



**QUEANBEYAN-PALERANG REGIONAL COUNCIL**

**Urban Forest Cooling Strategy  
December 2021**



**MOSAIC**  
insights

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# Contents

1	
<b>Acknowledgements</b>	<b>3</b>
<b>1 Introduction</b>	<b>4</b>
<b>2 What is an urban forest and why do we need it?</b>	<b>5</b>
<b>3 Policy context</b>	<b>7</b>
3.1 Community aspirations	7
3.2 Regional planning	7
3.3 Local planning	7
3.4 Transport	8
3.5 Climate change	8
<b>4 Relevant legislation and planning regulations</b>	<b>9</b>
<b>5 The need for urban greening and cooling</b>	<b>10</b>
5.1 A changing climate	11
5.2 Increased urbanisation	14
5.3 Liveability and amenity of urban centres	15
5.4 Protecting the natural environment and biodiversity	16
5.5 Enabling a healthy, active lifestyle	16
<b>6 QPRCs urban forest</b>	<b>17</b>
6.1 History of the urban forest	17
6.2 The urban forest today	19
6.3 Threats to the urban forest	24
6.4 Priority tree planting locations	25
<b>7 The way forward</b>	<b>26</b>
7.1 Our goals	26
7.2 Strategies and actions	27
<b>8 Implementation</b>	<b>32</b>
8.1 Priority actions	32
8.2 Action plan	33
<b>Appendix A References</b>	<b>38</b>

## Figures

Figure 1 Benefits of Green Infrastructure (GANSW 2020a)	6
Figure 2 Policy context	7
Figure 3 Relationship between temperature averages and extremes, showing the potential role for urban cooling and greening strategies (from Climate Commission 2013 modified from IPCC 2007)	11
Figure 4 Percent area classified as an urban heat island or severe urban heat island in QPRC urban areas (QPRC 2020a)	12
Figure 5 Surface heat mapping for the Queanbeyan-Palerang municipality (QPRC 2020a)	13
Figure 6 Monaro Street 1926 (Queanbeyan)- Queanbeyan and District Historical Museum Collection	17
Figure 7 Wallace Street Braidwood 1920-30 (source unknown)	18
Figure 8 Monaro Street 1905 vs 2013 (Queanbeyan)- Queanbeyan and District Historical Museum Collection	18
Figure 9 Overall tree canopy cover in urban centres	19
Figure 10 Map of canopy cover in Queanbeyan urban area by land use zone	20
Figure 11 The percent of zoned land with canopy cover in Queanbeyan urban area	20
Figure 12 Map of canopy cover in Bungendore urban area by land use zone	21
Figure 13 Percent canopy cover by land use zone	21
Figure 14 Map of canopy cover in Braidwood urban area by land use zone	22
Figure 15 Percent canopy cover by land use zone	22
Figure 16 Map of canopy cover in Googong urban area by land use zone	23
Figure 17 Percent canopy cover by land use zone	23

Figures 6, 7 and 8 provided by Queanbeyan-Palerang Regional Council.

QPRC ran the 'Urban Forest Local Photo Competition' in September 2021 to provide local photos for use in the Urban Forest Cooling Strategy. Photographs have been attributed as requested.

## Tables

Table 1 Immediate actions (quick wins)	33
Table 2 Medium-term actions (2-5 years)	34
Table 3 Longer-term actions (5+ years)	37



## Acknowledgements

We pay our respect to the Traditional Custodians of the Queanbeyan-Palerang area on whose land we live and work. We acknowledge that these lands are Aboriginal lands and pay our respect and celebrate their ongoing cultural traditions and contributions to our surrounding region. We also acknowledge the many First Nations peoples from across Australia who have now made this area their home, and we pay respect and celebrate their cultures, diversity and contributions to the Queanbeyan-Palerang area and surrounding region.

We would like to thank members of the community and Council staff who contributed by providing feedback in engagement activities during development of this Strategy. We would also like to thank TreeiQ for their contribution in preparing this Strategy.



Image credit: Emma Grey

# 1 Introduction

This Urban Forest Cooling Strategy (the Strategy) has been written at a time when Queanbeyan-Palerang continues to experience significant population growth and urban expansion, particularly in its established urban centres of Queanbeyan, Bungendore and Braidwood and in emerging centres such as Googong. This Strategy has been developed to support Council to continue providing housing and infrastructure for our growing population while ensuring urban centres are healthy and attractive environments for residents and wildlife.

The Strategy's key drivers have come from current and emerging challenges and overarching goals set by the community in regional and local strategic plans and during engagement activities in 2021. These drivers are:

- A changing climate
- Population growth, urban development and the effects of urban heat
- Liveability and amenity of urban centres
- Protecting the natural environment and biodiversity
- Enabling a healthy, active lifestyle

The Strategy has been prepared to provide Council with coordinated, local and practical actions to manage its urban forest. Management of the urban forest cuts across multiple sectors, roles and responsibilities within Council and many different agencies, organisations and groups in the community. Effective management requires a localised understanding of impacts, resource constraints and strategic priorities for Council and our community. After engaging with the community and Council staff, we have developed a Strategy that will:

1. Deliver on the community vision for urban greening and cooling in our urban centres:

**Council, businesses and the community value and actively care for an urban forest that is resilient, fairly distributed, and provides a cooler, healthier environment for people and wildlife.**

2. Achieve the following goals:

- A resilient urban forest
- A fairly distributed urban forest
- A cooler, greener urban environment
- Increased biodiversity and tree canopy
- An actively managed urban forest

The Strategy has adopted the four principles of Greener Places, a green infrastructure framework developed by the Government Architect of NSW (GANSW 2020a), to inspire and inform Council's approach to urban greening, these are:



#### PRINCIPLE 1.

##### Integration

combine green infrastructure with urban development and grey infrastructure



#### PRINCIPLE 2.

##### Connectivity

create an interconnected network of open space



#### PRINCIPLE 3.

##### Multifunctionality

deliver multiple ecosystem services simultaneously



#### PRINCIPLE 4.

##### Participation

involve stakeholders in development and implementation



## 2 What is an urban forest and why do we need it?

The urban forest can be defined as “all trees and other vegetation within [an urban area] and the soil and water that supports it” (2020 Vision 2014). The urban forest includes all vegetation within urban areas – from street trees to backyard lawns, from weeds in footpaths to remnant bushland. It is the vegetation in our streets, parks, gardens, along creeks, rivers and railway corridors, in public spaces and places, on our roofs and balconies.

All the vegetation in our urban forest relies on water (sourced from rainfall, groundwater or irrigation) and healthy soils as its foundation. A thriving urban forest is vital to healthy urban communities and needs to be well-designed, planned and managed to create cooler, greener environments for people and wildlife. Trees are fundamental to the urban forest and perform a myriad of functions for people and the environment. Trees survive amongst the built infrastructure of towns and cities (the roads, footpaths, powerlines and pipes) and can only thrive in this environment if given what they need, including adequate water, careful maintenance and attention in the early stages of establishment.

Mature trees with a good healthy canopy cool the air and ground with shade and evaporative cooling. They can slow water from rain and storms and protect land and built features from extreme weather events. Trees can catch pollutants from vehicles and move stagnant air that would otherwise be trapped in urban spaces. Many of the benefits provided by trees can be increased through planting and management of other vegetation. The urban forest is a critical asset that, when integrated in the planning and design of our urban environments, can create healthy, resilient, equitable and responsive places.

The GANSW Greener Places framework describes the urban forest as green infrastructure, ‘the network of green spaces, natural systems, and semi-natural systems that support sustainable communities...’. The framework sets the expectation that green infrastructure is integral to our urban environments and must be designed in coordination with other infrastructure such as transport, cultural and communications to create multi-functional assets that contribute to broader community, liveability, resilience and economic benefits.



Image credit: Tom Warry

## Who benefits from Green Infrastructure

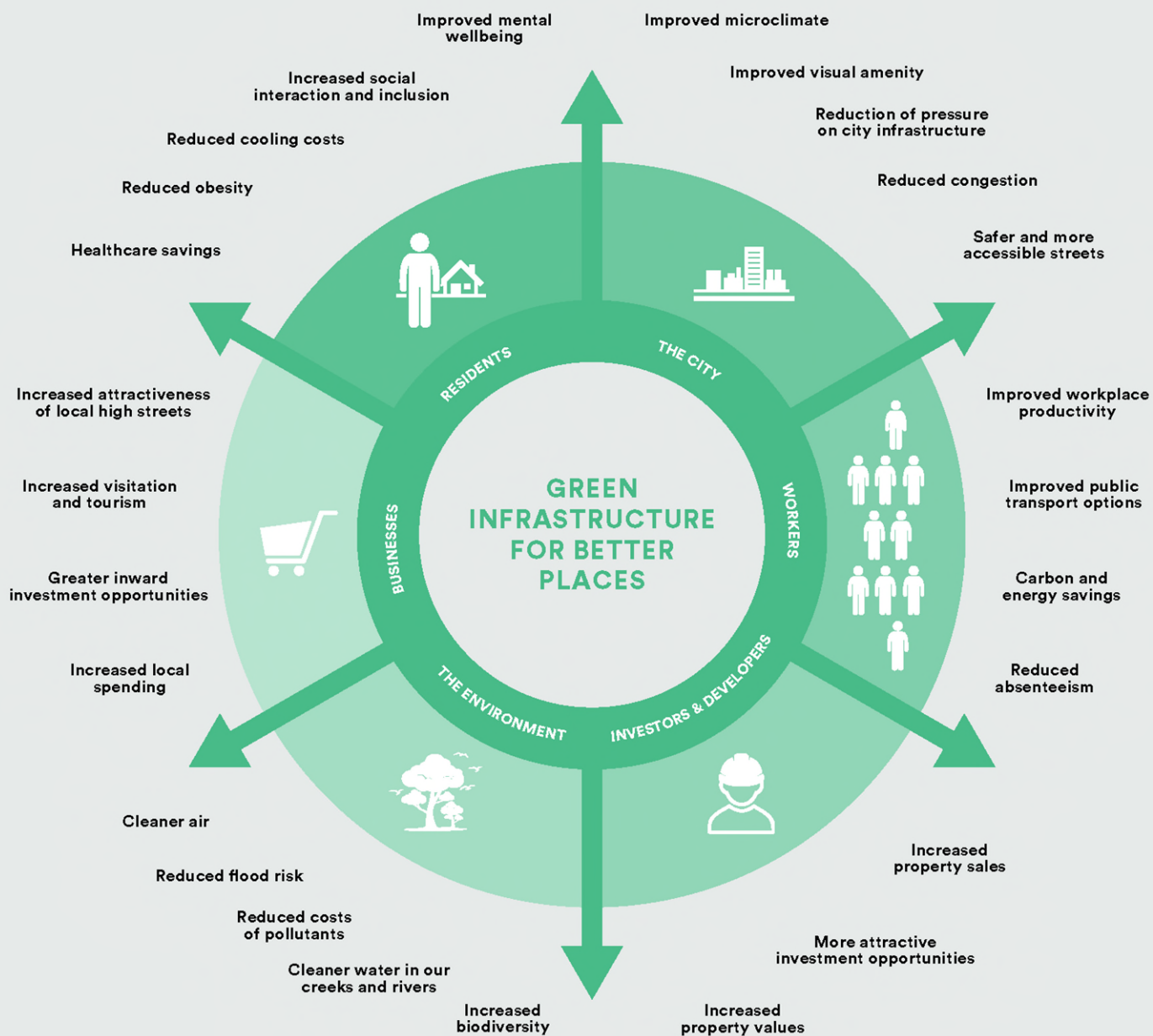


Figure 1 Benefits of Green Infrastructure (GANSW 2020a)



### 3 Policy context

This Strategy sits within Council's broader policy context, complementing community goals for climate change adaptation and resilience, planning and development, transport, biodiversity and environmental conservation.

