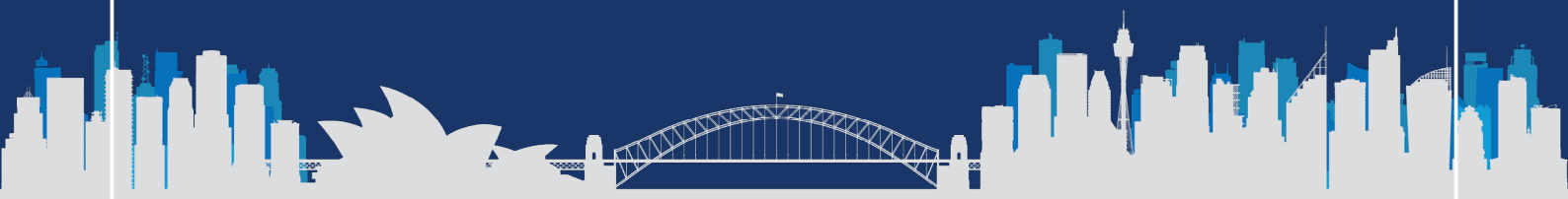
URBAN SYSTEMS TRANSFORMATION

GREATER SYDNEY REGION



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THE URBAN CHALLENGE

Future Earth Australia, hosted by the Australian Academy of Science, is leading a process to co-design a national strategy for Australian sustainable cities.

Australia is already one of the most urbanised countries in the world, with 89% of the population living in urban areas (UNDESA, 2014) and 67% living in the capital cities. Australia's estimated resident population of 24.6 million people, as at June 2017, is projected to increase to between 37.4 and 49.2 million people by 2066 (ABS, 2018). All capital cities are projected to grow at a greater pace than the rest of their respective state or territory (ABS, 2018). Some are seeking to constrain growth; others, including many regional centres, are looking for extra or renewed growth.

Our urban environments are an interrelated system comprising social, economic, ecological and technical spheres. Urban systems transformation is needed to ensure that people can move around efficiently, live in safe and healthy homes, receive adequate education and medical care and enjoy lives of social equity in a healthy and biodiverse environment.

The metropolitan plans for most Australian capital cities include consistent sustainability planning and design principles such as containing urban sprawl, reducing car dependency and providing greater housing choices. However, in practice, urban decision-making is subject to numerous complex drivers—social, environmental, economic, institutional, technological—with the potential to create barriers to sustainable development.

The challenge lies in ensuring effective and consistent urban policy and decision-making in the complex urban institutional environment (across spatial scales and decision-making levels, and across sectors), with genuine stakeholder and community engagement that understands the many and varied underlying aspirations and values. In turn, this process needs to be guided by a shared vision of our urban futures, underpinned by approaches to co-produce, share and implement knowledge to inform decision-making. In this context all decision-makers and stakeholders are both providers and users of knowledge.

However, current urban development and decision-making is characterised by a lack of shared vision and excessive fragmentation in institutional arrangements and in relevant knowledge development, translation and use.

RESPONDING TO THE CHALLENGE

Future Earth Australia is working to improve the appreciation of the underlying barriers and enablers to sustainable urban development, and the supporting development, synthesis, translation, accessibility and application of relevant knowledge. Through a nationwide consultative process, it is co-developing a national strategy for the sustainable development of Australia's cities and communities over the coming decades.

Through a series of workshops in the capital cities, Future Earth Australia asked policymakers, practitioners, researchers, business and community stakeholders to contribute to the development of local and national strategies. Each workshop included a special focus on the specific city and the surrounding region, as well as implications for a national approach.

THE IMPORTANCE OF A NATIONAL STRATEGY

To be successful, transformational strategies will need to include shared urban visions of feasible and desirable futures, with a focus on:

- key systemic leverage opportunities
- collaborative and aligned urban governance integrated across systems, sectors and scales
- effective stakeholder and community engagement across multiple goals and diverse values
- co-produced knowledge development and use by policy and urban decision-makers.

These elements should all be supported by continuing learning and adaptive management. A national strategy will provide governments, practitioners, businesses, communities and researchers with recommendations for cost-effective and integrated urban systems transformation.

