

Tree Strategy 2017

A Strategy to address the management of all trees in the public realm.

(draft)

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1. Executive summary

The City of Boroondara is home to a vibrant and healthy street and park tree population. These trees are important for maintaining the highly sought after character of Boroondara's urban landscapes. They provide much needed shade as well as host of other key benefits to the community including environmental benefits such as air pollution removal, storm water interception and carbon sequestration.

Detailed engagement with the Boroondara community reflects the positive attitudes towards and concerns for this tree population. Over 95% of the 337 people, who completed the online Tree survey between December and March 2017 thought that trees were very important to the future liveability of Boroondara. Added to this, tree canopy mapping has demonstrated that Boroondara has a very high canopy cover, a position that many other Local Government Authorities are striving to achieve.

However, 75% of the street tree population is of mature age. These trees contribute to the amenity and character of the area but pose a risk of eventual decline, removal and renewal. The street tree population is also dominated by a few species including Pin Oaks, Queensland Brush Box and Plane Trees, which increases risks associated with low diversity. A precise data set is currently not available for trees in parks and other open space however it is considered that many of these trees will be of a similar maturity but with a greater species diversity. Large mature trees pose ongoing concerns in constructed landscapes, particularly conflicts with infrastructure and must be managed with good knowledge and best practice.

There are a number of focus areas into the future for how Council manages its public trees. Reviewing the way Council engages with the community, provides education and advocates for trees, how it will strategically renew older trees to ensure minimal loss of landscape amenity over time, planting shade trees in areas of need for people, planting future legacy trees and using trees to act as corridors between areas of biodiverse value are all opportunities that Council will pursue through this strategy.

Public trees are currently governed by a Tree Policy and associated Tree Management Guidelines which were endorsed in 2010. This Tree Strategy will supersede the existing Tree Policy and a review of the Tree Management Guidelines will be a key action arising from this Tree Strategy.

Reflecting the community feedback this strategy sets a clear vision for the future.

“Boroondara continues to be a place of shady trees, with leafy streets and green parklands. Our trees enable us to experience the seasons, connect with nature and contribute to our sense of wellbeing.”

Council will achieve this through adhering to a set of key themes within its tree management program:

1. Preserving the character of our streets and neighbourhoods
2. Engaging with our community
3. Improving health, wellbeing and community connectedness
4. Managing risk and nuisance
5. Continuing responsible stewardship and management
6. Improving our natural environment

Accompanying this strategy, an Action Plan has been developed to define how Council's tree planning and operations will be amended to address the identified challenges and opportunities and to maintain the valuable tree asset well into the future.

2. Introduction

In the Woiwurrung language of the original Wurundjeri clan, 'Boroondara' means 'where the ground is thickly shaded'. This is how the area looked in 1837, when Robert Hoddle surveyed the district and declared it the 'Parish of Boroondara'. The City of Boroondara is now renowned for its leafy streets and parks with established trees that contribute significantly to the area's identity, sense of place, heritage, environmental values and liveability. It is a highly sought-after residential environment with high levels of amenity.

Results from an array of community engagement show that one of the reasons people choose to live in Boroondara is the leafy green streets and extent of well-maintained public green open space. Trees are extremely important in maintaining and retaining the city's liveability factor and they are a key asset for Council, to be invested in for the future. The value of trees to the municipality is recognised in both the Community Plan and Public Health and Wellbeing Plan (2013-17). Feedback from the initial extensive consultation phase for the Boroondara Community Plan identifies 'Parks and Green Spaces' and 'The Environment' as priority themes.

There are approximately 130,000 Council-managed trees in the city: around half within open space and half as street trees. Base level data held for the 64,000 street trees contains information regarding their species, age and size. There is currently a more limited dataset held for Council's park trees.

Boroondara's mature tree population, while being one of the primary contributors to public amenity and neighbourhood character, is also a risk management priority. Around 75% of street trees are mature, meaning they have reached their prime of their life and will require significant maintenance and care as they grow older, eventually requiring removal and replacement. The many benefits associated to health and well-being, mitigating environmental stresses, increase in biodiversity outcomes and overall amenity and neighbourhood character need to be balanced with the management of end of life issues. These issues include damage to infrastructure, landscape amenity loss, loss of shade, pest and disease incursion, and loss of space available on privately owned land for future trees.

2.1. Strategy and Policy context

There are many trees within the municipality. This strategy addresses trees on Council managed land, including street and park trees. This strategy does not address trees on private land. Council influences protection of trees on private land through its Tree Protection Local Law and Planning Controls. This strategy supports Council's vision by addressing the following objectives in the Council Plan 2013-17:

- The character of our neighborhood is protected and improved
- Our natural and urban environment is improved in a sustainable way

This strategy fits within the context of the Health and Wellbeing Plan (2013-2017) and Council Plan (2013-2017). It also aligns with other Council strategies including the Urban Biodiversity Strategy 2013 - 2023 and the Boroondara Open Space Strategy (BOSS) to achieve the broader objectives for tree outcomes across the municipality.

Private trees are not actively managed by Council. Instead they are protected through planning controls and local laws:

- Boroondara's Tree Protection Local Law covers most of the municipality and requires Local Law permits for tree removal, some pruning and works occurring near trees.
- Planning controls include areas that are protected under a Significant Landscape Overlay, which requires a planning permit for tree removal and pruning.

This Tree Strategy will supersede the Tree Policy 2010. The Tree Management Guidelines 2010, which currently sit under the Tree Policy, will be updated following adoption of this strategy.

2.2. Regional Context

Resilient Melbourne

Melbourne was selected as one of the first 32 cities around the world to become a member of the 100 Resilient Cities network. Resilient Melbourne sets out the first resilience strategy for Greater Melbourne. It is a joint project of 32 metropolitan Melbourne councils, Melbourne's academic, business and community sectors, and the Victorian Government, supported by the "100 Resilient Cities" initiative. The project has set a flagship action to develop a Metropolitan Melbourne Urban Forest Strategy which has a primary aim to "extend and link existing urban greening, reforestation and nature initiatives across Melbourne, to improve wellbeing and reduce our exposure to hazards such as heatwaves and flooding". Council resolved on 22 August 2016 to support in principle the vision, objectives and implementation of the Resilient Melbourne strategy.