#### 3.1 Community aspirations

The Community Strategic Plan sets out long term aspirations of the community by identifying priorities for the future and strategies for achieving them. The plan is driven by five strategic pillars, four of which are supported by this Strategy:

- **Community:** A safe community with opportunities for an active healthy lifestyle
- **Character:** Consider environmental impacts of future development, sound resource conservation and good environmental practice and sustainable management of the region.
- **Connection:** Promote better social connection and access for the community
- **Capability:** Enable Council activities to work towards the goals and aspirations set out under the strategic pillars.

#### 3.2 Regional planning

The South East and Tablelands Regional Plan 2016-2036 is a 20-year blueprint for the future of our region. The document sets four goals and 28 directions to achieve a vision for a 'borderless region in Australia's most geographically diverse natural environment with the nation's capital at its heart'. Four directions, in particular, are relevant to this Strategy:

- Direction 15: Enhance biodiversity connections
- Direction 17: Mitigate and adapt to climate change
- Direction 18: Secure water resources
- Direction 22: Build socially inclusive, safe and healthy communities



Figure 2 Policy context

#### 3.3 Local planning

Our Local Strategic Planning Statement (LSPS), *Towards 2040*, provides Council with a roadmap for land use planning over the next 20 years, aligned to the community's long-term vision and aspirations identified in the Community Strategic Plan. This Strategy provides a pathway for delivering several high-level actions of the LSPS.

The planning vision includes several key themes that are of particular relevance to this Strategy:

##### Natural environment

The vision for land-use in Queanbeyan-Palerang includes protection and management of the natural environment and its biodiversity. This is articulated through actions to increase natural and green spaces, establish formal wildlife corridors, protect significant heritage trees and proactively conserve high quality environmental vegetation including mature and remnant native trees.

##### Lifestyle

The LSPS seeks to provide a safe and relaxed lifestyle for our community enabled through passive and active enjoyment of the natural and

built environment. Key actions to achieve this include promoting interconnected green spaces, increasing the number of homes within 10-minute walking distance to green, open and public space, providing shade, both natural and build, and designing spaces that are healthy to live in, to work in and to visit.

### **Climate change**

A climate change adaptation approach to planning is embedded in the LSPS and commits Council to considering the impacts of climate change in all planning decisions. Specific actions to support this include establishing adaptation strategies, employing urban design to minimise heat and encouraging new developments to be early adopters of sustainable approaches to reducing energy and water consumption.

## **3.4 Transport**

The Integrated Transport Strategy (ITS) guides investment and direction for all types of transport including walking, cycling and public transport. The ITS has three goals specifically relevant to the Strategy:

- **Social and economic inclusion:** Align accessibility of transport to needs of the community and economy, better connected communities and more travel choices for residents and visitors. Reduce obstacles to accessibility for disadvantaged groups.
- **Safety, health and wellbeing:** Design, construct and maintain transport infrastructure to meet acceptable standards and utilise a safe system approach to maximise the safety and security of all users of the transport system.
- **Environmental sustainability:** Minimise the impact of transport on the environment by supporting growth in public transport, walking and cycling for trips in the region

The ITS recognises the strong link between active transport and health and promotes sustainable transport methods such as walking, cycling and public transport for their social, economic and environmental benefits. This Strategy aligns actions with these goals by encouraging the planting and maintenance of green infrastructure along active travel routes to provide shade, visual amenity and access to nature as well as develop a network of linked green spaces and places.



## **3.5 Climate change**

Council continues to recognise that climate change is a serious and significant issue, and is committed to supporting the community in addressing it through a local response. We have developed two action plans to address climate change, the Council Operations Action Plan, which focuses on greenhouse gas emissions reduction, and the Community Action Plan. Many of the actions under both plans are interlinked with the benefits of an urban forest, in particular cooling and climate resilience. The Council Climate Change Action Plan specifically calls for the development of a heat adaptation and urban forest strategy as a key action (CO 7.1.8) as well as expansion of the QPRC Street Tree Planting Strategy. This Strategy focuses on the urban forest, recognising the important role it plays in responding to climate change alongside the various other climate change mitigation and adaptation efforts.

## 4 Relevant legislation and planning regulations

### Vegetation SEPP

The Vegetation State Environmental Planning Policy (SEPP) commenced in August 2017 and provides the mechanism to regulate the clearing of vegetation not linked to development on non-rural lands (including E zones, RU5 and urban and residential zones). The Vegetation SEPP applies to:

- Clearing of native vegetation above the Biodiversity Offsets Scheme (BOS) threshold specified in the Biodiversity Conservation Regulation 2017
- Clearing of vegetation below the BOS threshold, if the native or non-native vegetation is identified in council's Development Control Plan (DCP)

For the clearing of native vegetation on non-rural land that exceeds the BOS threshold, an approval is required from the Native Vegetation Panel, whether or not the vegetation is declared in a council's DCP.

If the vegetation clearing does not exceed the BOS threshold, is not identified in a DCP and is not linked to development requiring consent, it can be cleared without a council permit or authorisation under the Vegetation SEPP. While an authorisation is not required under the Vegetation SEPP, other legislative requirements may still apply to the proposed clearing. For example, if the proposed vegetation to be cleared is threatened species habitat, a listed threatened species or threatened ecological community, clearing can only occur with a valid Biodiversity Conservation Licence from the Department of Planning, Industry and Environment.

### Permits

For Council to regulate the management of vegetation that is below the BOS threshold, the vegetation needs to be identified in a DCP. Council can require a permit for clearing based on conditions set out in the DCP.

### Development consent

Clearing that is ancillary to development which requires consent is assessed as part of the development assessment process and may also require further assessment and approval under the *Biodiversity Conservation Act 2016*.

In addition, development consent is required for the clearing of vegetation that is a heritage item or that is located in a heritage conservation area, as well as vegetation that is an Aboriginal object or that is located in an Aboriginal place of heritage significance.



## 5 The need for urban greening and cooling

Urban greening is recognised globally as a key contributor to the liveability and climate resilience of urban areas (Ordóñez 2020). The natural landscape is highly valued by our community and valuable to the local economy. In a survey conducted as part of developing this Strategy, local residents named amenity and health benefits as the most valued attributes of the urban forest.

We held two community workshops and an online survey to understand community priorities and values, and to develop a shared vision for the future of the urban forest. The survey found that the vast majority (more than 95%) of respondents agreed that the urban forest should be increased, while respondents tended to disagree that the urban forest was equally distributed and were more likely to disagree than agree that the urban forest is healthy.

The following section outlines the key drivers informing this Strategy, including climate change, increased urbanisation, liveability and amenity of its urban centres, protecting the natural environment and biodiversity and enabling a healthy, active lifestyle for our citizens.



Image credit: Di Turton

## 5.1 A changing climate

The majority of our urban areas, including Queanbeyan, Googong, and Bungendore, fall within the hotter, north-west section of the municipality. The south-east area has lower surface temperatures, in part driven by a cool corridor influenced by Tallaganda National Park. The Braidwood urban area falls within this cooler section (QPRC 2020a). Figure 5 provides a map of the urban areas analysed.

Climate change is already affecting Australia, with a higher frequency and severity of extreme weather events including fire and heavy rainfall, an increase in extreme daily heat events, a decrease in extremely cold days and nights and increases in global GHG concentrations (CSIRO 2020). For Queanbeyan-Palerang, a business-as-usual approach will see a hotter municipality with more intense heat waves, increasing risk of flash floods, high intensity storms, fire and drought. There will be more hot days and fewer cold nights (OEH 2014a, OEH 2014b).

These general changes in climate and temperature will exacerbate the urban heat island effect in our town centres and have greater impact on the health and wellbeing of residents, electricity demand, resilience and health of local flora and fauna and broader economic and social impacts. As the climate changes, extreme weather patterns will place pressure on our urban forest at the same time as increasing its role in reducing heat, providing shade and bolstering resilience.

To respond to a changing climate, we will need to create a resilient urban forest through appropriate selection of trees that can adapt to the future climate. Providing equitable access to the urban forest and therefore shade, cool environments and protection from the heat will be critical to reducing urban heat inequality, especially when accommodating medium- and high-density housing that has limited available space for tree canopy.

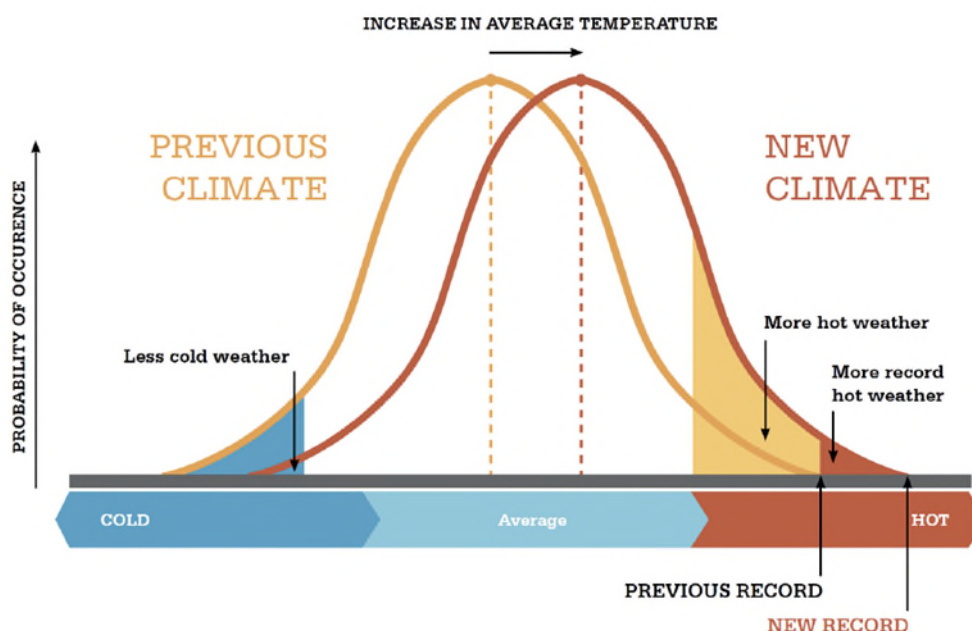


Figure 3 Relationship between temperature averages and extremes, showing the potential role for urban cooling and greening strategies (from Climate Commission 2013 modified from IPCC 2007)

### 5.1.1 Urban heat

Increasing heat is a significant issue in urban areas, where changing and intensifying land uses lead to more hard surfaces and less green cover. These surfaces absorb, store and radiate heat to create microclimates of significantly warmer areas. Human activity generates additional heat, adding to this effect. While smaller areas create pockets of heat, as land uses and human activities intensify, contiguous areas of retained heat create heat traps, leading to urban heat islands. These urban heat islands have significant impacts on the health, infrastructure, economy and environment of urban areas (UNSW 2015)

A Surface Heat Mapping Report (QPRC 2020a) for our urban centres prepared last year found that Googong and Bungendore classified entirely as a heat island, with most of Queanbeyan also classifying as a heat island Figure 4 and Figure 5.

