

**ITEM 3. CLIMATE ADAPTATION STRATEGY – ADOPTION****FILE NO: S118585.003****SUMMARY**

This report recommends that Council adopt the final version of the Climate Adaptation Strategy, “Adapting for Climate Change – A long term strategy for the City of Sydney” and associated Appendices.

On 10 August 2015, Council approved the public exhibition of the draft Climate Adaptation Strategy (the Strategy). The exhibition was held between 13 August and 16 October 2015.

The City received eight stakeholder submissions and 120 community surveys – a record level of community participation for a City environmental strategy document.

Consultation revealed strong community interest in climate adaptation and compelling endorsement for the City’s approach. All of the City’s proposals received significant support. Priorities include:

- using trees, plants and other natural systems to provide shade and shelter to adapt for extreme heat;
- incorporating climate change in future decision making, particularly around land use planning, design of open space and infrastructure, and building codes and design;
- increasing education and awareness, including clear and practical actions the community can take to ensure their homes, families and community are prepared for climate change; and
- working with other stakeholders on adaptation measures, as well as better public transport and reduced dependency on fossil fuels.

Attachment A provides a comprehensive analysis of community consultation. An outline of stakeholder submissions and the City’s responses is at Attachment B.

Stakeholder submissions praised the City for a rigorous scientific approach and broad, comprehensive engagement process for the development of the draft Strategy and recognising the long term and iterative nature of climate adaptation.

Some minor amendments were suggested and have been incorporated within the final Strategy where possible. Amendments improve, but do not substantially change the Strategy.

The final Strategy is included at Attachment C. The Project Report by RPS and KPMG is included at Attachment D. Attachment E is a presentation delivered by a citizens’ panel to the City in developing the Strategy.

The final Strategy is part of the suite strategies to assist in meeting ambitious energy and emissions targets and overall approach to address the risk of climate change established in *Sustainable Sydney 2030*.

The Strategy sets out a long-term pathway (2015-2070) for the City of Sydney, our community, business sector, residents and other levels of government to prepare for the likely risks and also opportunities presented by the changing climate. The Strategy establishes a rigorous scientific foundation on which to plan, act and collaborate now and in the coming decades. The City will need to work with its residents, businesses and other organisations to successfully deliver the Strategy.

## RECOMMENDATION

It is resolved that Council:

- (A) note the Consultation Report from public exhibition of the draft Climate Adaptation Strategy, as shown at Attachment A to the subject report;
- (B) note the Schedule of Responses from public exhibition of the draft Climate Adaptation Strategy, as shown at Attachment B to the subject report;
- (C) adopt the Climate Adaptation Strategy, “Adapting for Climate Change – A long term strategy for the City of Sydney”, as shown at Attachment C to the subject report;
- (D) adopt the Appendix: City of Sydney Climate Risk and Adaptation Project Report by RPS and KPMG, as shown at Attachment D to the subject report; and
- (E) adopt the Appendix: Citizens’ Panel Final Presentation, as shown at Attachment E to the subject report.

## ATTACHMENTS

**NOTE:** Hard copies of Attachments C and D will be circulated separately from the Agenda Paper in limited numbers. They will be available for inspection on Council’s website and at the One Stop Shop and Neighbourhood Service Centres.

**Attachment A:** Consultation Report

**Attachment B:** Schedule of Responses

**Attachment C:** Climate Adaptation Strategy, “Adapting for Climate Change – A long term strategy for the City of Sydney”