To help us achieve these goals, workshop participants are asked to consider:

- current issues and future visions for their city and region
- how to improve engagement outcomes with stakeholder and community groups by policy and decision-makers
- actions that if taken locally (at state/territory level) and nationally would increase the sustainable development of the city/region
- how such actions might contribute to a national strategy for urban systems transformation.

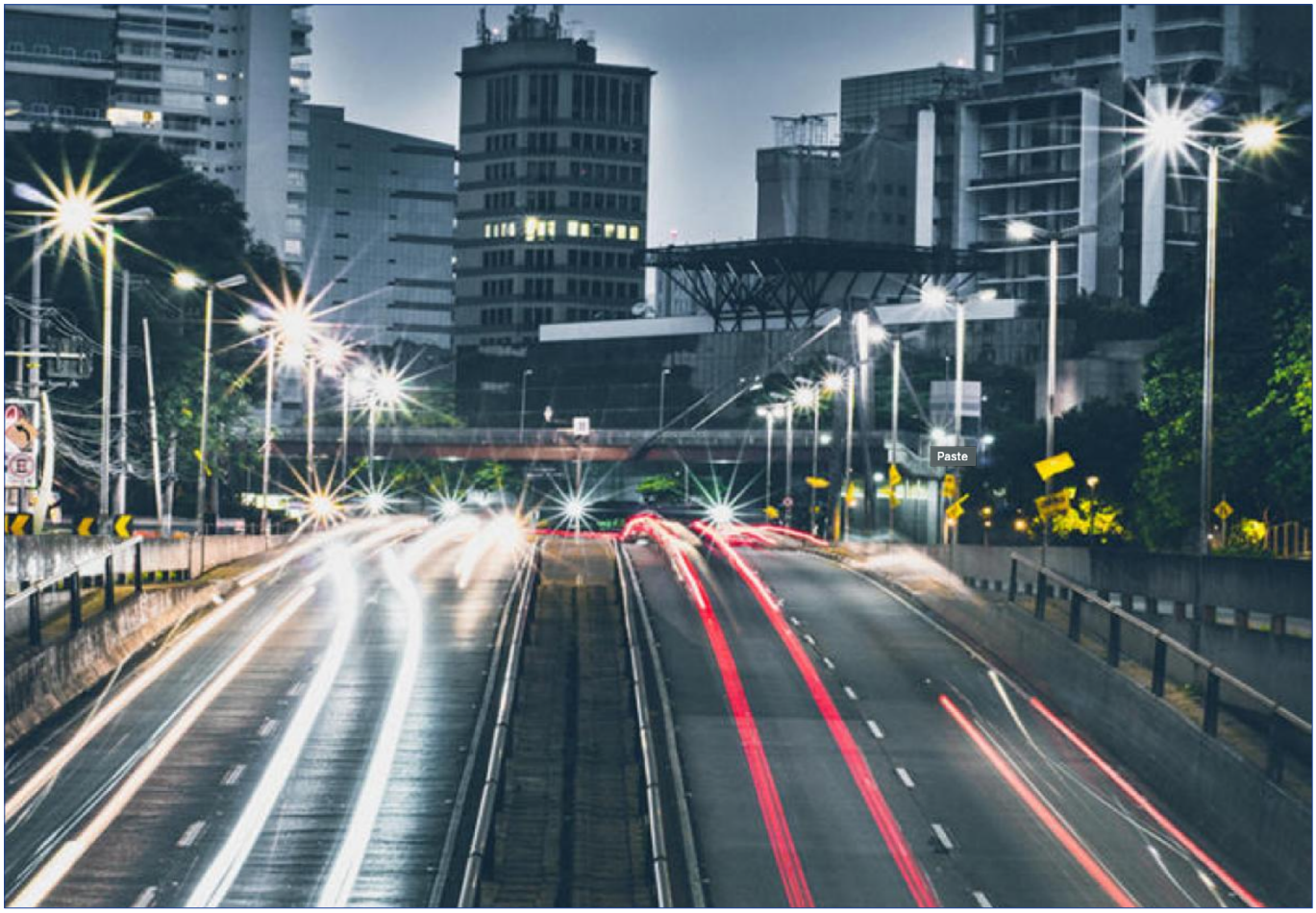
A national strategy will also help Australia meet our commitments under the United Nations' Sustainable Development Goals (SDGs). SDG 11 is to 'make cities and human settlements inclusive, safe, resilient and sustainable', but transformation is underpinned by integration of all 17 of the goals.