The Surface Heat Mapping Report identifies urban greening as the key action to mitigating urban heat island effect in the four urban centres. In particular, the report identified trees as offering the best cooling outcomes due to direct shading and evapotranspiration.

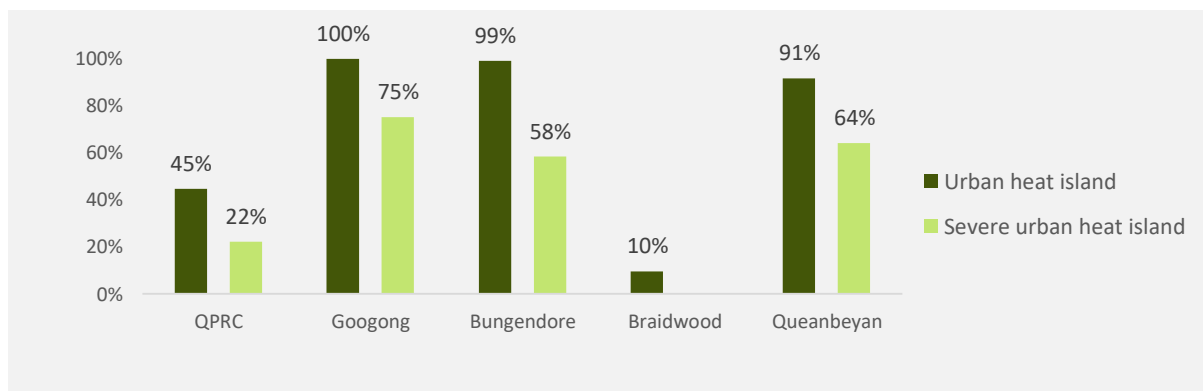


Figure 4 Percent area classified as an urban heat island or severe urban heat island in QPRC urban areas (QPRC 2020a)

#### Heat vulnerability

The stress caused by urban heat can pose a significant risk to public health (Hsu 2021). Vulnerability to heat is not equally distributed across a population. There are several factors that contribute to a person's ability to cope with heat:

**Exposure:** To what extent is a population exposed due to local weather patterns, climatic conditions and characteristics of the built environment.

**Sensitivity:** Certain socio-economic characteristics can increase a population's vulnerability to heat, including age, health and wealth. Heat vulnerability can be highest in low-income areas, areas with an aging population, and for members of the population with chronic illness.

**Adaptive capacity:** To what extent can a population adapt to the impacts of urban heat, both within their homes and in external environments. For example, are people able to change their transport mode to better adapt during a heatwave.



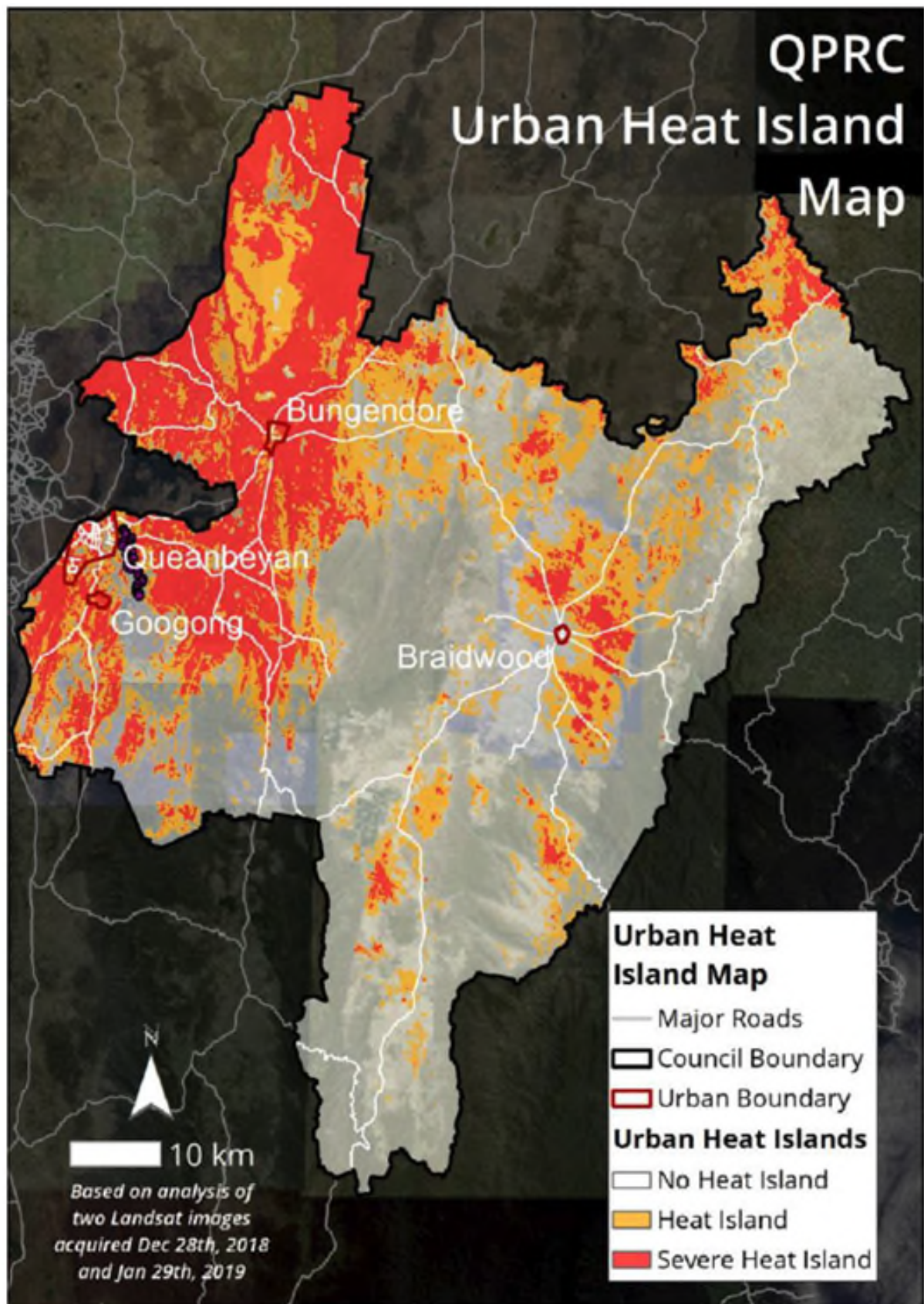


Figure 5 Surface heat mapping for the Queanbeyan-Palerang municipality (QPRC 2020a)

## 5.2 Increased urbanisation

Our policy and planning aim to balance urban growth and provision of opportunities for new housing with protection of the existing character and amenity of established residential areas.

Proximity to Canberra is a key growth and economic driver for Queanbeyan-Palerang, with approximately 18,500 residents travelling west to the ACT for work, education and other services. Approximately 5,000 residents of the Australian Capital Territory (ACT) travel east into Queanbeyan-Palerang for work and other purposes. The South East and Tablelands Regional Plan notes that 70 percent of the region's population growth to 2036 is projected to occur in the areas that share a border with the ACT.

Queanbeyan-Palerang is expected to see moderate to strong growth in population and associated housing over the next 15 years, with an average growth rate of 2.19% (.idcommunity 2021a). This growth is based around a combination of planned infill and greenfield development to meet demand in our urban centres.

The housing typology in the Queanbeyan urban centre differs from the rest of Queanbeyan-Palerang due to its proximity to the ACT (QPRC 2020b). Much of Queanbeyan's housing stock services workers from the nation's capital, resulting in a higher number of medium- and high-density housing and catering to a larger number of lone person households (more than 40% of the population) (.idcommunity 2021a). A general decline in average household sizes will also see a need for additional dwellings and likely increased density in established suburbs such as Queanbeyan East, Queanbeyan and Crestwood. The LSPS includes actions to investigate opportunities for infill and mixed-use development and allow higher density development in certain areas.

As density increases and urban areas expand to accommodate future residents, the impact of increasing land use types that retain heat, intensity of human activity producing heat will increase the urban heat island effect.

Without suitable controls and recognition of the role the urban forest plays in greening and cooling, the infill associated with urbanisation will continue to reduce vegetation and canopy in our urban areas.

Urbanisation and the urban forest can grow in tandem, as long as there are robust mechanisms in place to ensure appropriate conditions to protect vegetation and provide the conditions that will allow the Urban Forest to thrive (Julian & Sweeney 2020). In particular, public land presents a significant opportunity to increase urban tree canopy whether in parks, street verges or underutilised spaces such as carparks. Parks in urban areas that are treed and well-irrigated can have much greater cooling benefits for surrounding land and provide cooling for areas that can't maintain their own trees. Alternative green infrastructure, such as green roofs and walls can provide cooling where there is insufficient space for trees. With careful, coordinated and considered planning and active input from the community, increased urbanisation in our town centres can be balanced with innovative greening solutions to enable a cooler, pleasant urban environment.

### 5.3 Liveability and amenity of urban centres

The liveability and amenity of our urban centres is a key factor driving business and investment in the region. Improving the attractiveness and amenity of main streets in towns and villages while retaining rural ambience is identified as a priority for Queanbeyan-Palerang in the South East and Tablelands Regional Plan. Revitalisation of the main town centres presents opportunities for enhancing liveability through protecting and growing the urban forest. In particular, recognising and building on the proximity of some of our urban centres to the natural landscape by considering opportunities for ecological enhancement and extending biodiversity corridors. Opportunities also exist to bring the natural landscape into urban centres through increased tree planting, water sensitive urban design (WSUD), green roofs and walls and linking existing open spaces to create an interconnected green network. Selection of appropriate tree species can increase human comfort in urban areas through providing shade (cooling) during summer and sunlight (warmth) during winter.

The Queanbeyan CBD Place Plan identifies interventions to improve Queanbeyan's CBD including a 'green strategy', utilising paving to reduce urban heat island effect and building an understanding of microclimate to increase climate resilience and adaptation of the CBD. Trees and vegetation are critical to urban amenity. Revitalisation of the Queanbeyan, Braidwood and Bungendore town centres should consider opportunities to maximise shade, amenity and health benefits through:

- Designing public spaces, streetscapes and open space to ensure adequate space both above and below ground to support tree growth and vegetation that minimises impacts on other services. Reviewing planning controls to support heat mitigation and tree planting
- Integrating passive watering and WSUD measures for improved tree health, increased cooling, and management ease.
- Selecting trees for planting should aspire to keeping 'rural ambience', though they need also be resistant to urban constraints, and resilient to climate change and urban heat.



**Water Sensitive Urban Design (WSUD)** aims to improve the ability of urban areas to capture, treat and re-use stormwater.

Benefits of WSUD include improving water quality and reducing stormwater runoff as well as cooling our local environments, improving the appearance of our streets and parks and protecting existing waterbodies.

WSUD comes in many forms, such as raingardens, swales and constructed wetlands (Sydney Water 2018).



## 5.4 Protecting the natural environment and biodiversity

There is a strong sense of community pride and value in the natural environment within and surrounding our towns. The LSPS vision for Queanbeyan-Palerang is a 'place offering a wonderful lifestyle for residents, families and visitors, a lifestyle created in large part by passive and active enjoyment of the natural and built environment. The lifestyle is friendly, safe and relaxed – the result of living in an environmental haven, with clean and pristine waterways and bushland, well maintained public spaces and a commitment to sustainable energy and waste'.