**Attachment D:** Appendix: City of Sydney Climate Risk and Adaptation Project Report by RPS and KPMG

**Attachment E:** Appendix: Citizens’ Panel Final Presentation

**BACKGROUND**

1. In 2008, Council adopted *Sustainable Sydney 2030*, which committed the City of Sydney to becoming a green, global and connected city, and identified climate change as a major local and global challenge.
2. Responding to this issue, the City engaged well-regarded consultants RPS and KPMG to develop a risk assessment and action plan based on the likely climate risks posed by the changing climate over coming decades.
3. The Climate Adaptation Strategy, *Adapting for Climate Change – A long term strategy for the City of Sydney (the Strategy)* was prepared using locally-specific modelling that relates to the NSW Government's NARClIM model, which is likely to form the basis of future adaptation planning.
4. The climate modelling and processes were overseen by a science reference group which included members from Commonwealth Scientific and Industry Research Organisation (CSIRO), Bureau of Meteorology, the NSW Office of Environment and Heritage, Australian National University Climate Change Institute, the University Corporation for Atmospheric Research, and the Climate Institute.
5. Substantial internal and external engagement activities were used to identify and prioritise risks posed by climate change and the responses required to address those risks to ensure a resilient and well prepared City and its people.
6. KPMG ran a risk interdependency process using its actuarial services and proprietary network analysis software. The resulting findings have contributed to a thorough risk assessment process, regarded as leading practice.
7. The high level risk themes identified in the Strategy are:
  - (a) increasing heat;
  - (b) changing rainfall and drought;
  - (c) bushfires and air quality;
  - (d) sea level rise; and
  - (e) combined risks.
8. This work has identified that the City has many programs, strategies and practices underway that are already responding to climate change risks. Some examples include:
  - (a) active transport plans;
  - (b) Decentralised Energy Master Plans;
  - (c) Decentralised Water Master Plan;
  - (d) draft Social Sustainability Strategy;
  - (e) drought proofing parks;
  - (f) emergency management;

- (g) Energy Efficiency Master Plan;
- (h) floodplain management studies and plans;
- (i) Greening Sydney Plan;
- (j) improved outdoor working conditions;
- (k) monitoring of the urban heat island;
- (l) Rain gardens;
- (m) Urban Ecology Strategic Action Plan; and
- (n) Urban Forest Strategy.

### **CLIMATE ADAPTATION STRATEGY**

9. The Strategy comprises the following chapters summarised below:

- (a) What does climate change mean for us?;
- (b) Our role;
- (c) Climate risks and adaptation actions;
- (d) Working together to implement this strategy;
- (e) How we developed this strategy;
- (f) Future reviews;
- (g) References; and
- (h) Appendices.

### **What does climate change mean for us?**

- 10. The global climate is changing and there have been observed climate related changes in the Sydney region. Temperatures have been increasing since about 1960, with higher temperatures experienced in recent decades. Average rainfall has decreased in south-east Australia, and sea-level has risen by 3.2 millimetres per year in the last 20 years.
- 11. Effective adaptation will reduce vulnerability and increase the city's resilience to the possible shocks and stresses that a changing climate could cause, such as heat waves and floods.
- 12. The natural environment can reduce the impacts of climate change which highlights the importance of *Sustainable Sydney 2030* and the Greening Sydney Plan.
- 13. An important task is to identify the parts of our community who are most vulnerable and to establish support networks.
- 14. Climate change can lead to economic impacts caused for example by interruptions to vital infrastructure and services like energy, transport and communications.

15. By 2070, the following changes are anticipated for Sydney:
  - (a) average temperatures will be higher with more warmer months in the year;
  - (b) extreme heat days and nights will be hotter, more frequent and of longer duration;
  - (c) increased air pollution due to heat impacts;
  - (d) increased intensity of rainfall and storm events;
  - (e) continued variability in total annual rainfall and seasonal variability;
  - (f) increased drought and bushfire conditions; and
  - (g) increased sea levels and extent of coastal inundation.

### **The City's Role**

16. Working with partners from industry, state, federal and local governments, businesses and the community will be essential for adapting to climate change. The City's role in assisting our community to respond to climate change falls within the control, influence and concern framework. The City recognises that there are actions we can do our own, some will be shared, whilst others lie wholly as the responsibility of other entities.
17. Multiple jurisdictions have developed climate change scenarios and adaptation frameworks, including the Australian and NSW Governments.
18. Climate change is identified as a key issue within *Sustainable Sydney 2030*. Just as workplace health and safety and access have become embedded in our decision making, climate change must now be considered within the City's *Sustainable Sydney 2030* delivery program, operational plan, resourcing strategy and planning controls.