Greater Sydney region workshop

In November 2018 Future Earth Australia held two workshops for 'Urban systems transformation: sustainable cities' in the Greater Sydney region, the first in Western Sydney (2 November 2018), the second in Sydney (7 November 2018). Two workshops were held in recognition of the scale of the Greater Sydney region and the rather dissimilar sustainability issues and planning priorities of these two areas. This paper covers the second workshop.

The Sydney workshop was hosted by the University of New South Wales (UNSW) at their Kensington campus. Thirty stakeholders from the state government, councils, universities, local businesses, NGOs and research groups participated.

This document summarises discussions grouped under the following workshop themes: urban visioning initiatives and pathways; collaborative governance and decision-making; stakeholder and community engagement; and co-produced knowledge development, usage and learning.



SPEAKERS

Professor Helen Lochhead, Dean, Faculty of the Built Environment, UNSW

Professor Lochhead welcomed participants and gave a brief overview of the work of the faculty. She spoke about research issues such as human-centred development, ageing and place, new emerging technology and analytics, affordable housing and the macro- to micro-events shaping future cities.

Professor Christopher Pettit, Director, City Analytics Program, Faculty of the Built Environment, UNSW

City Analytics is a digital toolkit comprising a set of frameworks and methods to support collaborative city planning and user-centred design. The program offers a Master of City Analytics, using data-driven approaches to understand the inherent complexity of cities. The aim is to grow the skill set and culture of data-driven evidenced-based policy and decision-making across cities. Ongoing research in the City Analytics Lab includes the investigation into data-driven digital techniques, digital planning tools for future city scenario planning and design, and data infrastructure assets, geodesign and smart cities.

Dr Simon Pinnegar, Associate Professor in City Planning, Faculty of the Built Environment, UNSW

Dr Pinnegar discussed several of the urban policy and strategic planning issues that need to be at the forefront of long-term visions in a fast-growing city such as Sydney. In this regard, the Greater Sydney Commission's *A metropolis of three cities* identifies several key challenges and opportunities tied to negotiating and managing that growth. Reworking the metropolitan area into three '30 minute' cities can be framed in terms of improving productivity and liveability, however the more fundamental spatial shift signal led by the plan is the need for a structural rebalancing—in access to opportunity, education and jobs—between Sydney's east and west.

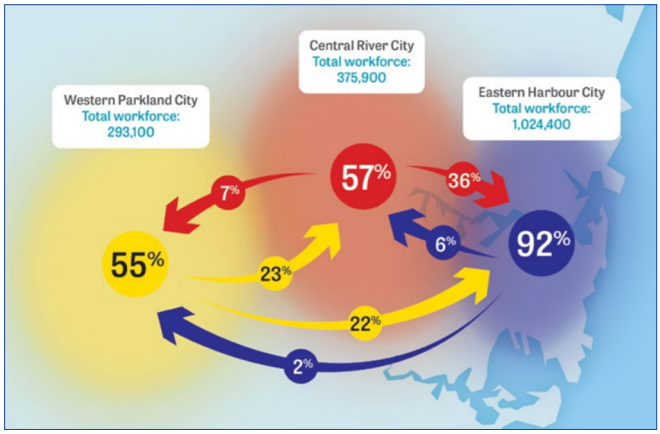


Figure 1: Proportion of people who live and work in each city (ABS Census 2011)

While 'smart' advances such as big data, blockchain technologies, autonomous vehicles and last mile delivery will require responses and add to the planners' scope, more longstanding challenges facing strategic planners will hold firm. The skills sets required will continue to focus on improving urban governance, helping communities live through change and, above all, continually and meaningfully engaging on issues affecting our cities.

A VISION FOR GREATER SYDNEY

Participants were asked to consider their current perceptions of Greater Sydney and to use their devices to enter applicable words into an online poll to generate a word cloud. The words most frequently entered were *corrupt, exploited, disconnected, construction* and *congested*. More positive popular words were dynamic and changing (word cloud 1).

Participants discussed the interpretation of this word cloud and agreed that it was very negative and suggested helplessness and confusion. They agreed that one source of these frustrations was the lack of involvement people felt in planning processes.