Through its strategic documents, Council has committed to the protection and management of the natural environment and its biodiversity, including specific goals such as:

- Designing to mitigate impacts on water including through WSUD
- Maintaining and enhancing ecological connectivity and establishing wildlife corridors
- Reviewing opportunities for high quality environmental vegetation to conserve
- Protection of significant heritage trees

## 5.5 Enabling a healthy, active lifestyle

Enabling a healthy, active lifestyle for residents, workers and visitors is a key priority in many of our strategic documents. In particular, integrating walking and cycling networks, encouraging active transport and providing opportunities for people to enjoy the outdoors for exercise, recreation, socialising and access to nature. Provision of shade via urban tree canopy, cooling through vegetation and water and designing shade into buildings and transport networks are some of the ways in which this Strategy supports a healthy, active lifestyle.

The network of green spaces and linear parks in urban areas are critical to the community's health and wellbeing. If well-designed and maintained, green active transport corridors can have the dual benefit of making continuous cool spaces that support an actively lifestyle for residents and visitors, while supporting local flora and fauna movement and biodiversity.



Image credit: Kim Duggan

## 6 QPRCs urban forest

### 6.1 History of the urban forest

The Ngambri-Ngunnawal people are the traditional custodians of the land and waters that we now recognise as the Queanbeyan, Bungendore and Googong urban centres and people of the Dhurga language group as the traditional custodians of the region surrounding Braidwood. Their connection to the lands and waters, tangible and intangible cultural practices, knowledge and relationships have supported the health and wellbeing of Country, including the urban forest, over tens of thousands of years. This custodianship and connection continues today, despite the impacts of colonisation. (GANSW 2020b)

Early Europeans described the area as “a most beautiful forest as far as we could see, thinly wooded by Gums and Bastard Box, the tops of the Hills stony and stone sand, but in the valleys a fine Rich Soil” (ABS 2012).

Prospecting in the early 19th century led to the construction of homesteads, cattle runs, inns and other development, eventually leading to the establishment of Queanbeyan the township in 1838 (Queanbeyan Museum 2021). As agriculture and urbanisation activities increased, the Eucalypt woodland including brittle gum, snow gum, ironbark and stringybark trees was heavily impacted (Benson and Howell 1990), such that the area was decreed ‘Devoid of Timber’ in records in 1915 (artefact 2020). Remnants of the Natural Temperate Grassland and Box-Gum Woodland are retained within the Queanbeyan Nature Reserve.



Figure 6 Monaro Street 1926 (Queanbeyan) - Queanbeyan and District Historical Museum Collection





Figure 7 Wallace Street Braidwood 1920-30 (source unknown)

Street tree planting expanded through the mid to late 19<sup>th</sup> Century, beginning in Sydney and expanding to other NSW towns. Species were selected and prescribed through botanical gardens based on conditions of the receiving landscape, success in planting trials and features of growth form (e.g. capacity to shade, canopy density, shape uniformity) as well as prestige and fashion (Maiden 1917).

Locally commemorative plantings of *Fraxinus* sp., pin oaks and other species were planted in the mid-1930s and 40s (Australian Garden History Society 2018). Though Canberra's greening in the 19<sup>th</sup> and early 20<sup>th</sup> centuries was influenced by manicured City Beautiful and Garden City movements (Davison & Kirkpatrick 2014), early shots of our main streets (Figure 6, Figure 7, Figure 8) show limited greening, at least within commercial precincts (Norris 2003).



Figure 8 Monaro Street 1905 vs 2013 (Queanbeyan)- Queanbeyan and District Historical Museum Collection



## 6.2 The urban forest today

### 6.2.1 Tree canopy cover

One of the most common measures of an urban forest is the amount of coverage provided by tree canopy. This measure can help quantify benefits such as shade, stormwater filtration and carbon sequestration.

This Strategy used light detection and ranging (LiDAR) data to map canopy cover in our urban areas of trees greater than two metres tall. The following information and maps provide a general sense of the urban forest to support decision-making and action setting for the Strategy. We are currently undertaking several other actions to better understand the existing urban forest, including a review of species and trial of a tree inventory for Braidwood. Understanding the current health, status and characteristics of trees, vegetation, soil and water is critical to management and future planning of our urban forest. This Strategy sets several priority actions related to monitoring and data collection to support longer term objectives.

The average canopy cover in LGAs across Australia is 39 percent (Jacobs 2014). The GANSW Greener Places Design Guide provides an indicative canopy cover target of greater than 25 percent for medium to high-density areas and greater than 40 percent for low density areas. This is, of course, subject to the specific conditions of an area including climatic and land use patterns. In Queanbeyan-Palerang, tree canopy cover across our four urban centres varies from just over three percent in Googong to 31 percent canopy cover in Queanbeyan.

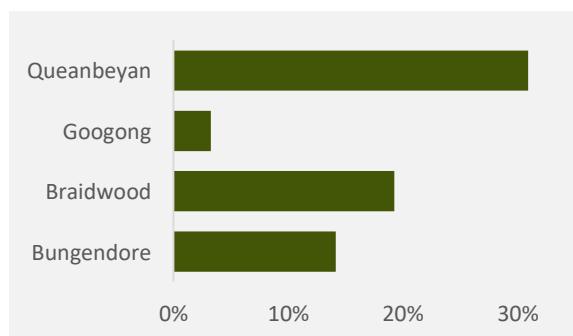


Figure 9 Overall tree canopy cover in urban centres

The significant difference in canopy cover in Googong is due to the majority of trees having only recently been established and therefore not reaching the height requirements to be detected by the LiDAR analysis. What this suggests is that Googong will have significant issues without provision of shade and other benefits from canopy trees over the next few years, and depending on subsequent planting regimes, maintenance and ongoing management, will continue to impact urban heat in the area over the long term. Queanbeyan, on the other hand, has the highest canopy cover generally due to the density of trees within the Jerrabomberra Mountain Reserve and Greenleigh residential area.

#### Measuring the urban forest

Tree canopy is just one way to measure the urban forest, other characteristics that support urban forest management include:

- age (young, mature, old, life-expectancy variation)
- species – variety in species, genera and family as well as mix of deciduous and evergreen.
- features (leaf shape and size, plant height, flower size, shape, colour etc)
- soil health
- climate data
- prevalence of pests and disease

This Strategy sets actions for Council to assess and continue monitoring various aspects of the urban forest to determine its overall condition and related risks. This will allow integration of green infrastructure with capital works and support future planning through budgeting, succession planning and scheduled maintenance.

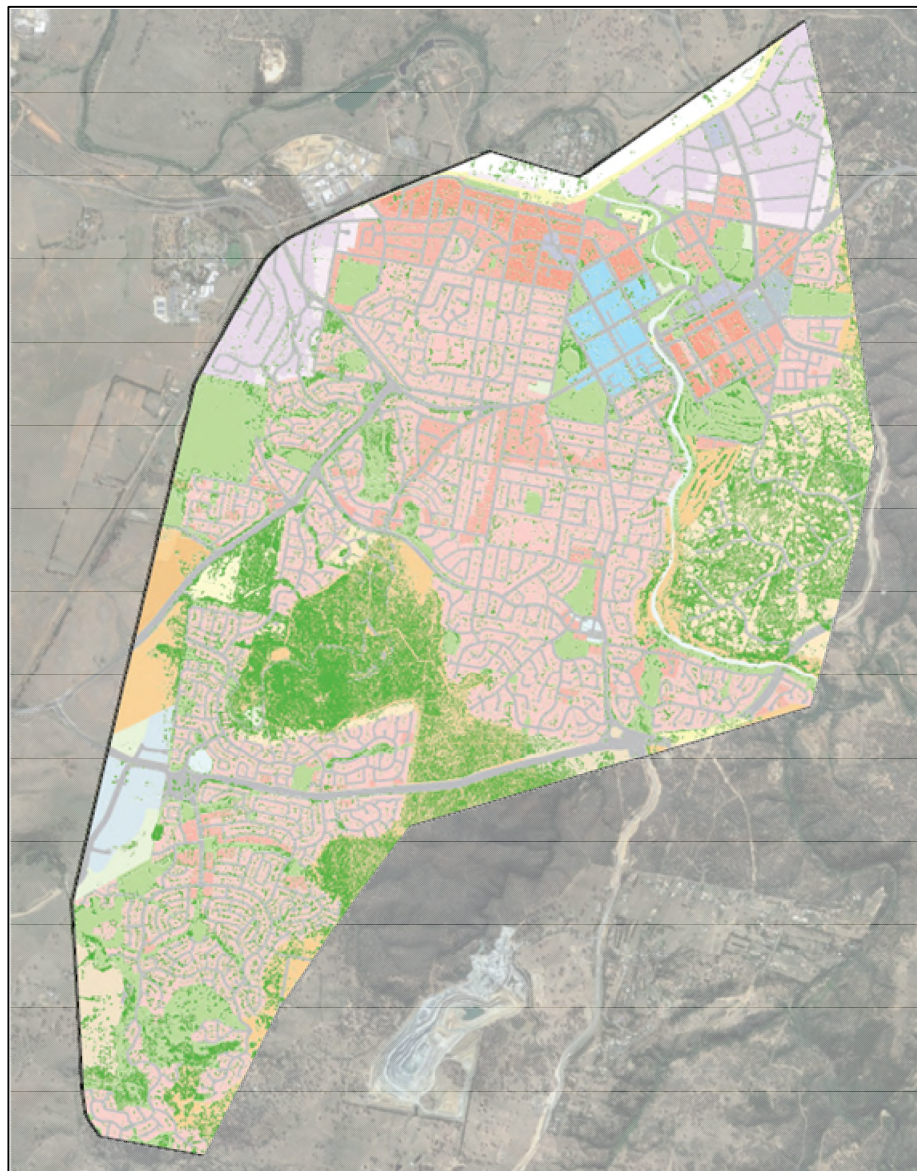


Figure 10 Map of canopy cover in Queanbeyan urban area by land use zone

## Queanbeyan

**30.9%**



Queanbeyan has an estimated 30.9 percent canopy cover across its urban area, which includes the suburbs of Queanbeyan East, Crestwood, Greenleigh, Karabar, Jerrabomberra, Queanbeyan West and Queanbeyan. There is a highly inequitable distribution of canopy cover across zones within Queanbeyan. Rural and Environment zoned land has a significantly higher percentage canopy cover than other zones, in particular Business and Industrial zoned land.

Removing the Environment zoned land, comprising predominantly non-urban areas with contiguous vegetation such as Mount Jerrabomberra and Greenleigh, reduces Queanbeyan's total tree canopy cover to 23.7 percent. Significant opportunity exists to increase planting in industrial lands and on commercial/business lands such as the Jerrabomberra and Karabar town centres and Queanbeyan East commercial precinct along Ellerton Drive.