Plan Melbourne

This Victorian State Government plan outlines how Melbourne will grow for the next 35 years through integrated land-use, transport and infrastructure planning. Recent changes by the Victorian Government have seen updates to the Planning Scheme dictating areas of required open space on new development lots. Outcome 6 of this plan is that Melbourne will be a sustainable and resilient city. A key direction is to make the city greener and cooler. A key action is to support a cooler Melbourne by greening urban areas, buildings, transport corridors and open spaces to create an urban forest.

Electrical Line Clearance Guidelines

The Electricity Safety (Electric Line Clearance) Regulations 2015 require tree pruning and management that protects the safety and functionality of electrical power lines. These are set by Energy Safe Victoria as the responsible authority. Council prepares an annual Electric Line Clearance Management Plan that outlines our tree management and compliance with these regulations.

3. Background and Context

3.1. The City's trees

Council has approximately 64,000 street trees and a similar number of park trees. The street tree population includes approximately 323 species. Around 60% of the street tree population comprises ten species, and over a third of the population is represented by three species - Pin Oaks, Queensland Brush Box and London Plane Trees. Noting that these species contribute a significant amount of amenity and shade for Boroondara. Further tree species diversity exists within our parks and reserves and whilst a precise dataset is not yet available, the completion of this dataset will provide a comprehensive understanding of all Council managed trees in Boroondara.

To further understand the function and value of our street trees, the metrics of each street tree was inputted into a valuation tool called i-Tree Eco (developed by the U.S. Forest Service), used worldwide to attribute a dollar value to urban trees, including their environmental benefits. This information is a snapshot of what the street trees in Boroondara provide.

Based on the attributes and composition of Council's portfolio of tree assets (number, species, and size), modeling¹ suggests that the City's street trees:

- Remove over 13 tonnes of pollution from the air each year including Sulphur Dioxide, Ozone and Nitrogen Oxide
- Store over 24,000 tonnes of carbon

¹ i-Tree Eco 2016

- Sequester over 772 tonnes of carbon per year
- Produce over 2,500 tonnes of oxygen per year
- Provide 780 acres of canopy coverage
- Prevent 24,300 cubic meters of storm water runoff per year
- Have an overall worth of \$274m

3.2. Trees have many benefits

Trees provide health and wellbeing benefits. Research suggests that trees can reduce in daytime temperatures by between five and 20 degrees Celsius², encourage motorists to drive more slowly through the provision of uniform, avenue like plantings along streets creating safer streets³, and reduce air, water and soil pollution.⁴

Research around the environmental benefits of trees suggests that trees can sequester carbon, particulate matter and other air pollutants⁵; reduce the severity of localised flooding by intercepting stormwater⁶; connect biodiversity locations by creating green corridors⁷, and are one of the most effective mechanisms for reducing the Urban Heat Island Effect (that is, the build-up of heat in hard surfaces during periods of hot weather)⁸

Well managed trees can also provide economic benefits. Research in this field suggest that trees can improve retail activity by up to 20% with shoppers spending longer periods and more money in retail areas that are well treed and landscaped⁹; increase house prices, as buyers favour areas with healthy and well maintained street trees¹⁰, reduce energy use in buildings (a 10% increase in deciduous tree cover can reduce heating and cooling costs in houses by 5-10%)¹¹.

3.3. What the community told us

To inform the draft Strategy, community consultation was undertaken between December 2016 and March 2017 with over 500 people engaged through an online survey and face-to-face drop-in sessions at the Ashburton and Glenferrie Road festivals. Participants noted the benefits and management issues relating to trees and identified their key concerns and preferences for the future of tree management in the municipality.

Most people emphasised the value and importance of trees in open spaces in Boroondara and were keen to contribute to the discussion around their management.

Respondents thought trees were highly connected to many aspects of place and neighbourhood in Boroondara and that they added character to the area. Over 95% of respondents thought trees were very important for the future liveability of Boroondara.

The overall key themes identified in these community consultations were:

- the need to maintain the local green character of Boroondara at the local street level as well as through feature or significant trees;

² Akbari, 1997

³ Mullaney, 2014

⁴ Mullaney, 2014

⁵ Mullaney, 2014

⁶ Mullaney, 2014

⁷ Mullaney, 2014

⁸ Silva, 2010; Rozenzweig, 2009; Gober, 2010; Adams Smith, 2014; GHD, 2011

⁹ Wolf, 2015

¹⁰ Plant, 2015; Pandit, 2016

¹¹ Simpson and McPherson, 1996

- the value of trees in providing urban cooling, shade, and clean air;
- how essential trees are for habitat, especially for birds;
- concerns about the impact of development on trees;
- tree species selection (including on private property), with a preference for a better choice of trees planted, such as sustainable species suited to the area; and
- the need for education and information about tree management decisions, especially tree removal, and opportunities for residents to engage with council on tree selection and maintenance decisions.

Consultation revealed that people value trees in their direct surrounds as well as significant trees and attractive treed locations across the municipality. They value trees for a broad range of reasons, from shade to habitat and even trees for climbing.

Overall, participants valued trees most highly for their shading and cooling (25.6%) and for habitat for native birds and animals (23.3%). In comments, many people simply said in relation to the reasons they value trees, 'They're all important.'

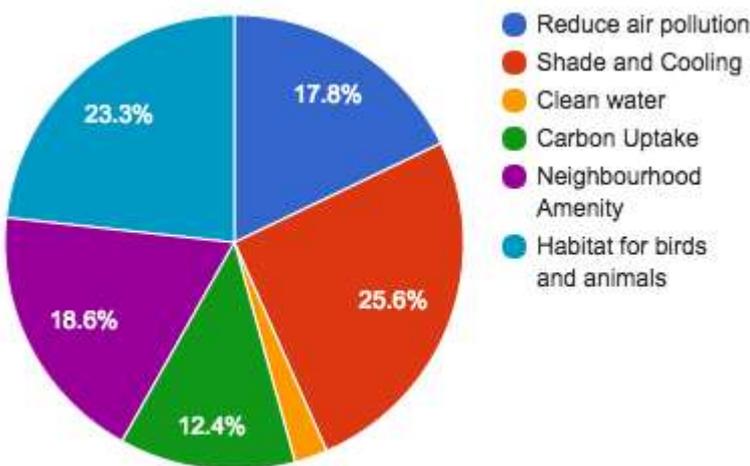


Figure 1: Survey results for which tree benefits people valued most

Survey participants were also asked to consider what they particularly felt was important for the long-term future of trees in Boroondara. While local character was still a strong theme, the concern of urban cooling had a greater number of responses across the three rankings.