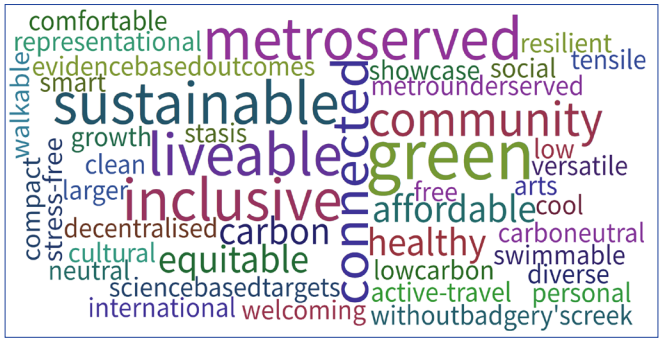
People feel intense irritation about never-ending construction: 'We live with the consequences of changing infrastructure without enjoying the benefits.' A comparison was made with how growth has been managed in London: 'The character of the city has been retained, whereas in Sydney everything is being pulled down.'

Participants agreed about the transience of city plans. There are always new visions and plans, which cause residents to feel imposed upon by the city. There should be more focus on the people.

Word cloud 1: Current perceptions of Greater Sydney

The most popular answers to the question 'What would you like Sydney to be like in 30 years?' were *green, sustainable, liveable, inclusive* and *community* (word cloud 2). The word *metroserved* was prominent, indicating the frustration with the current system.

The group felt that there was a strong disconnection between how Sydney is seen now and the vision for the future. This suggested a lack of trust and transparency and feeling of powerlessness. The current community feedback cycle is not working if people don't feel things are changing. Overall, however, there was hopefulness that engagement can change things.



Word cloud 2: Vision for Greater Sydney for 2030–2050

The first word cloud is focused on the negative aspects of construction, whereas the second is about human needs in planning. It points to the need to break the constant cycle of construction. There are still pockets of the good stuff left in Sydney, where things are green and there is a strong community. The aspiration is for the whole of Sydney to be like this.

Affordability is a perennial issue in Sydney, however, interestingly, it is less important than connectedness

and sustainability, which featured prominently as key emerging issues of significance. People want Sydney to be a good place for future generation.

To achieve a more sustainable Sydney, the barriers that exist between state and federal planning departments as well as public planners and architects should be resolved. Often the uptake of current science is slow in the public sphere. The link between science data analytics and the planning profession are weak. It's not an oppositional thing, the two simply work in different spheres. It can be very hard to breach silos. A major issue is that culture and cultural values are not contained within any scientific sphere.

A more sustainable Sydney would be more socially and economically integrated with a common understanding between diverse groups of people. A natural progression following integration would be an improvement in the environment.

INITIATIVES AND PATHWAYS

Participants were asked to consider what specific knowledge would be needed to achieve their vision for a sustainable Sydney region.

1. PROPORTIONATE DISTRIBUTION OF AFFORDABLE HOUSING

Development of socially sound, well-distributed, affordable housing across Sydney that considers the heritage of an area (environmental, existing built form, and Indigenous). Equitable distribution across Sydney must be ensured.

Opportunities would include more co-op-based housing and improving social and economic growth and integration. Barriers might be market forces and the need for significant development of public facilities to service these developments.

2. INTEGRATED KNOWLEDGE-BASED VISION

More projects like 'Our living River'[1], a program of the Parramatta River Catchment Group, are needed. The group is an alliance of councils, government agencies and community groups who are working to transform the Parramatta River and its tributaries into living waterways. This project has a strong, simple vision but implementation has been complex.

The how (the principles of the project): be transparent (the process and the data should be open); co-design; break down silos; integrate with SDGs; develop case studies; and take a data-driven approach.

The who: local, state and federal government; universities; communities; private sector; design and planning professionals; and IT and data analytics professionals.

The opportunities: use of AI; increased productivity, innovative solutions and optimisation; big data tools; use of existing IT tech to assist process; collaborations at local level; and community participation.

The barriers: achieving collaboration between (1) levels of government, (2) different agencies (3) competing or collaborating priorities/agendas; and lack of access to data and skills to work with this data.

3. INFORMATION AND INFRASTRUCTURE

A system of information infrastructure with continuous data updates could be used to populate city amenities apps, such as healthcare and transportation.

Opportunities include the ability to continually grow with technology, the reframing of city data as a monetisable asset with subsequent commercial opportunities and the ability to contribute to standards oversight.