### **Climate risks and adaptation actions**

19. Increasing heat:
  - (a) The Sydney climate is gradually getting warmer and average temperatures could increase by more than 30 degrees Celsius by the end of the century. The heatwave that Sydney experienced in 2011, which resulted in 96 deaths during seven days over 35 degrees Celsius and a maximum temperature of 37.7 degrees Celsius, was a one in 100 year event, but is projected to be a one in two year event by 2070.
  - (b) Risks include heat stress to humans, plants, animals and systems. Increasing temperatures affect the efficiency of and demand for energy networks, and may have implications for workforce productivity, outdoor activity and transport disruptions.
  - (c) Major short term actions are to maintain existing policies and programs, develop a heat wave response plan, and to communicate and raise awareness on heatwaves, air pollution and other climate events.

20. Changing rainfall patterns and drought conditions:
- (a) Sydney's rainfall patterns will continue to feature natural variability with dry and wet spells; however there is a likely increase in deluges of heavy rainfall with a current one in 50 year event likely become a one in 20 year.
  - (b) Risks include damage to property and infrastructure, flash flooding, displacement, contamination and disruptions.
  - (c) Major short term actions are to continue flood management work, coordinate with emergency services agencies, and investigate risks to the City's assets and property portfolio.
21. Bushfire conditions and air quality:
- (a) Climate change will lead to an increase in conditions that contribute to bushfires. The City of Sydney Local Government Area (LGA) does not contain extensive areas of bushland, however bushfires in the region impact the city.
  - (b) Risks include community health impacts related to air quality, productivity implications due to disruption to commuters, disruption to services, and regional impacts such as a lack of emergency response capability in the city if resources are fighting nearby bush fires.
  - (c) Major short term actions are to contribute to emergency response in air pollution events, contribute to community awareness of health risks, reduce other sources of air pollution, and limit outdoor working hours during air pollution events.
22. Sea level rise:
- (a) Sea level rise is a longer-term issue for the City to confront. A detailed understanding of the likely impacts, timing and suitable responses is necessary. The current risk of inundation is relatively minor primarily due to the city's topography, however this risk will increase over several decades as sea levels rise (0.9 metres by 2094).
  - (b) Risks include financial burden, reduced accessibility, aesthetics, and transport impacts.
  - (c) Major short term actions are to develop a sea level rise adaptation action plan and to assess sea level rise and storm surge impacts on planning and flooding standards.
23. Combined risks and actions:
- (a) There are many overarching climate risks to the City and our community in addition to the specific risks listed above.
  - (b) Risks relate to insufficient consideration of adaptation within relevant planning and building standards, coordination and communication during extreme events, impacts to economic productivity and social wellbeing, the evolving climate science, financial viability, and insurance affordability.

- (c) Major short term actions are to incorporate climate adaptation into all future key Council decision making, establish a climate risk and adaptation reference panel, review latest climate science, and advocate for engineering and building standards to address climate change.

### **Working together to implement this strategy**

- 24. Effective climate change adaptation requires action beyond policy and planning. Many of the actions in the Strategy require ongoing interaction and cooperation with organisations outside the City of Sydney. The City has extensive networks and sophisticated communications channels to inform and encourage action by others.
- 25. External stakeholders such other levels of government, the business community, the not-for-profit sector, residents and the broader community must play a part for Sydney to adapt and become resilient against climate change.
- 26. An adaptation reference panel will be a standing body to coordinate, review and communicate the ongoing response to climate change. The City will also harness existing bodies such as the Business Adaptation Network to strengthen our understanding of the most suitable adaptation actions available.