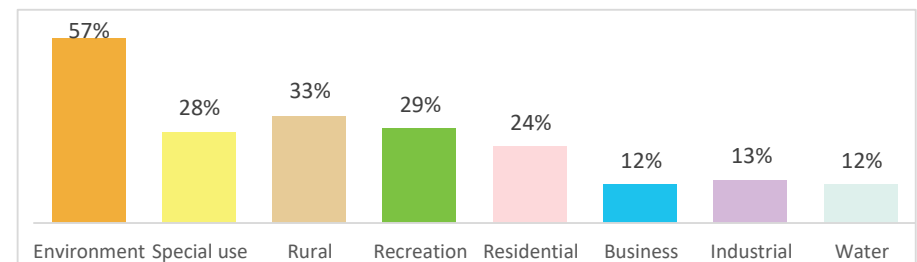
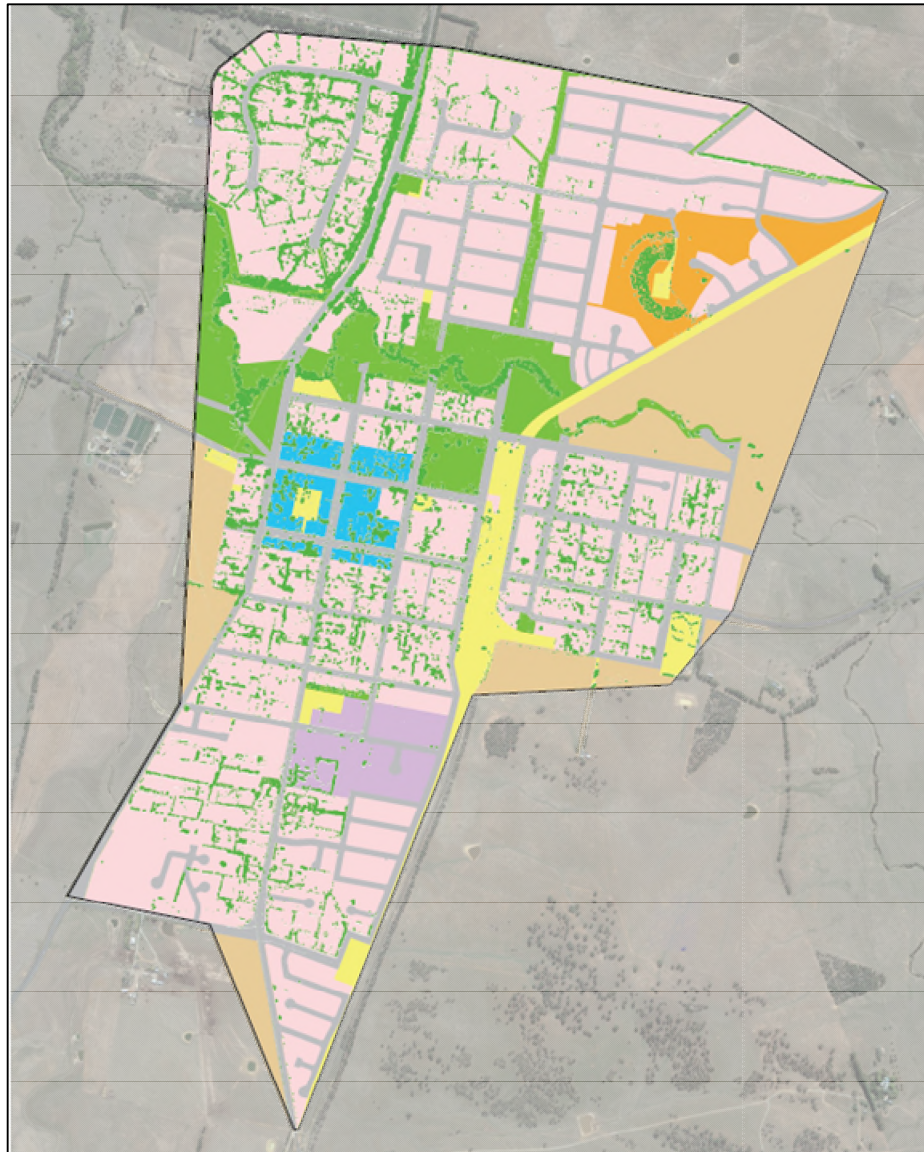


Figure 11 The percent of zoned land with canopy cover in Queanbeyan urban area



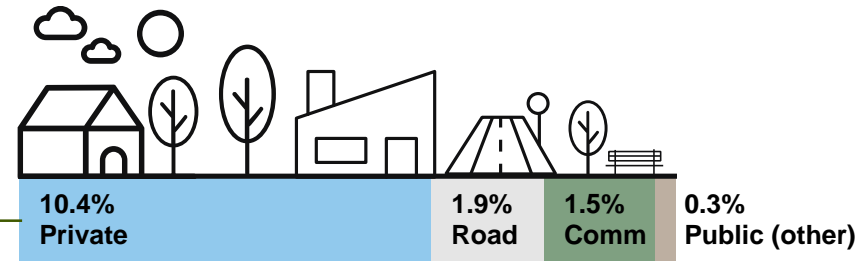


**Figure 12 Map of canopy cover in Bungendore urban area by land use zone**

## Bungendore

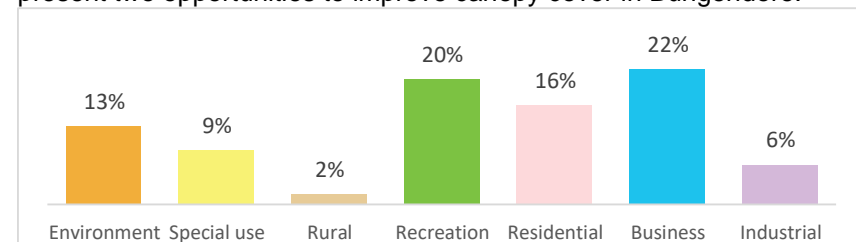
**14.2%**

Total tree canopy cover



Bungendore has an overall canopy cover of 14.2 percent, the majority of which is located on private land. Private property makes up 67 percent of land within Bungendore's urban centre and contains almost three quarters of the urban forest (74%). In contrast to Queanbeyan, land zoned for Business has the highest canopy cover of all land use zones at 22 percent. The canopy in the commercial centre is represented predominantly by trees within residential properties surrounding the commercial strip along Kings Highway and Ellendon Street, which themselves are moderately treed.

The tree lined Tarago Road to the north and canopy along the Turallo Creek make up a large portion of the urban forest in the residential and recreation zones, respectively. Rural zoned land has the lowest canopy cover at two percent, characterised by cleared grazing and farming land. Planting additional street trees and increasing canopy within the industrial zone present two opportunities to improve canopy cover in Bungendore.



**Figure 13 Percent canopy cover by land use zone**



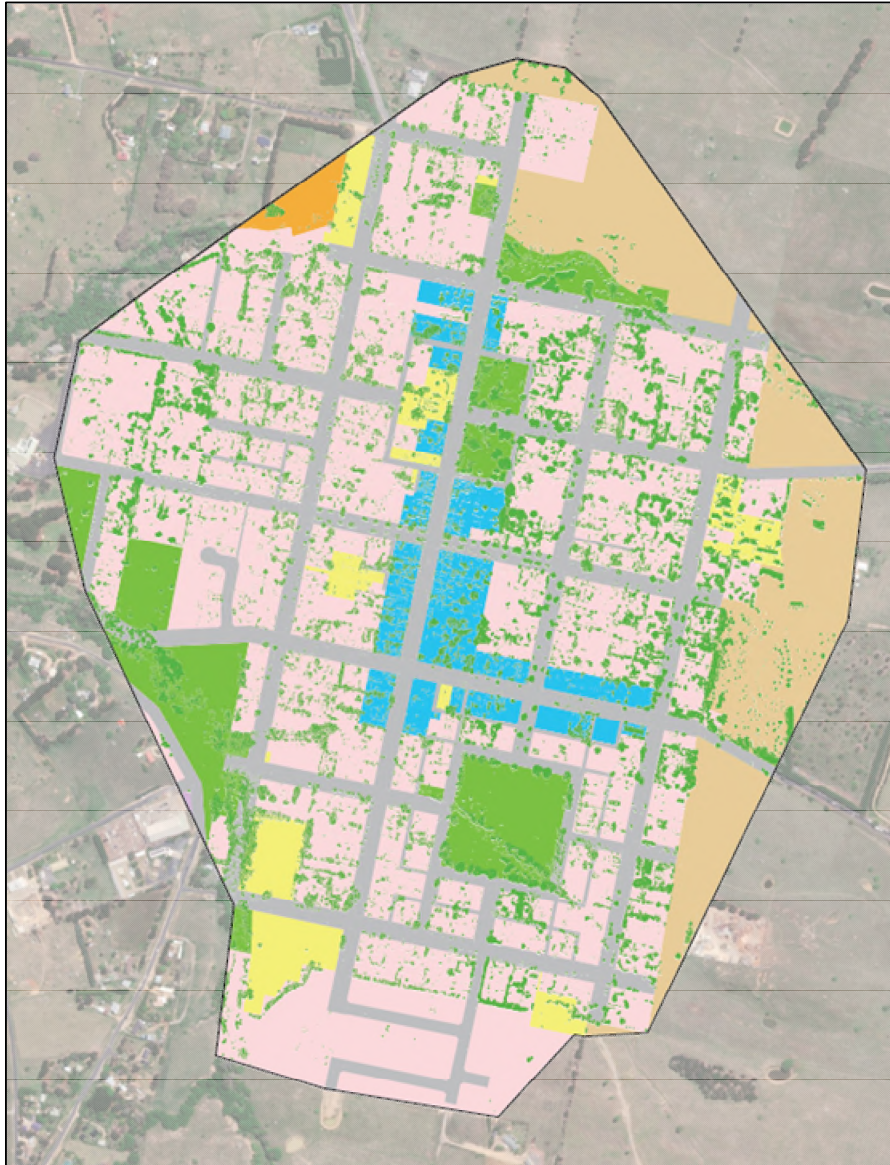
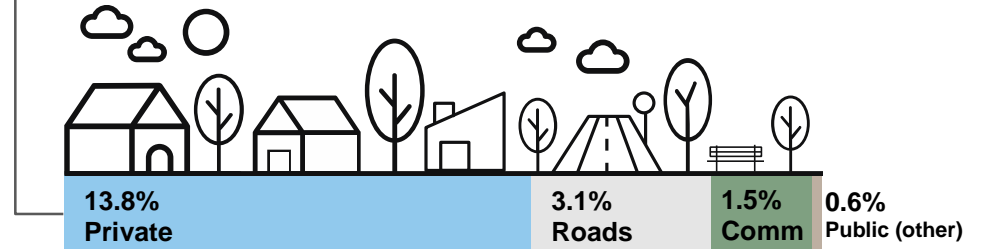


Figure 14 Map of canopy cover in Braidwood urban area by land use zone

## Braidwood

**19.3%**

Total tree canopy cover



Braidwood has an overall canopy cover of 19.3 percent. Private land makes up two thirds of the overall urban area (66%) and accounts for 72 percent of the urban forest. The remainder of the urban forest is mostly found within road reserves (16 percent) with only two percent of the overall tree canopy found in community-purpose public land.

Trees along the Gillamatong Creek, Flood Creek and Recreation Ground Creek provide the majority of canopy cover within land zoned for recreational use, along with trees within parks and reserves. While Figure 15 illustrates a very low canopy in industrial land, there is only a small portion of land zoned for that purpose at the south-western urban boundary. Opportunities exist to increase tree planting in residential areas and along road reserves.