Barriers that might arise include problems with integrating the data repository and apps with current systems, issues with the governance and politics around data storage and the need for specialised skills for the end user.

1. www.ourlivingriver.com.au/

4. BIM FOR PUBLIC INFRASTRUCTURE PROJECTS

BIM (building information modelling) is an intelligent 3D model-based process to more efficiently plan, design, construct and manage buildings and infrastructure. This should be mandated for public infrastructure projects above a certain scale. It would facilitate informed public procurement, as has been implemented in Helsinki, Singapore, the UK and Korea. Planners would build knowledge networks for data sourcing. However, appropriate risk mitigation procedures would be essential in case of the provision of poor information.

5. TOOLS FOR TRANSPORT

Conduct original research on where new infrastructure for active travel is needed and how existing space should be reallocated. For example, user preferences data could inform public spending around transport, and users would answer relevant questions, such as where more active transport infrastructure is needed.

Knowledge gaps exist in data for user preferences and the lack of infrastructure for active transport (regarding connectivity and safety perceptions).

As a solution, research should be undertaken into methods to measure needs, to measure change in real time and to predict people's reaction through behavioural models.

COLLABORATIVE GOVERNANCE AND DECISION-MAKING

The group agreed that there needs to be incentives for the private sector for collaborative governance and decision-making to become the norm and discussed incentives for compliance and penalties for non-compliance. Compliance is a fundamental principle but hard to introduce in a legislative environment. Consequently, some in the group suggested that legislative change would be needed to ensure collaboration.

Detailed performance metrics and measurable targets should be established at the outset in a collaborative fashion. Targets are needed to achieve outcomes and be rigorous. They should transcend changes in governments and be based on evidence.

STAKEHOLDER AND COMMUNITY ENGAGEMENT

All participants felt that the community needs to be involved in all stages. Suggestions to facilitate this included running a school challenge to educate and raise awareness and creating a community leaders action forum to increase commitment and collaboration. Referring to the visioning exercise, there was a great deal of disappointment about the fact that community feedback regarding construction activity in Sydney has been largely ignored. Participants felt that many of the problems in Sydney were related to a lack of input from citizens to the development of their city.

CO-PRODUCED KNOWLEDGE DEVELOPMENT, USAGE AND LEARNING

Sydney needs to be sustainable for it to be more liveable for coming generations. This means preserving for the next generation—intergenerational equity. We are currently bankrupting future generations. To achieve this preservation and sustainability requires robust and transparent data and tools with open access.

Mature engagement with the research and development community—as in Europe—would be beneficial.

Currently there are lots of groups doing small parcels of research, but nothing consistent and on a large scale.

WHAT ARE THEY KEY PRIORITIES FOR A NATIONAL STRATEGY?

The participants agreed that many of their recommendations for Sydney could translate into a national strategy, such as reducing the city's carbon footprint, having a clean energy action plan, increasing renewables, demonstrating the potential for city-wide transformation and putting humans at the core of planning.

General themes suggested for the strategy were integrating people, process and technology, and ensuring that public consultations are meaningful and not dismissive. And that it is made clear the people matter.

'The concept of demonstration projects for research and development and for education was popular. Collaborating across silos was agreed to be essential, as was the setting of achievable, fact-based and measurable sustainability targets at the start of all projects.

CRC FOR LOW CARBON LIVING

To conclude the workshop, Professor Deo Prasad discussed the Cooperative Research Centre (CRC) for Low Carbon Living, which was established in 2012. The CRC has three research programs: integrated building systems, low carbon precincts and engaged communities. To date, the CRC has provided the evidence base for approximately $1 billion per annum investment in government programs, incubated next-generation multi-purpose building products, enabled world-class low-carbon property development and provided tools for Australia's building design services industry. The expected benefit to the Australian economy is $684 million by 2027.

THE GREATER SYDNEY REGION

Greater Sydney, as classified by the Australian Bureau of Statistics (ABS), extends from Wyong and Gosford in the north to the Royal National Park in the south and follows the coastline in between. Towards the west, the region includes the Blue Mountains, Wollondilly and Hawkesbury. Greater Sydney covers 12 368 km^2 and is made up of 35 local councils. The population, as of 2016, was 4 823 991, with an Aboriginal and/or Torres Strait Islander population of 70 135.