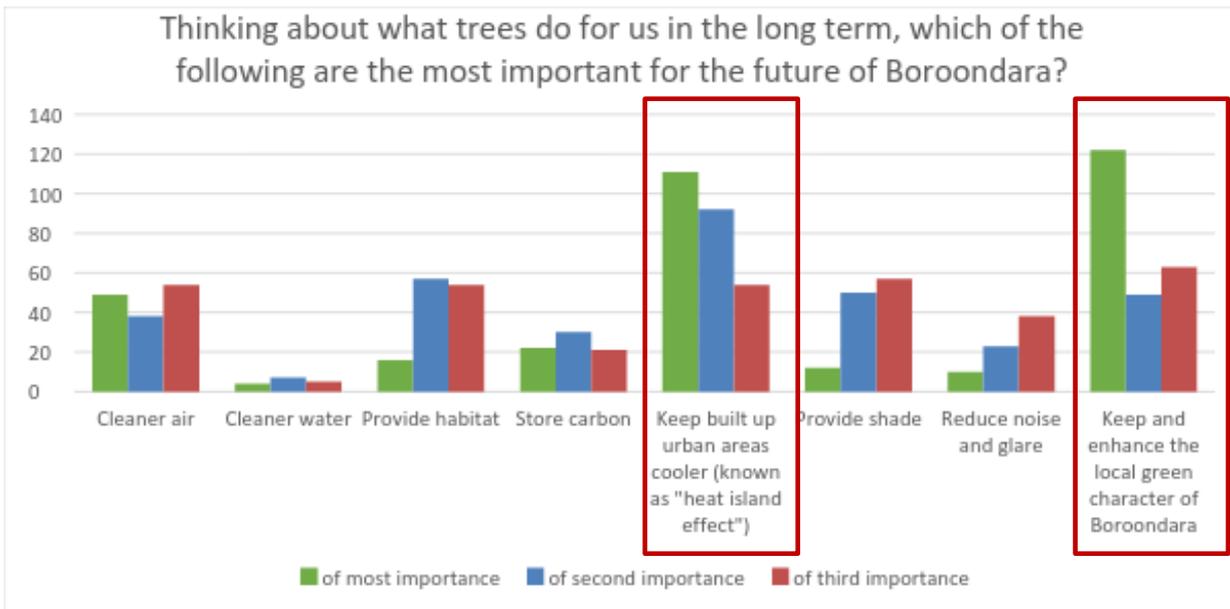


Figure 2: Survey results for which long term tree benefits are important to people

The two most important tree management issues for people were the impact on trees from development, with comments that any trees removed during development should be reinstated, and selection of sustainable street and park species that were suitable for each location when planting new trees in Boroondara.

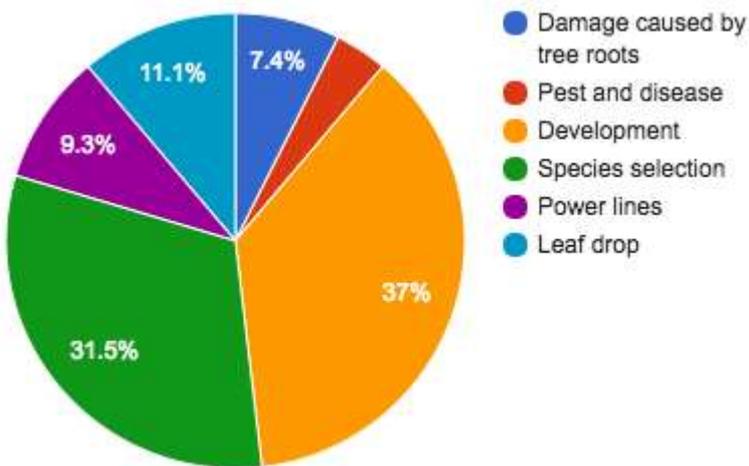


Figure 3: Tree Management Issues identified by the community

When asked to contemplate long-term tree management, participants emphasised development impacts as the top issue.

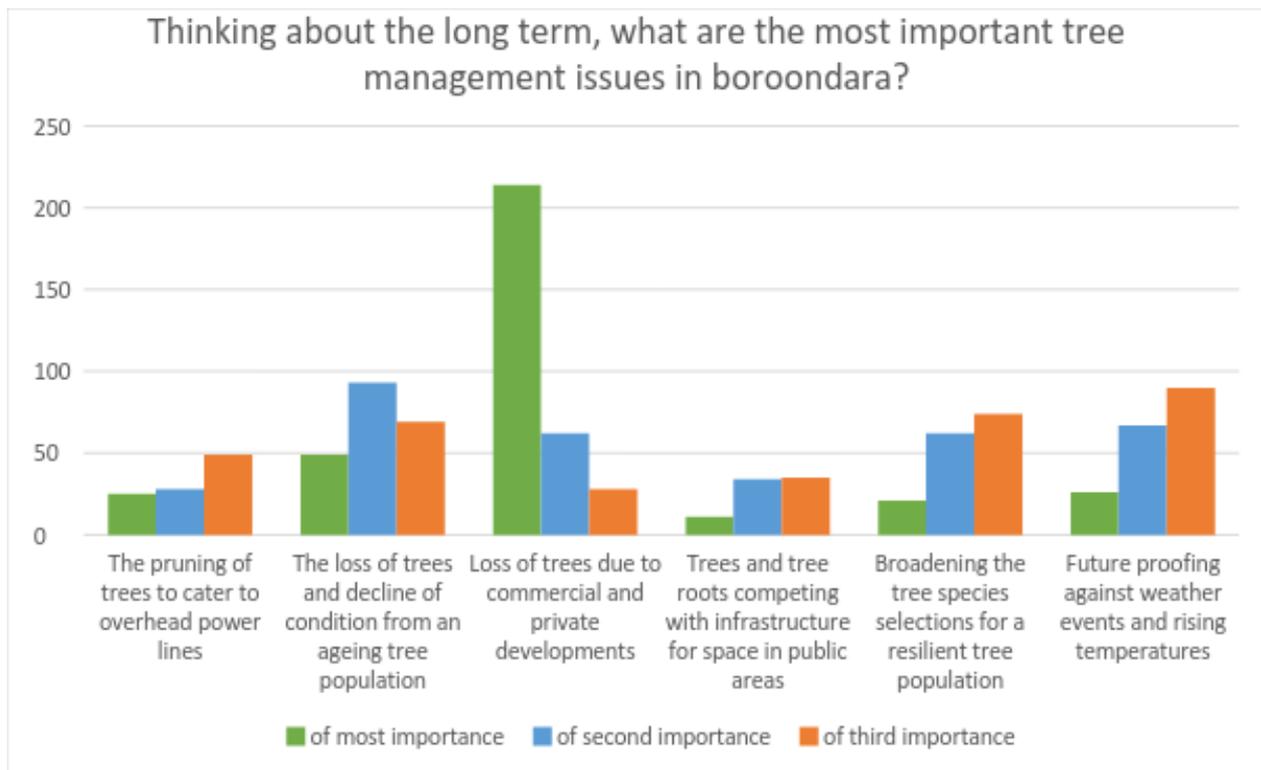


Figure 4: Long term tree management issues identified by the community

Respondents could further comment on whether there was anything else related to tree management issues that they thought was important. The top three results focus in more detail on maintenance, tree selection and replacement:

- professional maintenance of trees (not excessive ugly pruning – 24%),
- better choice of trees planted (size/mess/variety/pollen – 20%), and
- replace trees and plant more (18%).

Results from the community engagement sessions show that residents wanted more information about how street trees are selected, and were keen to engage with Council around the maintenance of trees and to understand the practical elements of tree management.

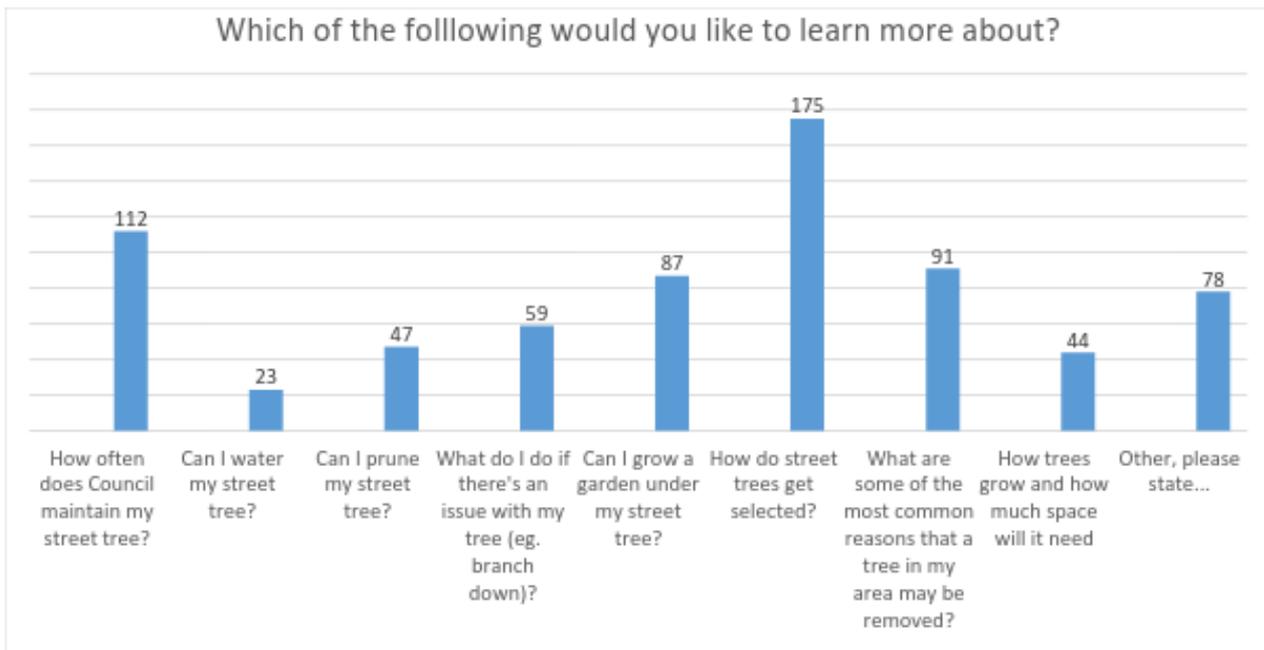


Figure 5: Items that the community would like more information on

3.4. Canopy coverage

While this is not an Urban Forest Strategy (which would look at all trees within a municipality, including private realm trees) Council trees play an important role in the overall urban forest, and urban forest principles, issues and opportunities are important and relevant in this Strategy which looks at all public realm trees.

Overall tree canopy cover across the Boroondara municipality is estimated at 28%, which was calculated as part of an Australia-wide study by the University of Technology Sydney in 2014 to measure canopy cover in every urban Local Government Areas (LGA). Tree canopy cover is the area of urban tree canopy that covers land area when viewed from above. This study was undertaken as part of the 2020 Vision funded by Horticulture Australia Limited. Tree canopy cover is a useful assessment of whole tree population benefits. Tree canopy cover measures the breadth of canopy biomass. This allows for exact measurements of shade provision and storm water interception which individual tree counts cannot measure. This calculation is only quantitative. It is unable to determine the health, species distribution or structure of the canopy.

Canopy cover (%) for selected Victorian Local Government Areas

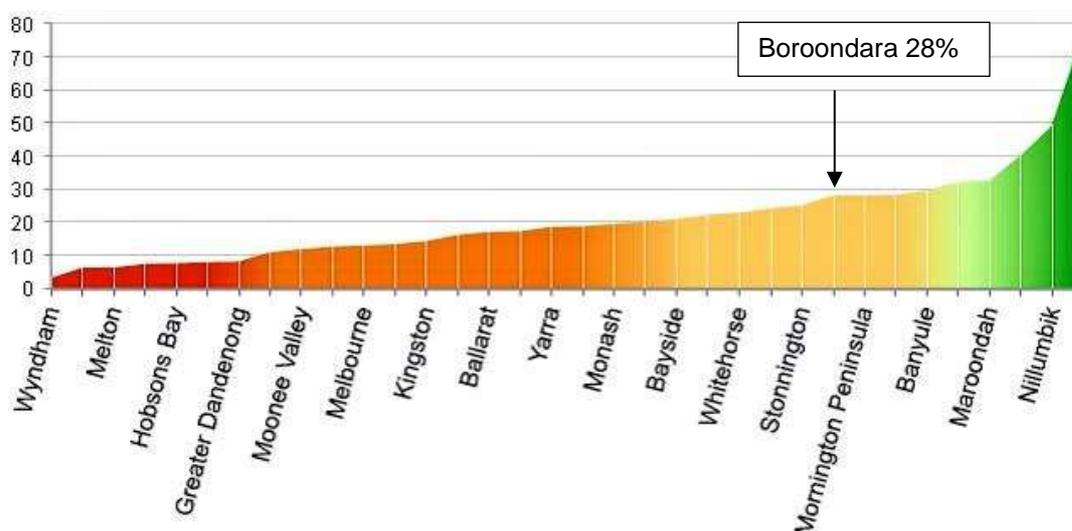


Figure 6. Tree canopy cover measurements for Victorian LGA's. Adapted from Jacobs et al, 2014

At 28%, Boroondara has a very high canopy cover when compared to similar municipalities across Metropolitan Melbourne. This is due primarily to leafy residential streets, many large private blocks that continue to host mature trees, well-treed parks and gardens, and native trees along the Yarra River and Gardiners Creek corridors. Many other urbanised LGAs aspire to achieve canopy cover results such as Boroondara's.