### **How we developed this Strategy**

- 27. The City underwent a thorough and inclusive approach to establish an evidence base to understand climate change, then to identify the risks and the best way to address them. These were identified with consultants, staff, and external stakeholders. Scientific inputs were reviewed by a science reference group.
- 28. A rigorous risk assessment process was used by KPMG to identify and rank climate risks with an interdependency analysis to show the links, knock-on impacts and perceived severity of risks when considered together rather than in isolation. This is considered leading practice.
- 29. The community was engaged through a citizen's panel, reference groups, workshops and meetings with business stakeholders.
- 30. The Strategy draws from the latest global, national, state and local climate data and modelling including Global Climate Models, the CSIRO Climate Futures Framework, the NARCLIM model used by the NSW Government, and SimCLIM for the City LGA.
- 31. Climate projections have been based on the best available information to minimise uncertainty. Worst case emissions scenarios (which reflect the current trajectory of global emissions growth) were used as the most prudent approach to not underestimate the risk.
- 32. In developing this Strategy, an extensive review of existing adaptive capacity was undertaken.

### **Future reviews**

- 33. The City is committed to reviewing this Strategy in accordance with the City's 2030 Delivery Program cycles and as new climate science is released, which occurs each seven years with publication of UN IPCC Assessment Reports.

**UPDATES TO THE CLIMATE ADAPTATION STRATEGY**

34. The final Strategy has been modified slightly in response to the submissions and feedback received. These changes improve the Strategy but are not considered material changes to the overall scope or intent of the Strategy. Changes to the Strategy are summarised below:
- (a) Additional text *“this is our first adaptation strategy and has been written to raise the issues and opportunities that adapting to climate change will present. As our understanding of the risks and responses develops over time, so the adaptation strategy will evolve in the years to come”* added to further explain the purpose of the strategy (p.2);
  - (b) Additional text *“this increase is likely to be non-linear, meaning that it will not take place in a smooth gradual annual increase, but rather it is likely to have periods of rapid increase and at other times slow increases”* to explain the nature of the risk of sea level rise (p.13).
  - (c) Additional action to develop a *“vulnerable communities communications plan”* added at the request of the City’s Manager of Emergency Management reflecting the work already underway (p.24);
  - (d) Additional action to *“work with business stakeholders to consider the best way to inform the local business community on the likely business impacts and develop responses that assist individual entities in their continuity planning”* to provide practical advice to the business community (p.51);
  - (e) Additional wording *“this may sit within broader stakeholder collaboration as part of the 100 Resilient Cities Program”* added to Action C2 following input from the Chief Resilience Officer regarding the establishment of an adaptation reference panel of key stakeholders (p.50); and
  - (f) Additional action to *“investigate collaborating with Sydney Water and the Office of Environment and Heritage to trial the Adapt Infrastructure tool to coordinate inter-agency responses and quantitative analysis, measurement and manage of risks and adaptation actions”* following a suggestion from Sydney Water that received broad support from City engineers and asset owners (p.51).
  - (g) Additional stakeholders added:
    - (i) City of Sydney Inclusion (Disability) Advisory Panel added to Action H2, development of the Heatwave Management Sub-plan (p.24);
    - (ii) Sydney Water added to Action R4 - *factoring the impact of changing rainfall patterns on infrastructure design*, Action R6 - *identifying risks to water infrastructure*, and Action R8 - *collaboration with other agencies to assess extreme weather risks and responses* (pp.31-32); and
    - (iii) Office of Environment and Heritage added to Action R8 - *collaboration with other agencies to assess extreme weather risks and responses*.
  - (h) Miscellaneous minor edits.