Of the 2 418 902 Greater Sydney residents who reported being in the labour force in the week before the 2016 census, 61.2% were employed full time, 28.2% employed part time and 6% were unemployed (ABS, 2016). Major employment industries recorded were hospitals, IT, hospitality and banking. To commute to work, 52.7% drove their car, 10.9% took the train, 5.5% took the bus, 4.4% worked at home and 4% walked.

SYDNEY CITY

As of June 2017, the estimated resident population in the City of Sydney local government area (LGA) was 232 926 people, representing around 4.6% of Greater Sydney's total population[2]. The population density within the city is 8384 per kilometre (at June 2016). The population increased by 36.2% between 2006 and 2016, compared with 18.2% for Greater Sydney and 14.8% for NSW.

REGIONAL CHALLENGES

The current Lord Mayor of Sydney, Clover Moore, has identified urban growth, climate change and social inequality as key sustainability challenges for Sydney (Gorrey, 2018). Sydney's urban footprint has grown over the past 100 years and is predicted to continue to increase if the rate of sprawl continues at the same rate.

A divided city

Sydney is a city divided along east–west lines, economically, socially and environmentally. The west has lower taxable incomes, a higher rate of social disadvantage and is dryer and hotter, with less canopy cover than the east.

Housing affordability

The housing affordability crisis in Sydney and Melbourne is close to being the worst in the developed world. As of 2017, the ratio of median house prices to median household income in Sydney was 12.9 and in Melbourne 9.9. Only Vancouver and Hong Kong were as bad or worse on this metric (Birrell and Healy, 2018).

Loss of industrial and urban services land

Industrial and urban services lands are under pressure from residential redevelopment. The Property Council of Australia has expressed concern that the land currently available across Greater Sydney represents less than two years of forward supply (Hill, 2018). Industrial and urban services land that is lost to residential redevelopment cannot be recovered.

2. https://www.cityofsydney.nsw.gov.au/learn/research-and-statistics/the-city-at-a-glance

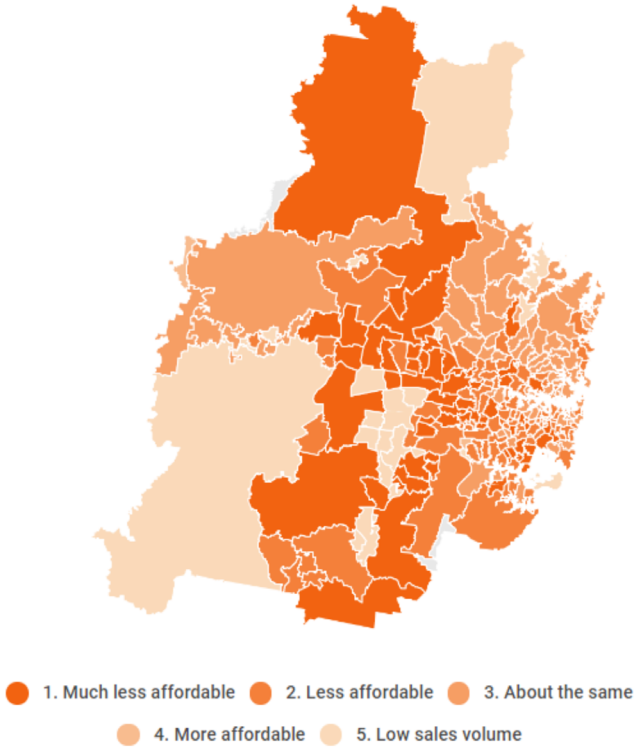


Figure 4: Housing affordability change 2005–2015 (GSC Data Hub)

KEY CURRENT PLANNING DOCUMENTS

This section briefly summarises the current urban systems plans and strategies developed for the city of Sydney and the greater region. The current major planning work is the Greater Sydney Commission's *Greater Sydney Region Plan: A metropolis of three cities* (2018), which underpins five separate district plans.

A Sydney of three cities?

The plan proposes a Sydney made up of a Western Parkland City, Central River City and Eastern Harbour City. The Eastern Harbour City stretches from the Northern Beaches to Sutherland Shire and forms a centre of financial, professional, FinTech, health and education services.

The plan was prepared concurrently with the NSW Government's *Future Transport Strategy 2056 and Infrastructure NSW's State Infrastructure Strategy 2018–2038.*

A Sydney of five districts?