A further research paper quantifying change to urban tree canopy cover in public and private space provides a detailed analysis of the aerial imagery shows that there is considerable 'churn' in tree canopy within the private realm¹². This means that trees are being removed while others grow; small trees are replacing larger trees. Balwyn lost the most percentage of canopy cover through construction activity, with a large proportion of the canopy cover decrease coming from private land-use areas.

3.5. Current management of public trees

The City of Boroondara currently manages its street and park tree population as outlined in a technical management framework entitled *Boroondara Tree Management Guidelines 2010*. The overarching Tree Policy that supports these guidelines includes the following statements.

- Tree management standards consistent with best practice will be maintained at all times.
- The community will be consulted and informed about all major projects involving tree removal, tree planting and other major tree management programs.
- Trees will be protected from development, construction, temporary works and other activities that may have a negative impact upon tree health.
- Trees will be selected for planting based on their suitability for the site, performance, and potential to contribute to landscape character.
- The City of Boroondara will proactively carry out tree planting in road reserves, open space and other Council managed land.
- Tree pests and diseases are a component of the urban landscape and Council recognises that control measures will be required at times to maintain healthy and aesthetically pleasing landscapes

¹² Kaspar 2016

- Poor performing, dead and hazardous trees will be removed and replaced.

This Tree Strategy will supersede the current Tree Policy and the Tree Management Guidelines 2010 will be reviewed and updated (to ensure best practice) as an implementation action of the Strategy.

4. Key Issues

4.1. Ageing tree population

The City of Boroondara has 64,000 street trees. An inventory of Boroondara's street trees, captured information for each tree including species, location, age and size. According to the inventory data, three-quarters of the street tree population is mature. Managing a population of mature trees presents a range of issues. Older trees do not recover as easily from damage and are less resistant to the stresses of an urban environment including susceptibility to pest and disease outbreaks, impacts of development, drought and a changing climate.

Council is likely to face a large management investment in the near future in managing these trees over time and with their renewal and replacement consideration should also be given to creating a more age-diverse population.

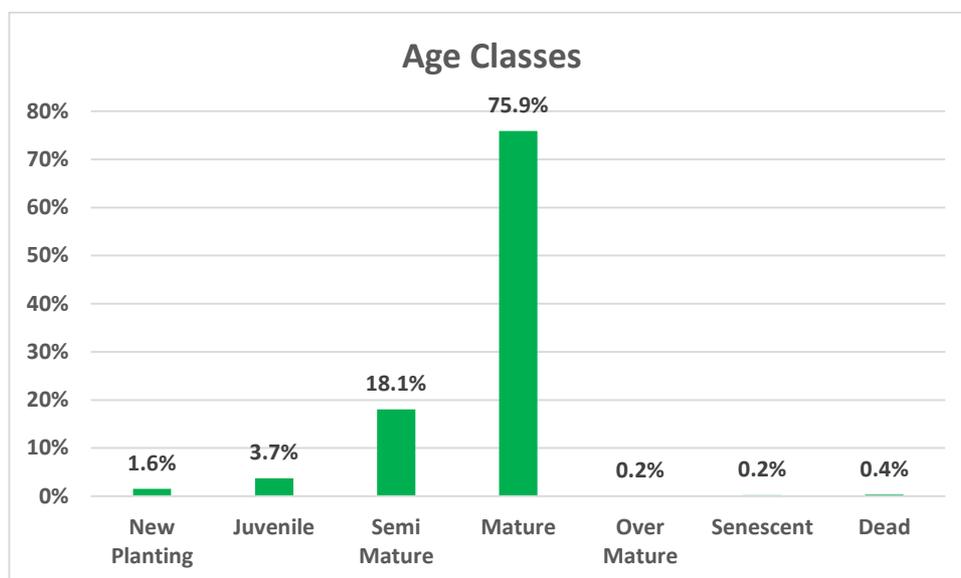


Figure 7: Age of Boroondara's Street Trees

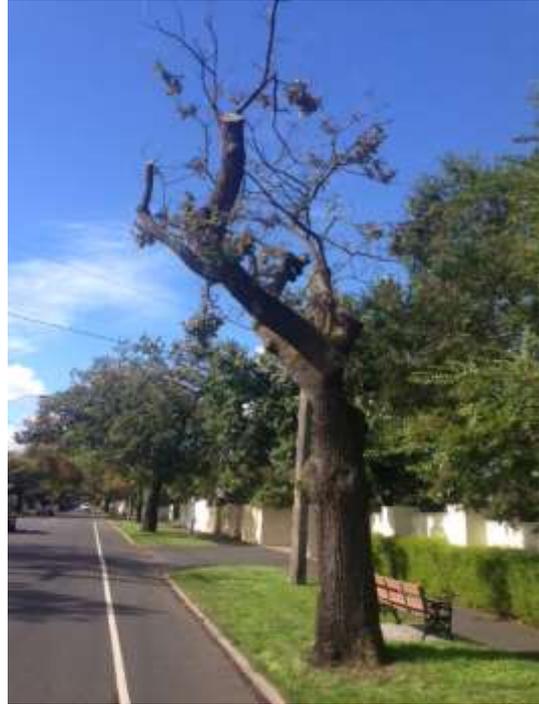
Of the mature street tree population, 35% are from only three species: 14% are Pin Oaks, 13% are Queensland Brush Box and 8% are London Plane Trees. A limited data set is currently held for trees in parks and other open space however it is considered that these trees are of a similar maturity but will provide an overall increased species diversity across the municipality.