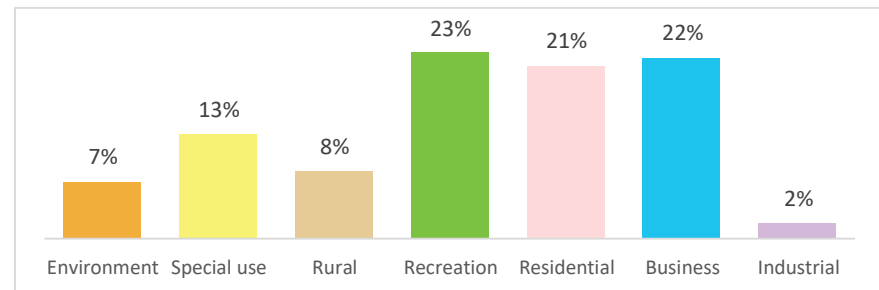


Figure 15 Percent canopy cover by land use zone

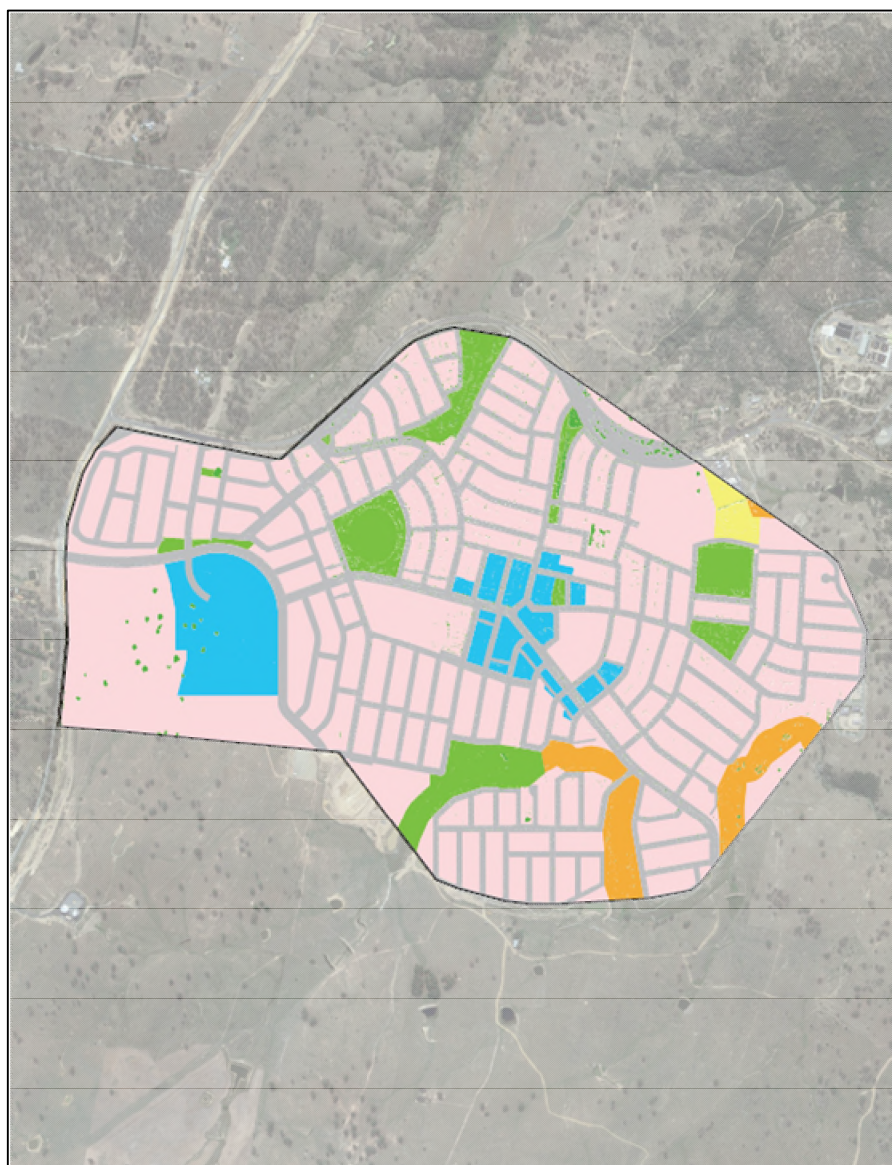


Figure 16 Map of canopy cover in Googong urban area by land use zone

## Googong

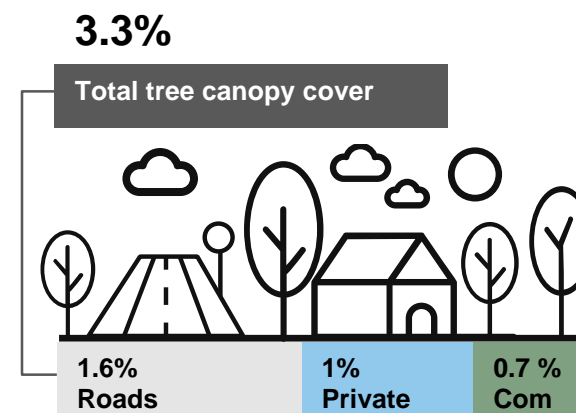


Figure 16 demonstrates the lack of existing tree canopy cover in Googong. Overall, Googong's tree canopy covers only 3.3 percent of land, the majority of which is found in road reserves. As discussed, this is largely due to the relatively recent development in Googong resulting in an absence of mature canopy trees. This absence of trees means the urban heat island effect will continue to effect residents in the coming years, particularly as the extent of impervious area across residential development provides little opportunity to plant trees for shade and cooling.

Land zoned for recreation has the highest canopy cover at seven percent, with business and residential the lowest at two and three percent, respectively. Opportunities for tree planting exist across the entire area including additional street tree planting and planting within parks and commercial centres.

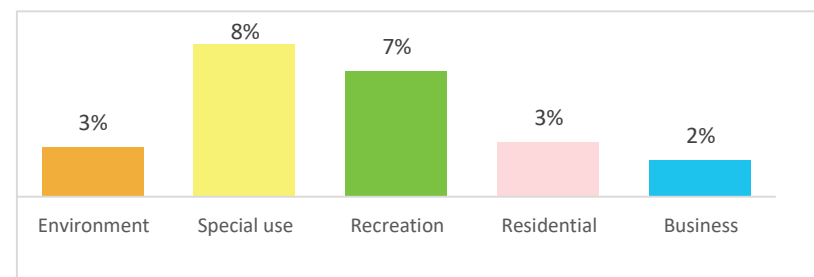


Figure 17 Percent canopy cover by land use zone



### 6.3 Threats to the urban forest

This section summarises the key challenges facing our urban forest that this Strategy seeks to address.

#### Climate change and urban heat

Our future climate is predicted to include warmer summers, variable rainfall and longer and more frequent heatwaves. Climate change will have implications for the cost of and approaches to maintaining urban green space. While tree canopy is effective in reducing urban heat it will also be affected by changes to climate including trunk scorch, shifts in tree habitat suitability and increase susceptibility to pests and disease as well as impacts on tree habitat including soil. Increasing heat due to climate change paired with trapped heat from human activities in urban areas will affect which tree species can survive in urban spaces (Norton 2015).

#### Urban densification

As our urban areas continue to grow and densify, there will be an increasing competition for space, in particular decreasing private open space in new developments and the need for urban infrastructure reducing opportunities for street tree planting. Unless planning and design controls are put in place to protect and enhance tree planting, resilience and maintenance there will be continued removal and replacement of trees and pervious surfaces with buildings and paved surfaces.

#### Aging tree stock

Queanbeyan-Palerang is lucky to have a number of very mature trees which are an important component of the current tree stock particularly in the historic parts of the urban centres. Many of these trees are reaching the end of their life and in the absence of adequate maintenance will be lost. There has also not been adequate succession planting to replace these trees to maintain the streetscape they have created.

Increased densification impacts not only urban trees but all manner of flora and fauna, which can lead to biodiversity loss. Without holistic planning and management, urban growth can lead to fragmentation of flora and fauna habitat and reduce connectivity, preventing the movement and dispersal of native flora and fauna and increased competition from invasive and exotic species.

#### Governance and resourcing

Management of the urban forest crosses multiple jurisdictions and disciplinary boundaries, including:

- Asset and project management
- Sustainability
- Biodiversity
- Design
- Heritage
- Development assessment
- Strategic planning
- Open space and recreation
- Stormwater and flooding
- Environmental management
- Maintenance
- Learning and Development
- Community Engagement
- Community Services
- Property

This leaves the urban forest and its monitoring and management split across different responsibilities and areas of interest within Council. A lack of strategic governance and coordination will often impact resourcing and funding potential for related activities, in turn limiting Council's capacity to provide adequate management of the urban forest. Setting clear goals and identifying roles and responsibilities can support coordination and integration of green infrastructure across planning and delivery. Other local governments have responded to this gap by introducing specific positions responsible for coordinating actions across teams and building organisational capacity.

#### Community understanding

Community and landowner acceptance and understanding is critical to the success of the urban forest (Ordóñez 2020). Without this, issues such as illegal tree removal, vegetation clearing, and vandalism will continue to occur in urban areas. Responding to community concerns and establishing clear, documented information to build awareness and engage in a dialogue will support our ongoing greening efforts.



## 6.4 Priority tree planting locations

The 2020 Surface Heat Mapping Report identified priority areas for tree planting to mitigate heat based on the mapping of severe urban heat islands, including:

- Googong (whole area)
- Queanbeyan
  - Riverside Plaza;
  - some high-density residential areas south of Ellerton Drive;
  - Queanbeyan East
  - Crestwood
  - Queanbeyan West
  - some of the high-density residential areas in Karabar
  - Jerrabomberra
- Bungendore:
  - north-east corner, east of Tarago Road and north of McMahon Drive
  - south-east areas
  - residential area between Ellendon Street and Trucking Yard Lane along Finch Street
- Braidwood
  - far east of the suburbs, south of Wilson Street/Little River Road and east of Monkittee Street (appears to align with the hospital a new high-density residential development with minimal green infrastructure)
  - central north-south residential corridor just west of Wallace Street
  - intersection of Lascelles and Elrington Streets

While this is a good starting point, further investigation using the following criteria along with completing monitoring and data collection activities outlined in the action plan will develop a clearer agenda for tree planting:

- Areas undergoing revitalisation or as development controls are reviewed (e.g. Braidwood, Bungendore and Queanbeyan town centres)
- Areas where additional tree canopy cover will have the greatest community benefit, that is areas with low canopy cover, significantly impacted by urban heat and where vulnerability to heat is high.
- Vacant sites on public land that present opportunities for additional tree planting.
- High pedestrian volume and movement areas such as playgrounds, public transport stops, public plazas, parks and community facilities as well as key cycling and pedestrian corridors as identified in Pedestrian and Mobility Plans.
- Areas zoned for increased residential density and greenfield development.

## 7 The way forward

Our vision is that Council, business and community value and actively care for an urban forest that is resilient and fairly distributed providing a cooler, healthier environment for people and wildlife.

### 7.1 Our goals

This vision is articulated through five goals and underpinned by the principles established in the GANSW Greener Places. They are:

- **A resilient urban forest:** The urban forest is diverse, healthy and responsive to future conditions.
- **A fairly distributed urban forest:** The urban forest provides benefits to all citizens. Canopy cover is prioritised in areas where it is currently lacking, particularly in areas where there are high concentrations of vulnerable communities.
- **A cooler, greener urban environment:** Planning and design of our urban areas supports a thriving urban forest in the public and private realm that enables greener, cooler spaces and places for residents, workers and visitors.
- **Increased biodiversity and tree canopy:** A connected, strategically managed urban forest protects, maintains and enhances biodiversity and tree canopy in urban areas.
- **An actively managed urban forest:** Council, residents and the business community understand the benefits of the urban forest, are knowledgeable and are partners in managing the urban forest.



## 7.2 Strategies and actions

The actions have been grouped into five key strategies to support Council and community prioritise, manage and implement this Strategy.

### Strategy 1: Build awareness and encourage participation in urban greening

We must continue to build understanding of the benefits of the urban forest and share this information with others. This may involve partnering with organisations, business and the community to support urban greening.