The plan also underpins five separate district plans: Western City District, Central City District, Eastern City District, North District and South District. The district plans are designed to provide a link between regional and local planning efforts. This document focuses on the Eastern, North and South Districts, as the Western City and Central City district plans have been reviewed in a separate document summarising planning in Greater Western Sydney.

Eastern City District Plan

The Eastern City District contains the LGAs of Bayside, Burwood, City of Canada Bay, City of Sydney, Inner West, Randwick, Strathfield, Waverley and Woollahra. The plan prioritises:

- new infrastructure, particularly connections along the Eastern Economic Corridor to other city districts
- collaboration areas, such as the Camperdown-Ultimo and Randwick health and education precincts
- collaborative projects between various agencies, such as the Central to Eveleigh and Parramatta Road Corridor *Urban Transformation Strategies.*

North District Plan

The North District contains the LGAs of City of Ryde, Hornsby, Hunters Hill, Ku-ring-gai, Lane Cove, Mosman, North Sydney, Northern Beaches and Willoughby. The plan prioritises:

- enhancing the role of the Eastern Economic Corridor, including North Sydney as part of the Harbour CBD
- creating protected natural areas, including Lane Cove, Ku-ring-gai Chase and Garigal national parks
- creating metropolitan rural areas, including agricultural and scenic lands
- improving transport links, including NorthConnex, the Western Harbour Tunnel and Beaches Link
- creating a 'green grid', linking existing recreation areas and corridors.

South District Plan

The South City District contains the LGAs of Georges River, Canterbury-Bankstown and Sutherland. The plan prioritises:

- supporting the growth of the ANSTO innovation precinct, health and education precincts, Bankstown Airport and Milperra industrial area
- retaining industrial and urban services land and freight routes
- optimising on the district's locational advantage of

being close to Sydney Airport, Port Botany, the Illawarra and Port Kembla
- protecting and enhancing natural assets.

Sydney 2030

Sustainable Sydney 2030 (City of Sydney, 2016) expresses the community's vision and the City's commitment to the sustainable development of Sydney. The plan is for a green, global and connected city: green with trees, parks, gardens and linked open spaces and a modest environmental impact, global in economic orientation, links, partnerships and knowledge exchange, and connected physically by active and public transport infrastructure, virtually, as communities and to other spheres of government. *Sustainable Sydney 2030* is aligned with the SDGs. The *Delivery Program 2017–2021* is the City's four-year program.

A Sydney mega-region?

A Sydney think tank, the Committee for Sydney, recently produced a discussion paper recommending that that Sydney be grouped with Newcastle, the Central Coast and Wollongong into a sandstone mega-region (The Committee for Sydney, 2018). As of 2017, this mega-region encompasses 70% of the NSW population and nearly 25% of the national population.

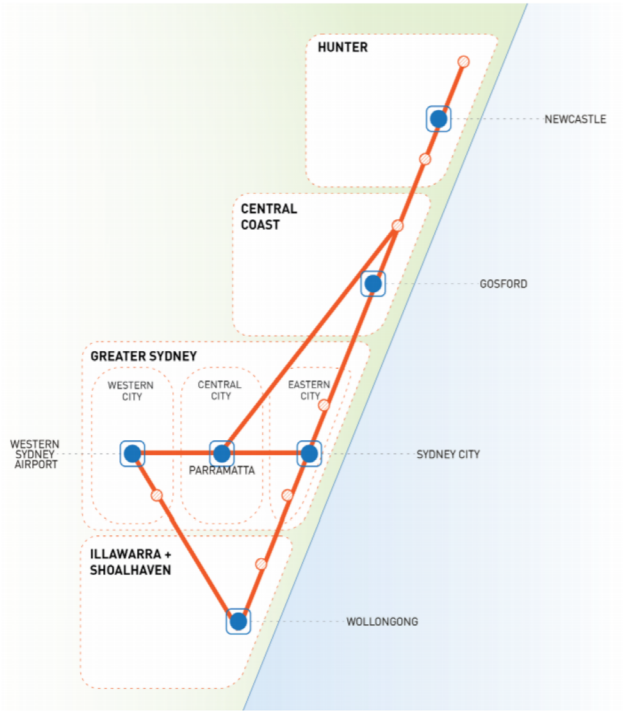


Figure 3: The Sandstone mega-region

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