Without proactive renewal, Boroondara's mature street and park trees will continue to progress into over-mature and senescent phases and require significant care. Ongoing condition data will be required for each tree to understand the actions required to manage the tree population for continued amenity, to ameliorate risk and to ensure benefits continue to accrue. The implications of not taking a proactive approach are:

- a large, tree population that could decline and require removal at a similar time
- alternatively, slow ongoing loss will result in a mixture of tree sizes and a loss of avenue and park landscape character



St James Park, Hawthorn



Month Albert Road, Canterbury

A proactive approach will:

- ensure continuity of current streetscape and neighbourhood character provide opportunity to broaden and trial new tree species selection
- continue the community's enjoyment of street and park trees whilst future proofing for the next generations

4.2. Species diversity

While Council's street tree population includes some 323 species around 60% of the street tree population is made up of only 10 species and 35% of the population is represented by just three species: Pin Oaks, Queensland Brush Box and London Plane Trees. These species contribute a significant amount of amenity and shade for Boroondara, particularly as boulevards along residential streets, but are over the recommended limit of any one species in a population. Literature commonly cites a recommended cap of between 5% and 10% of any one species within a population¹³. At 14% and 13% respectively, Pin Oaks and Queensland Brush Box would be considered overly dominant within Boroondara's asset portfolio.

Scientific Name	Common Name	Number	% of Population
<i>Quercus palustris</i>	Pin Oak	9,244	14%
<i>Lophostemon confertus</i>	Queensland Brush Box	8,250	13%
<i>Platanus x acerifolia</i>	London Plane Tree	5,062	8%
<i>Liquidambar styraciflua</i>	Liquidamber	2,595	4%
<i>Pyrus calleryana cv</i>	Ornamental Pear	2,516	4%
<i>Syzygium smithii</i>	Lilly Pilly	2,454	4%
<i>Melaleuca styphelioides</i>	Paperbark	2,358	4%
<i>Cinnamomum camphora</i>	Camphor Laurel	2,074	3%
<i>Lagerstroemia indica</i>	Crepe Myrtle	2,006	3%

¹³ Richards, 1993

<i>Acer species</i>	Maple Species	1,987	3%
<i>Melaleuca linariifolia</i>	Paperbark	1,982	3%
<i>Prunus cerasifera nigra</i>	Purple Leaf Plum	1,276	2%
<i>Fraxinus raywoodi</i>	Claret Ash	1,162	2%
<i>Grevillea robusta</i>	Silky Oak	958	1%
<i>Quercus robur</i>	English Oak	942	1%
<i>Fraxinus oxycarpa</i>	Desert Ash	857	1%
<i>Melia azedarach</i>	White Cedar	822	1%
<i>Corymbia ficifolia</i>	Red Flowering Gum	808	1%
<i>Angophora costata</i>	Smooth Barked Apple	635	1%
<i>Ficus hillii 'Mop Top'</i>	Fig	583	1%

Table 1: Top 20 Most Common Street Tree Species

Species diversity is important in managing risks of pest and disease incursion and helps ensure the tree population is resilient to future weather and climate conditions. Elm Leaf Beetle is a current pest risk associated with our elm tree population. This is managed by soil and stem injection on a recommended biannual basis however recent years have seen this pest complete numerous lifecycles during the warmer months which has resulted in an increased defoliation of elm trees in streets and parks.

The implications of not taking a proactive approach is increased risk of mass loss heightened by the age of our tree population whilst the benefits of a proactive approach are that we are mitigating this risk and diversifying and enriching the community's experience.

4.3. Risks and damage to private and public assets

Boroondara's mature street tree population exists within a highly urbanised setting and these trees inherently pose risks to public and private infrastructure (for example, roots impacting fencing or damage due to fallen tree branches).

An example of proactive management of risks posed by trees in this setting is the pruning of street trees to address the Electric Line Clearance Regulations. The issue of overhead power lines came up as a concern through the community engagement process and Council will continue to investigate options to achieve better outcomes for trees. These options include undergrounding of power, aerial bundling of cables, appropriate pruning of trees under power lines and a continual review of tree species for each location. Council also continues to improve stakeholder engagement with power distribution businesses to achieve better pruning outcomes for street and park trees.

Beyond this, most risk-based actions are reacting to community complaints or concerns. Reviewing operational programs and practices could identify opportunities to manage risks more proactively. Impacts by residents undertaking development can also affect the health and ability for council to retain street trees; vehicle crossovers are an example of this impact and Council currently manages this process through our Tree Management Guidelines.

5. Opportunities

Boroondara has an enviable level of canopy coverage that provides cooling and shading, habitat for native birds, and attractive green corridors on neighbourhood streets. There is however some key opportunities to build on this base and ensure it can be maintained into the future.

5.1. Strategic renewal of ageing avenues of street trees

There is a key opportunity to develop and implement a strategic program to progressively renew avenues in streets and parks of aging trees. This will avoid the significant landscape amenity loss that would ultimately result from avenues of declining trees requiring group removal and replacement. The current approach is reactive removal (and replacement) of individual dead or dying trees. This program would initially target streets avenues of 'over-mature' trees, and might require removal and replanting of every second or third tree, followed by removal of the remaining once the new trees are well established (for example, a gap of five years).

5.2. Community awareness and engagement

Consultation revealed that our community cares deeply about the City's trees, however have limited knowledge of issues relating to a mature street tree population and low species diversity.

To take a proactive approach in addressing these issues, we need community understanding and support. Engaging the community in a well-planned, transparent, collaborative way will help ensure that residents 'come on the journey' to realise the objectives and vision of the strategy. Community engagement is possibly the key challenge in implementing this strategy. Having high-level, ongoing support for the new direction in street and park tree renewal and sending consistent, clear messages will help to smooth the change process.

5.3. Tree planting for increased shade

There are opportunities to prioritise planting of additional new canopy trees in strategic locations.

Shade from canopy trees helps cool the local environment and protects people from risks associated with sun exposure. Areas that would benefit from an increase of natural (canopy) shade are where concentrations of pedestrian activity exist such as childrens' playgrounds, along walking and shared paths, and near communities more vulnerable or exposed to the Urban Heat Island.