Access to nature and open spaces are a cherished aspect of Queanbeyan-Palerang's landscape setting. Biodiversity protection and sustainable management of natural landscapes and water resources are priorities identified through strategic documents co-developed with the community.

Demonstrating to our community how the urban forest can enhance these lifestyle and amenity aspects of urban areas as well as informing people of the many benefits will increase support for urban greening and cooling efforts. A more informed and engaged community will also be able to actively care for and manage the urban forest by understand what trees need to survive and what actions might cause harm. A comprehensive, ongoing program of education and engagement will be essential to keeping the community informed about their role in enhancing and protecting the urban forest.

A coordinated engagement strategy will also keep the community up to date with specific activities and opportunities to be involved and partner with us in planning for the urban forest.

Queanbeyan-Palerang has an active community of volunteers engaged in caring for the natural environment (.idcommunity 2021b), including participating in existing programs that support the urban forest such as National Tree Day planting activities.

Volunteers provide an invaluable service to our community, one that is increasingly being recognised (Volunteering Australia 2020). To support the vision of this Strategy it is necessary to take a coordinated approach to volunteer efforts to ensure volunteer time and energy is effectively spent and maximised.

Council may also wish to consider re-establishing a local nursery as a strategic and meaningful partnership between Council and the local community.

#### Actions

- 1.1. Continue to manage and promote existing Council-led programs (National Tree Day, Environment Week) and support community-led activities and programs, where appropriate.
- 1.2. Regularly demonstrate and communicate successes in urban greening and cooling to the community.
- 1.3. Include the community in future landscape and planning projects.
- 1.4. Prepare and deliver a coordinated, ongoing community education and communication campaign across the LGA. This may include:
  - Signage and interpretation information.
  - A community champions program.
  - A coordinated, well-resourced and promoted program of events including competitions and giveaways.
  - Community input on tree planting program and high-value areas.
  - Education resources (online and in-person) on greening and cooling in private spaces including building design, tree planting, maintenance and selection methods.
  - An interactive, informative, and fun Council webpage on tree education.
- 1.5. Establish an Urban Greening Volunteer Program to coordinate community and Council efforts for tree planting and support more impactful initiatives. Investigate the potential for the program to be run by a community consultation committee representing a range of community organisations and interests.
- 1.6. Actively partner with existing conservation groups, Local Aboriginal Land Councils, local Landcare, Friends of Groups and other organisations to deliver urban greening and cooling education and outreach programs and events.
- 1.7. Develop partnerships with universities, research institutes and other regional organisations to support knowledge sharing and understanding of best-practice management and explore innovative methods of maintaining the urban forest.
- 1.8. Work with developers and business owners to deliver greening particularly in industrial areas, new release areas and as part of urban renewal projects.



## Strategy 2: Expand data collection and monitoring of the urban forest

Council bears the responsibility for caring for public trees in streets and parks. Canopy mapping is a valuable tool, however alone it does not provide sufficient information to support robust management of tree assets.

We must expand our monitoring and evaluation of the urban forest to support evidence-based decision-making for tree maintenance, replacement, removal and planting programs.

In 2015, following the death of a child in a Bendigo Council park, the Victorian Coroner provided eight recommendations for LGAs to follow when managing trees under their responsibility (Victoria Courts 2015). These recommendations have been incorporated into the actions under this Strategy, with the exception of the three recommendations noted below. These should be noted and considered by Council when implementing tree monitoring and maintenance:

- In any tree inspection, tree assessment or risk assessment, it should be noted that the anatomy of a branch and of an epicormic shoot are quite different. The term "branch" should only be applied to tree structures that have a proper branch anatomy and epicormic shoots should be clearly identified as such in any assessment or inspection procedures.
- All local government agencies should have a computer-based risk assessment system that is applied to all trees contained within the tree inventory. Such a system may incorporate the use of systems such as QTRA or TRAQ, which are widely and readily available or another system which embodies the principles of risk assessment specified in the relevant Australian Standard.
- All inspections must be undertaken by a qualified (Level 4 or above) arborist.

While the Victoria Courts recommendations listed above require a Level 4 or above arborist, it is further recommended that this be amended to Level 5 to ensure appropriate understanding of tree specific risks when undertaking assessments.

### Actions

- 2.1. Incorporate the Braidwood tree inventory into Council's existing asset management system to enable recording of details (date, what was done and why) of all future and ongoing maintenance and inspection operations.
- 2.2. Expand the tree inventory to all urban areas and integrate with asset management. At a minimum this inventory must identify tree species and location but will ideally include age and height and other characteristics to support risk management and forward planning.
- 2.3. Review/develop tree inspection and risk assessment protocols to:
  - record the purpose and form of inspection (e.g. walk-by, any technological aids)
  - record whether inspection is ground-based or from above.
  - record date of inspection and indication of timelines for next inspection
  - record whether any additional arboricultural works are recommended, when they should be undertaken and the reason for recommending the works
  - ensure the use of relevant criteria to assess the trunk and canopy components at the time of inspection
  - include mechanisms to ensure recommended works are completed
- 2.4. Improve record keeping of tree complaints and referrals and link to asset management.
- 2.5. Undertake an audit of overall tree canopy loss and gains every two years, to determine impact of urban greening and cooling actions to support business cases for continued urban forest management funding and inclusion in operational plans.
- 2.6. Investigate and map dieback, areas of high biodiversity value, endangered ecosystems and vegetation, existing vegetation corridors across the LGA to inform planning and prioritisation of further greening actions.
- 2.7. Investigate and undertake a small trial of a publicly available online tool, database or map of public place trees in Braidwood.

### Strategy 3: Coordinate tree and vegetation planting and management

Council currently delivers a public tree planting program of 1,200 trees each year. Preparing a tree planting plan for public areas at the precinct scale will guide implementation of this Strategy and coordinate efforts to ensure planting occurs in areas of highest priority and need.

Planning at the precinct scale will also enable Council to determine the most appropriate tree species and recommend design principles based on proposed function and place-based conditions, enabling a fit-for-purpose tree planting and replacement program. Planting the right tree in the right place supports a healthy and responsive urban forest.

A program will also provide a central source of information to coordinate efforts across different levels of administration, planning and delivery and support collaboration between the various disciplines in Council.

Early planning is essential to support planting the right tree in the right place and coordinating green infrastructure with broader urban planning and design.

While not a direct action of this Strategy, it is recommended that Council pursue development of a comprehensive vegetation management plan that considers blue/green/grey infrastructure at the precinct scale and makes recommendations on linking, connecting and enhancing waterways, drainage assets, vegetation, bushland reserves and open space network for broader ecosystem, recreation and cooling benefits. An integrated precinct planning approach would direct planning, funding and resourcing across open space, tree planting, WSUD, active transport, biodiversity, vegetation and asset management.

#### Actions

- 3.1. Set urban forest targets to guide future planning and evaluation such as tree canopy cover, biodiversity, number of trees planted and tree health. Incorporate these targets into relevant planning documents and policies.
- 3.2. Finalise the recommended tree species list and set tree species diversity targets. Incorporate these into planning documents.
- 3.3. Develop, resource and implement a coordinated tree planting program and precinct plans that:
  - supports integration of tree planting with asset and infrastructure planning and capital works programs
  - identifies vacant tree sites and areas with low canopy cover
  - identifies priority areas for planting of new and existing spaces at the precinct scale
  - provides a tailored appropriate tree species lists for precincts based on character, tree function, habitat value, climate (current and future), soil conditions, lifecycle costs and diversity requirements
  - includes succession planting
  - considers heritage and bushfire issues
  - monitors and evaluates plantings
- 3.4. Develop technical guidelines for urban vegetation management (including, for example, bushfire management, infrastructure integration, pruning) that includes relevant policy documents, a summary of statutory tools, Council processes and standards for design, management, maintenance, compliance and reporting. Make this available to all staff and integrate its use in core business.

## Strategy 4: Review planning policy and development controls

A review of Council's planning policy and development controls has identified several gaps and inconsistencies that should be resolved to support better management of the urban forest and support integration of green infrastructure in planning and development.

Consolidation of DCP requirements relating to tree planting and management will support consistent application of planning controls. This will support our staff and make planning requirements clear to community and developers. An updated DCP should reference current acts and planning instruments such as the Biodiversity Conservation Act 2016, Vegetation SEPP, and Australian Standards such as AS 4970 Protection of Trees on Development Sites (2009), AS 4373 Pruning of Amenity Trees (2007), AS 2303 Tree Stock for Landscape Use (2015).

Council's draft Significant Tree Policy sets out roles and responsibilities of Council, residents and landowners relating to the identification, nomination, registration and maintenance of Significant trees. A 'Significant Tree Register' will need to accompany the policy providing a list of significant trees within the municipality.

Council's Tree & Vegetation Vandalism Directive – draft outlines our strong opposition to public tree and vegetation vandalism and provides a framework for consistent management and response to acts of tree and vegetation vandalism.

Action 4.4 recommends development of a Tree Management Policy, in which the Significant Tree Policy and Tree & Vegetation Vandalism Directive could form chapters to protect trees including significant trees, and mature and remnant native trees. New chapters are also recommended covering tree protection, planting, pruning, removal, asset management, community consultation and engagement. The Queanbeyan Street Tree Management Directive 2016 would become redundant and any relevant information incorporated into the new Tree Management Policy.

### Actions

- 4.1. Include urban forest principles and targets in urban renewal and new release area planning documents.
- 4.2. Develop a single Tree and Vegetation Management DCP that provides consistent controls across QPRC.
- 4.3. Review and refine planning instruments to:
  - Support multifunctionality of blue, grey and green infrastructure, particularly WSUD integration opportunities.
  - Provide tree requirements for public open space in new developments.
  - Ensure sufficient information is provided for tree retention, maintenance, planting and location in handover documents.
  - Promote urban design and development that encourages tree planting and urban cooling. Examples include increasing pervious areas, supporting green walls and roofs and reducing dark coloured materials.
  - Ensure protection of existing canopy cover.
- 4.4. Establish a Tree Management Policy incorporating and updating existing tree-related policies and development of a significant tree register, to provide a framework for consistent decision making, documentation and standardisation of processes of tree management and maintenance issues.
- 4.5. Investigate policy and planning controls that incentivises additional planting and retention, and regulates the loss and damage of trees and vegetation, including:
  - A tree trust for development on private and public land
  - Rate reductions for residents and businesses that retain large canopy trees
  - Incentives for planting in existing areas or new developments that provide green infrastructure beyond minimum requirements.
- 4.6. Develop/review design guidelines and standard engineering details to support and enhance tree growth and health in public and private spaces including passive watering, setbacks, deep soils and pervious paving.
- 4.7. Update the Street Verge Maintenance Policy to include standard setbacks to street trees for the construction of driveway and kerb crossings based on AS 4970 Protection of Trees on Development Sites (2009) and opportunities to improve integrated street tree outcomes.



## Strategy 5: Increase Council capacity in urban forest management

Sustainable urban forestry is supported by institutional capacity and embedding evidence-based decision-making and collaboration in Council practices (Ordóñez 2020).

One important way of achieving this is providing appropriate training to build staff skills and knowledge related to urban greening and cooling. It is also important to encourage and normalise collaboration and working across disciplines to integrate green infrastructure planning with broader urban planning processes.

Council should encourage greening and cooling champions at all levels within its organisation. This gives a voice to Councillors and staff and supports advocacy and action at the project level while also establishing representatives in senior and executive management positions that have the authority and responsibility to institutionalise new practice and push an urban greening and cooling agenda at the whole-of-Council level.

