on a range of performance categories such as embodied and operating carbon, energy demand, water demand, transport, construction and operating costs. While there are several software applications that can be used to design, visualise or assess precinct plans, most of them are stand-alone applications that specialise in only one of these measures.

The aim of ESP is to link the visualisations of precinct designs with performance outputs and allow people to quickly understand the impact of different options. This supports evidence based planning and allows people to easily visualise the scale and density of development – something that can be highly contentious with project stakeholders and community groups.

When designing a precinct, end-users are requested to create land parcels and boundaries, or simply import them from another application. They can then amalgamate, subdivide the lots to experiment with their size, zone and height limits. They can also visualise the existing built form by extruding building footprints, populate their precinct with objects and draw in roads and pathways.

The tool is currently being used to support an ongoing urban renewal project in Blacktown. It was introduced in a workshop with local government stakeholders with the aim of developing and seeking feedback on possible precinct design scenarios. During the workshop, two subgroups of participants were asked to work simultaneously on the creation of possible design scenarios for a precinct. One of the groups used ESP as part of their design work and the other group used the more traditional, paper-based method. ESP was used in the design process to quickly visualise the various design decisions such as amalgamation of lots, subdivision of certain areas, rezoning or creation of new roads and pathways within the nominated precinct. The differing designs and the performance of the precinct were then easily compared, with results being conveyed instantaneously back to stakeholders with much better engagement and results than the paper-based approach.

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## SMART INFRASTRUCTURE FACILITY & LIVERPOOL CITY COUNCIL

The SMART Infrastructure Facility at the University of Wollongong engages in applied infrastructure research. In collaboration with Liverpool City Council, SMART is undertaking a Smart Pedestrian Project that monitors real-time movement in Liverpool CBD using sensing technologies. As part of this project, SMART has employed a gamification approach to community engagement. This novel practice builds upon Liverpool City Council's use of gamification, which was recently employed in a competition among primary school children.

The *Smart Liverpool, Smart Pedestrian* project is the first of its kind in Australia. The project aims to monitor mobility patterns within Liverpool CBD using complementary sensing technologies. To ensure that community members are engaged and involved in the development of the project, SMART in partnership with Liverpool City Council have undertaken a series of community engagement workshops in the first stage of the project.

The workshops, co-organised with arki\_lab studio, used gamification techniques to help participants contribute their views. Through the process of playing board games and creating collages, the workshops generated constructive discussion. For instance, participants identified traffic

congestion, the lack of diversified activities and the feeling of insecurity during night time in and around Liverpool CBD as high priority issues. They also strongly advocated for an urban transformation that would focus on creating a walkable campus city, encouraging a youth-friendly city, revitalising river banks and green spaces, and enhancing the neighbourhood around the local leisure centre. With these objectives in mind, participants also suggested and mapped key locations where smart sensors should be deployed to inform an evidence-based urban transformation.

Following the success of the first round of engagement, SMART and arki\_lab are now developing software that combines traditional collage activity and cutting-edge augmented reality technology, to make community engagement more interactive and widely accessible.

Of course, this isn't the first time that Liverpool City Council has used gamification techniques to engage the public in city planning issues. Earlier this year, Council ran a very successful Minecraft competition with local primary schools to build a prototype of the Western Sydney Aerotropolis. Minecraft is a video game where players create their own worlds and experiences, using building blocks, resources discovered on the site and their own creativity. Hundreds of students participated in the competition and teachers were able to incorporate the exercise into the curriculum.

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*Through the process of playing board games and creating collages, the workshops generated constructive discussion.*

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## SMART URBANISM LAB

The Smart Urbanism Lab at the University of Sydney's School of Architecture, Design and Planning anchors their research in the citizen's experience of the smart city. In collaboration with the City of Canada Bay Council and Logan City Council, the Lab is applying machine learning methods to better make sense of, and utilise opinions that are expressed through social media channels and other online platforms.

Social media and online communication have changed the way citizens engage with urban planning, and city decision making processes. It is no longer simply one-way or two-way communication, but citizens engage on urban issues in a complex and more connected way than ever before. Accessing and making sense of the diversity of citizen's opinions on how to shape urban environments is an ongoing challenge for government. Government needs new ways to listen to and act on its citizen's opinions and desires for their communities.

To tackle these challenges, the Smart Urbanism Lab at the University of Sydney is creating a tool that collects, analyses and visualise public sentiment using machine learning. Machine learning is an application of artificial intelligence that provides a system or tool with the ability to automatically learn and improve from experience without being explicitly programmed. Algorithms are written for machines to access data and use it to learn for themselves.

The tool is currently being piloted in two local government areas - Canada Bay (Sydney) and Logan (Brisbane). The Lab is collecting opinion data from public consultation panels, Twitter, Facebook, and comments on news articles relating to two urban projects in each local government area. Using machine learning methods of sentiment analysis and clustering, the Lab will extract overall sentiments of the people on the four projects and meaningful topics of interest from the data. The 'real time' or 'near real time' data will be presented to citizens and local government on data visualisation dashboards to inform local government decision making and planning and create a feedback loop to the public.<sup>6</sup>

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*Machine learning is an application of artificial intelligence that provides systems or tools the ability to automatically learn and improve from experience without being explicitly programmed.*

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<sup>6</sup> This project received grant funding from the Australian Government



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