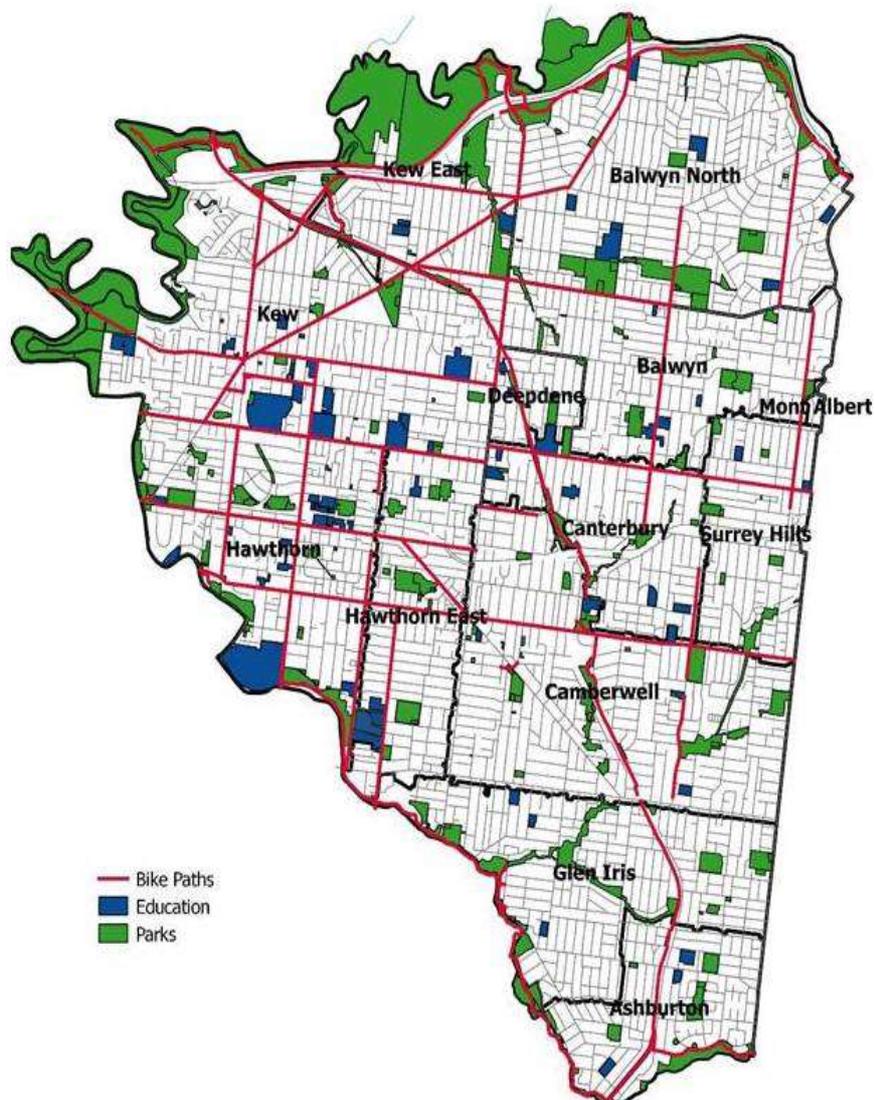


Figure 8: Areas of high pedestrian activity across the Municipality: Schools, bike paths, parks and retail/commercial areas

Certain social demographics are more vulnerable to the effects of extreme weather events, such as heatwaves and the Urban Heat Island Effect. These include young children, older people living alone, those who don't speak English at home and those most socially economically disadvantaged. In thinking about a future street tree planting and renewal programs, all of these locations should be prioritised to ensure continuity of shade provision to protect these more vulnerable populations.

5.4. Planting legacy trees of the future

Council's many parks and reserves provide opportunities for significant additional tree plantings. The more unconstrained setting of parks and reserves allows selection and planting of a broader range of tree species that have potential to become the 'legacy trees of the future'. These would include tree species that will become very large canopy trees or may be rare in our current landscape. An example of a rare tree in cultivation is the White Karee (*Searsia pendulina*) in Riversdale Park.

Emerging local research is identifying trees species that can perform well in the constrained urban context and show resilience to warmer temperatures and more extreme weather.

5.5. Tree planting to support biodiversity

Boroondara has a dedicated biodiversity management and enhancement program and the community rates biodiversity as one its top priorities when thinking about trees. Areas of significance including biodiversity corridors have been mapped and overlayed onto the network of streets. Council’s existing street and park tree planting program has the capacity to prioritise biodiversity outcomes by careful selection of tree species in streets and parks close to biodiversity corridors, significant sites and encouragement areas (see map below).



Figure 9: Boroondara’s biodiversity corridors and encouragement sites across Boroondara

5.6. Selection of best tree for location

There are a range of issues, opportunities and public opinions that are relevant to decisions about species selection. Through consultation, the community has told us that maintaining existing street, park and neighborhood character is paramount. This vision provides an opportunity to ensure that individual decisions about specific trees or issues will always be made in the context of the broader impact on

streetscape and neighbourhood character, and that the streetscape and neighbourhood character is of primary importance.

In terms of species selection, there are a range of tensions and issues to consider. These include:

- What to plant under power lines
- Allergies and irritations (for example, the Laganaria, whose seed capsules are filled with irritating hairs giving rise to the colloquial name of “itchy bomb tree”)
- Levels of fruit and nut drop
- Levels of root invasiveness
- Climate change resilience
- Indigenous versus exotic
- Shade provision along key walking routes

There is never a single “right tree” for any location, and choosing the best tree, in many cases, requires a balancing of competing benefits and issues. There is an opportunity through this strategy to espouse the principle of “best tree for location” in tree selection decisions.

6. Vision and Strategy

6.1. Vision

Through the community consultation and engagement process there was considerable feedback on how trees are integral to the look and feel of neighbourhood character, offering a connectedness to nature and contributing to the overall amenity of the streets and parks of Boroondara. This was further reflected in the many favorite trees identified across the municipality and the benefits they bring.

The vision for the City relating to its trees is that:

“Boroondara continues to be a place of shady trees, with leafy streets and green parklands. Our trees enable us to experience the seasons, connect with nature and contribute to our sense of wellbeing”

6.2. Strategic themes

Council will achieve this vision through the strategic themes outlined below. Each theme describes our objectives and what our action focus areas will be. This strategy will be supported by the Tree Strategy Action Plan, which outlines prioritised actions that align with the themes below.

Preserving the character of our streets, parks and neighborhoods

The collective value of trees is a critical element in defining the streetscape and neighborhood character. This is of primary importance, and individual decisions about specific trees or issues will always be made in the context of the broader impact on streetscape and neighborhood character. Canopy cover will continue to be a key focus, consistent with the above vision.

Key actions will center on ensuring key risks, such as maturing tree population, are proactively managed so neighborhood and streetscape character is maintained over a long term.