Engaging with the community on urban greening and cooling and demonstrating on-ground outcomes through trial and demonstration projects builds trust and confidence in Council's capacity to deliver. This strategy can be supported through Council's continued achievement of sustainability certifications for community assets and projects, which include measures relating to urban greening and cooling.

### Actions

- 5.1. Establish a cross-departmental working group to take ownership of this Strategy, promote and coordinate action across Council as well as ensure alignment with the Climate Change Action Plans, Resilience Plan, asset management and maintenance plans and other relevant policy and strategies.
- 5.2. Include relevant urban forest actions and objectives for all relevant Council teams in the Delivery Program and Operational Plans.
- 5.3. Improve Council capacity and capability through filling skill gaps including:
  - Biodiversity officer for DA assessment and compliance integration and knowledge proliferation.
  - Tree management/compliance officer.
  - Increasing resourcing of staff to allow for increased tree inspections and monitoring.
- 5.4. Educate and provide tools to ensure good pruning practices across QPRC works to promote healthy growth, pride in landscape appearance, prolong life of trees and demonstrate good maintenance practices to the community.
- 5.5. Provide training for relevant staff on benefits of green infrastructure, integrating blue/green/grey infrastructure and managing trees to support the urban forest and minimise perceived and actual conflicts with development.
- 5.6. Include urban forest impacts as an item in Council reporting/decision-making templates and tools.
- 5.7. Set up internal referral and coordination protocols to ensure collaboration and integration of infrastructure needs prior to planning approval.
- 5.8. Consider establishing a panel of arborists who can provide advice to Council and the community about trees and who can undertake pruning and removal works as required-take into consideration private and public land.

## 8 Implementation

Opportunities for greening and cooling can be divided into low cost, 'quick-win' actions that can be implemented within current budgets and work programs, and those where more significant funding will be required for implementation over a longer period of time. The plan on the following pages breaks the actions into short-, medium- and longer-term actions and identifies responsibilities and alignment with the Strategy goals.

Resourcing and implementation of this Strategy will need to be considered as part of Council's Integrated Planning and Reporting program. The vision, goals and strategies in this Strategy need to be considered in the next review of the Community Strategic Plan. Actions listed for each of the strategies should be considered and included in the development of the next four-year Delivery Program planning process and the annual Operational Plan.

### 8.1 Priority actions

The following priority actions must be accomplished initially to provide the necessary framework and information to enable Council to move towards best practice management of the urban forest.

- Identify and leverage funding opportunities to implement actions
- Incorporate the recent Braidwood tree inventory into Council's existing asset management system and pilot use for monitoring and maintaining the urban forest.
- Establish a cross-departmental working group to champion and implement the Urban Forest Cooling Strategy

## 8.2 Action plan

**Table 1 Immediate actions (quick wins)**

Ref	Action	Responsibility
1.1	Continue to manage and promote existing Council-led programs (National Tree Day, Environment Week) and support community-led activities and programs, where appropriate.	Natural Landscapes and Health
1.2	Regularly demonstrate and communicate successes in urban greening and cooling to the community.	Communications and Engagement
1.3	Include the community to be directly involved in future landscape and planning projects.	Organisational
1.6	Actively partner with existing conservation groups, Local Aboriginal Land Councils, local Landcare, Friends of Groups and other organisations to deliver urban greening and cooling education and outreach programs and events.	Organisational
1.8	Work with developers and business owners to deliver greening particularly in industrial areas, new release areas and as part of urban renewal projects.	Urban Landscapes, Development, Contracts and Projects, Land-use Planning
2.1.	Incorporate the Braidwood tree inventory into Council's existing asset management system to enable recording of details (date, what was done and why) of all future and ongoing maintenance and inspection operations.	Urban Landscapes
2.3	Review/develop tree inspection and risk assessment protocols to: <ul style="list-style-type: none"> <li>record the purpose and form of inspection (e.g. walk-by, any technological aids)</li> <li>record whether inspection is ground-based or from above.</li> <li>record date of inspection and indication of timelines for next inspection</li> <li>record whether any additional aboricultural works are recommended, when they should be undertaken and the reason for recommending the works</li> <li>ensure the use of relevant criteria to assess the trunk and canopy components at the time of inspection</li> <li>include mechanisms to ensure recommended works are completed</li> </ul>	Urban Landscapes
2.4	Improve record keeping of tree complaints and referrals and link to asset management.	Urban Landscapes
3.1	Set urban forest targets to guide future planning and evaluation such as tree canopy cover, biodiversity, number of trees planted and tree health. Incorporate these targets into relevant planning documents and policies.	Urban Landscapes



3.2	Finalise the recommended tree species list and set tree species diversity targets. Incorporate these into planning documents.	Natural Landscapes and Health, Urban Landscapes
4.7	Update the Street Verge Maintenance Policy to include standard setbacks to street trees for the construction of driveway and kerb crossings based on AS 4970 Protection of Trees on Development Sites (2009) and opportunities to improve integrated street tree outcomes.	Urban Landscapes
5.1	Establish a cross-departmental working group to take ownership of this Strategy, promote and coordinate action across Council as well as ensure alignment with the Climate Change Action Plans, Resilience Plan, asset management and maintenance plans and other relevant policy and strategies	Natural Landscapes and Health
5.6	Include urban forest impacts as an item in Council reporting/decision-making templates and tools.	Finance, Executive
5.7	Set up internal referral and coordination protocols to ensure collaboration and integration of infrastructure needs prior to planning approval.	Development

**Table 2 Medium-term actions (2-5 years)**

Ref	Action	Responsibility
1.4	<p>Prepare and deliver a coordinated, ongoing community education and communication campaign across the LGA. This may include:</p> <ul style="list-style-type: none"> <li>• Signage and interpretation information.</li> <li>• A community champions program.</li> <li>• A coordinated, well-resourced and promoted program of events including competitions and giveaways.</li> <li>• Community input on tree planting program and high-value areas.</li> <li>• Education resources (online and in-person) on greening and cooling in private spaces including building design, tree planting, maintenance and selection methods.</li> <li>• An interactive, informative, and fun Council webpage on tree education</li> </ul>	Communications and Engagement
1.5	Establish an Urban Greening Volunteer Program to coordinate community and Council efforts for tree planting and support more impactful initiatives. Investigate the potential for the program to be run by a community consultation committee representing a range of community organisations and interests	Recreation and Culture, Urban Landscapes

1.7	Develop partnerships with universities, research institutes and other regional organisations to support knowledge sharing and understanding of best-practice management and explore innovative methods of maintaining the urban forest.	Urban Landscapes
2.2	Expand the tree inventory to all urban areas and integrate with asset management. At a minimum this inventory must identify tree species and location but will ideally include age and height and other characteristics to support risk management and forward planning.	Urban Landscapes
2.5	Undertake an audit of overall tree canopy loss and gains every two years, to determine impact of urban greening and cooling actions to support business cases for continued urban forest management funding and inclusion in operational plans.	Natural Landscapes and Health
2.6	Investigate and map dieback, areas of high biodiversity value, endangered ecosystems and vegetation, existing vegetation corridors across the LGA to inform planning and prioritisation of further greening actions	Natural Landscapes and Health
2.7	Investigate and undertake a small trial of a publicly available online tool, database or map of public place trees in Braidwood.	Urban Landscapes
3.3	<p>Develop, resource and implement a coordinated tree planting program and precinct plans that:</p> <ul style="list-style-type: none"> <li>• supports integration of tree planting with asset and infrastructure planning and capital works programs</li> <li>• identifies vacant tree sites and areas with low canopy cover</li> <li>• identifies priority areas for planting of new and existing spaces at the precinct scale</li> <li>• provides a tailored appropriate tree species lists for precincts based on character, tree function, habitat value, climate (current and future), soil conditions, lifecycle costs and diversity requirements</li> <li>• includes succession planting</li> <li>• considers heritage and bushfire issues</li> <li>• monitors and evaluates plantings</li> </ul>	Urban Landscapes, Natural Landscapes and Health
3.4	Develop technical guidelines for urban vegetation management (including, for example, bushfire management, infrastructure integration, pruning) that includes relevant policy documents, a summary of statutory tools, Council processes and standards for design, management, maintenance, compliance and reporting. Make this available to all staff and integrate its use in core business.	Urban Landscapes
4.1	Include urban forest principles and targets in urban renewal and new release area planning documents.	Land-Use Planning, Development

4.2	Develop a single Tree and Vegetation Management DCP that provides consistent controls across QPRC.	Land-Use Planning
4.3	<p>Review and refine planning instruments to:</p> <ul style="list-style-type: none"> <li>• Support multifunctionality of blue, grey and green infrastructure, particularly WSUD integration opportunities.</li> <li>• Provide tree requirements for public open space in new developments.</li> <li>• Ensure sufficient information is provided for tree retention, maintenance, planting and location in handover documents.</li> <li>• Promote urban design and development that encourages tree planting and urban cooling. Examples include increasing impervious areas, supporting green walls and roofs and reducing dark coloured materials.</li> <li>• Ensure protection of existing canopy cover.</li> </ul>	Land-Use Planning, Development
4.4	Establish a Tree Management Policy incorporating and updating existing tree-related policies and development of a significant tree register, to provide a framework for consistent decision making, documentation and standardisation of processes of tree management and maintenance issues	Urban Landscapes
4.6	Develop/review design guidelines and standard engineering details to better support and enhance tree growth and health in public and private spaces including passive watering, setbacks, deep soils and pervious paving	Development, Contracts and Projects, Urban Landscapes
5.2	Include relevant urban forest actions and objectives for all relevant Council teams in the Delivery Program and Operational Plans. ( <i>repeated in longer-term actions for Delivery Program planning</i> )	Organisational
5.3	<p>Improve Council capacity and capability through filling skill gaps including:</p> <ul style="list-style-type: none"> <li>• Biodiversity officer for DA assessment and compliance integration and knowledge proliferation</li> <li>• Tree management/compliance officer</li> <li>• Increasing resourcing off staff to allow for increased tree inspections and monitoring</li> </ul>	Executive
5.4	Educate and provide tools to ensure good pruning practices across QPRC works to promote healthy growth, pride in landscape appearance, prolong life of trees and demonstrate good maintenance practices to the community	Urban Landscapes
5.5	Provide training for relevant staff on benefits of green infrastructure, integrating blue/green/grey infrastructure and managing trees to support the urban forest and minimise perceived and actual conflicts with development.	Natural Landscapes and Health



**Table 3 Longer-term actions (5+ years)**

Ref	Action	Responsibility
4.5	Investigate policy and planning controls that incentivises additional planting and retention, and regulates the loss and damage of trees and vegetation, including: <ul style="list-style-type: none"> <li>• A tree trust for development on private and public land</li> <li>• Rate reductions for residents and businesses that retain large canopy trees</li> <li>• Incentives for planting in existing areas or new developments that provide green infrastructure beyond the minimum requirement.</li> </ul>	Land-Use Planning, Urban Landscapes, Finance, Development
5.2	Include relevant urban forest actions and objectives for all relevant Council teams in the Delivery Program and Operational Plans. ( <i>repeated in medium term actions for Operational Plans</i> )	Organisational
5.8	Consider establishing a panel of arborists who can provide advice to Council and the community about trees and who can undertake pruning and removal works as required-take into consideration private and public land.	Urban Landscapes

## **Appendix A**

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