**KEY IMPLICATIONS****Strategic Alignment - Sustainable Sydney 2030**

35. *Sustainable Sydney 2030* is a vision for the sustainable development of the city to 2030 and beyond. It includes 10 strategic directions to guide the future of the city, as well as 10 targets against which to measure progress. The Strategy is aligned with the following strategic directions and objectives:
- (a) Direction 1 - A Globally Competitive and Innovative City – maintaining business continuity during and following a period of extreme weather is vital to remaining a thriving global city;
  - (b) Direction 2 - A Leading Environmental Performer – strong planning and implementation of climate adaptation is the mark of an environmental leader. Sharing our learning with other global cities, via the C40 network is a further attribute of environmental leadership;
  - (c) Direction 3 - Integrated Transport for a Connected City – successful adaptation planning and actions will help the city remain connected and functioning in times of, and following extreme weather events;
  - (d) Direction 4 - A City for Walking and Cycling – as much a mitigation measure, active transport will assist minimising particulates and airborne pollutants that have been identified as contributing to air pollution and the generation of low-level ozone, which will increase across metropolitan Sydney as the climate gets warmer;
  - (e) Direction 5 - A Lively and Engaging City Centre – ensuring that Sydney remains a lively and engaging city in the face of a changing climate is a key objective of the Strategy;
  - (f) Direction 6 - Vibrant Local Communities and Economies – the communication elements of the Strategy will enable the City to keep our residents, workers and visitors aware of the adaptation actions each should undertake to ensure successful adaptation. This will result in strong local networks, business continuity and continued workforce productivity that are vital in ensuring vibrant local communities;
  - (g) Direction 9 - Sustainable Development, Renewal and Design – factoring the likely future climate into the City's planning, strategies and general decision making, rather than basing assumptions on historical data, will enable infrastructure, spaces and buildings to be more resilient; and
  - (h) Direction 10 - Implementation through Effective Governance and Partnerships – the Strategy has been developed through extensive collaboration. Implementation over coming decades will require a similar level of collaboration with other levels of government, business and the community. The recommended adaptation reference panel provides a good a governance structure for monitoring the evolving climate science and the implementation of actions.

### Organisational Impact

36. The City has many programs, strategies and practices underway that are already responding to climate change risks. These are outlined earlier in this report. The actions listed in section 3 of the Strategy set out what is to be done, over what timeframe, and where required, with which external organisation(s).
37. The Strategy makes it clear that the City will not be able to implement this strategy alone. Actions have been framed in terms of the control, influence and concern model of the City's spheres of influence.
38. Central to the success of the Strategy will be the incorporation of climate adaptation into day-to-day thinking at the City, just as safety and access have become part of our decision making.
39. An implementation plan has been prepared and the extensive engagement undertaken to date has been used as the foundation of that detailed planning. Each City business unit nominated to take on specific adaptation actions and to incorporate these into their business plans. Consideration of climate change is particularly relevant for business units that deal with planning and infrastructure, emergency management, community services, communications and engagement
40. For actions that are within the City's control, the City is well positioned to respond to climate change and has many programs that address adaptation already underway. Into the future, climate change will affect and need to be considered by multiple operational areas of the organisation.
41. Many of the climate change impacts and responses are not immediate; however the City must start to make the longer term decisions to ensure that future needs are adequately planned for. The City also needs to continue to be ready for shorter term impacts like extreme heat, storms and flood events.

### Risks

42. This Strategy is founded on a detailed climate risk assessment and interdependency analysis. These risks are outlined in the section on "Climate risks and adaptation actions" earlier in this report.
43. Beyond the risks identified in the Strategy, a key risk is whether the current science has underestimated the impacts of climate changes. Similarly, if global emissions continue on the current growth trajectory, the impacts of climate change could be significantly more serious than anticipated. This risk may be mitigated by global reductions in greenhouse gas emissions and using up to date climate science.
44. This Strategy has been developed with extensive collaboration by many stakeholders. Despite this, a risk remains that this level of engagement will be insufficient to ensure successful implementation. Collaboration in the delivery of adaptation actions will be vital. For instance, unless actions in the Strategy such as C5 (collaborating with Sydney Water and the NSW Office of Environment and Heritage to trial the Adapt Infrastructure tool to coordinate inter-agency responses and quantitative analysis, measurement and manage of risks and adaptation actions) are undertaken with our stakeholders, many risks will not be effectively addressed.

**Social / Cultural / Community**

45. The Strategy does not propose interventions for specific community groups, however a priority action is to identify who in our community is most at risk of extreme heat.
46. An important action within the Strategy is for the City to communicate with staff, residents, workers and visitors to make them aware of climate risks and ways to respond.
47. Many of the actions contained in the Strategy pertain to improving the resilience of the City and its community with various social, cultural and community implications.

**Environmental**

48. This Strategy is about climate adaptation; however many mitigation measures that have significant environmental benefits also assist with climate adaptation. For example, the City has advanced policies and programs for improving energy efficiency, decentralised energy, and active transport, which serve both as mitigation and adaptation measures.
49. Many programs run by the City that are already assisting with climate adaptation have other environmental benefits. For example the Strategy recognises work underway to improve our local environment such as the Urban Forest Strategy, the Urban Ecology Strategic Action Plan, rain gardens and the drought proofing of parks.
50. The Strategy should inform environmental planning decisions such as landscape design, species selection, water cycle management and provision of shading to help to ensure that our public and green spaces retain the amenity that makes our city liveable.

**Economic**

51. The Strategy has been prepared to ensure ongoing prosperity of the City LGA, which is inherently underpinned by its resilience to shocks and stresses associated with climate change and other forces.
52. By working with essential infrastructure providers, the business sector and other levels of government, the Strategy contributes to the City's understanding of business continuity risks and our role in communicating with business to better understand their continuity risks and how to address them.

**BUDGET IMPLICATIONS**

53. The Strategy presents a long term approach to climate change adaptation. It seeks to ensure that the changing climate becomes a key factor in future thinking, planning and decision making.
54. Key budget implications will be incremental. The Strategy does not propose a detailed plan of asset augmentation with direct budget implications. Rather, it seeks to ensure that whenever buildings, assets and services are reviewed, renewed, or repaired, that future climatic conditions are part of the specifications.

55. Many of the actions pertain to continuing the services and programs that are already being delivered by the City. Budgets will likely see marginal cost increases, but these may well result in significant longer term savings when assets are better able to withstand extreme climate events.

### RELEVANT LEGISLATION

56. The Strategy contains an action to develop a heat wave response plan. This fits within the NSW Government Heatwave Sub Plan and is part of the NSW State Disaster Plan (Displan) in accordance with the *State Emergency & Rescue Management Act 1989* (as amended).
57. Sea level rise planning benchmarks are notably absent from State or Federal legislation. In NSW, local governments are encouraged to apply their own locally relevant sea level rise projections for flood modelling and planning decisions.

### PUBLIC CONSULTATION

58. The draft Strategy was placed on exhibition from 13 August to 16 October 2015.
59. Feedback was sought via the following activities:
- (a) a stakeholder briefing on 13 August 2015 to launch the exhibition, present the strategy and invite submissions from key stakeholders;
  - (b) a dedicated project page on [sydneyoursay.com.au](http://sydneyoursay.com.au) with the draft strategy, FAQ and online survey;
  - (c) emails to stakeholders announcing the exhibition, inviting them to have a face to face briefing and make a submission;
  - (d) public notices in the Central and The Sydney Morning Herald newspapers announcing the exhibition and the ways people could have their say;
  - (e) three Electronic Distribution Mail outs (EDMs) to 3,607 people within the SydneyYourSay database inviting them to have their say;
  - (f) promotions through the City's twitter and LinkedIn accounts;
  - (g) a briefing with the City's Inclusion Disability Advisory Panel; and
  - (h) the draft strategy was available at the City's One Stop Shop and Neighbourhood Service Centres.
60. The objective of consultation was to seek feedback on 18 actions proposed by the City to adapt to Sydney's changing climate. Eight stakeholder submissions and 120 survey responses were received. A comprehensive analysis of responses is at Attachment A.

61. All 18 actions received significant approval from the community. The priorities were:
- (a) using trees, plants and other natural systems to provide shade and shelter to adapt for extreme heat;
  - (b) incorporating climate change in future decision making, particularly for land use planning, design of open space and infrastructure, and building codes and design;
  - (c) increasing education and awareness, including clear and practical actions the community can take to ensure their homes, families and community are prepared for climate change; and
  - (d) working with other stakeholders on adaptation measures, as well as better public transport and reduced dependency on fossil fuels.
62. Stakeholder submissions praised the City for a rigorous scientific approach and broad, comprehensive engagement process for the development of the draft Strategy.

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