We will:

- Introduce proactive renewal of ageing street and park trees
- Select tree species based on their contribution to character and continue to manage risk, maintenance and legislative requirements
- Continue to make decisions about individual trees or issues in the context of the broader streetscape and neighbourhood character

Engaging with our community

This strategy is both about the City's tree assets, but also about the people that enjoy and value them.

Key actions will center around engaging the community and raising awareness community around critical issues, such as the aging tree population issue, and also participating at a local implementation level on significant change initiatives such as proactive street tree renewal.

We will:

- Introduce a proactive education program regarding an ageing tree population and associated issues
- introduce a process for targeted engagement about street and park tree renewal
- improve information available to our community about trees

Enhancing health, wellbeing and community connectedness

Trees play a key role in improving health, wellbeing and community connectedness of the Boroondara community.

Key actions will be to proactively pursue opportunities for improving walkability and active lifestyles, such as increased canopy plantings, and the creation of landmark and future legacy trees, that resonate with people and contribute to a special sense of place.

We will:

- increase tree planting in strategic areas to enhance shade and enjoyment of open space
- develop a program to plant legacy trees for the future including large canopy trees

Managing risk and nuisance

There are risks associated with trees in an urban environment, and in different circumstances they can cause nuisance or inconvenience to residents.

Key actions will be to ensure renewal and replacement decisions are underpinned by the principle of the best tree for location, and to develop new Tree Management Guidelines that reflect the vision and objectives of this Strategy.

We will:

- Develop new Tree Management Guidelines that provide a clear direction for maintenance, operational management, and risk management processes
- Continue to make decisions and manage risk and nuisance with the objective of preserving our streets and neighbourhoods

Continuing responsible stewardship and management

This strategy will ensure that the central role Council plays in stewardship and management of street and park trees aligns with the community vision.

The key action will be to ensure Council has clear, robust maintenance and management processes in place to deliver the objectives of the Strategy; that these are clear and easily understood by the community, and consistently and professionally administered by Council administration.

We will:

- Develop new Tree Management Guidelines that provide a clear direction for maintenance, operational management, and risk management processes
- Develop community information, FAQ's or handbooks, to support and explain Council's operation services and processes.

Improving our natural environment

Trees play an integral part in improving the natural environment, and how the community connects with nature.

Key actions will center on exploring and implementing storm water and biodiversity improvements, as well as the strategic use of trees in Council projects to provide opportunities to connect and interact with nature.

We will:

- Increase opportunities to include trees in water Sensitive Urban Design (WSUD) projects

- Continue to include tree planting opportunities to improve biodiversity outcomes
- Continue appropriate tree species planting to enhance biodiversity corridors and zones

7. Implementation and monitoring

The strategy will be implemented through the Tree Strategy Action Plan, which outlines prioritised actions that align with the strategic themes in this strategy.

Council will monitor key performance indicators to enable progress reporting over time:

- Species diversity profile (every 5 years)
- Tree age profile (every 5 years)
- Canopy cover change (every 5 years)
- Number of trees planted (annual)
- Number of trees removed (annual)

8. References

Akbari, H., D. M. Kurn, et al. (1997). "Peak power and cooling energy savings of shade trees." *Energy and Buildings* 25 (2): 139-148.

Akbari, H., M. Pomerantz, et al. (2001). "Cool surfaces and shade trees to reduce energy use and improve air quality in urban areas." *Solar Energy* 70 (3): 295-310.

American Council for an Energy Efficient Economy (2014) *Cool Cities for Cool Policies: Best Practices for Mitigating Urban Heat Islands in North American Cities*, Report no U 1405.

Clark J.R., N.P. Matheny, G. Cross and V. Wake, 1997. A model of urban forest sustainability. *Journal of Arboriculture*. 23(1):17-30.

Dunn, J. (2016) Improved neighbourhoods generate higher property prices. *Australian Financial Review*, 5 Feb. <http://www.afr.com/news/special-reports/202020-vision/generating-higher-property-prices-through-improved-neighbourhoods-20160204-gmlsxf>

Gill, S., Handley, J., Ennos, R., & Pauleit, S. (2007). Adapting cities for climate change: the role of the green infrastructure. *Built Environment* 33(1): 115–133.

GHD (2011b). *City of Melbourne: Report for Urban Heat Island Effect, Mitigation Strategies and Planning Policy Approaches*. Melbourne, Vic.

i-Tree Eco 2016, *Tools for Assessing and Managing Forests and Community Trees*, retrieved from i-tree Eco version 6 database <<https://www.itreetools.org/eco/>>

Jacobs, B., Mikhailovich, N., and Delaney, C. (2014) *Benchmarking Australia's Urban Tree Canopy: An i-Tree Assessment*, prepared for Horticulture Australia Limited by the Institute for Sustainable Futures, University of Technology Sydney.

Kaspar J, 2016, *Quantifying change to urban tree canopy cover in public and private space using simple random point sampling*, University of Melbourne

Livesley, S. (2010). Energy saving benefits of shade trees in relation to water use. *TREENET Proceedings of the 10th National Street Tree Symposium* September 2010.

Miller, R. W., Hauer, R. J., & Werner, L. P. (2015). *Urban forestry. Planning and managing urban greenspaces. Third edition*. Waveland Press, Inc.

Mullaney J, Lucke T, Trueman SJ (2015) A review of benefits and challenges in growing street trees in paved urban environments. *Landscape and Urban Planning* 134 157-166

New York City Department of Parks and Recreation, 2016. About Million Trees NYC: NYC Tree Facts. US Forestry Service. http://www.milliontreesnyc.org/html/about/urban_forest_facts.shtml

Norton B, Coutts A, Livesley S, Williams N, (2013). Decision Principles for the selection and placement of green infrastructure to mitigate urban hotspots and heatwaves, Victorian Centre for Climate Change Adaptation Research

Norton, B., Bosomworth K, Coutts A, Williams N, Livesley S, Trundle A, Harris R, McEvoy D (2013). Planning for a Cooler Future: Green Infrastructure to Reduce Urban Heat, Victorian Centre for Climate Change Adaptation Research

Nowak, D.J., and D.E. Crane, Stevens, J.C., Hoehn, R.E., Walton, J.T., and Bond, J., 2008. A Ground-Based Method of Assessing Urban Forest Structure and Ecosystem Services. *Arboriculture & Urban Forestry* 34(6): November 2008. International Society of Arboriculture.

Pandit, R, Polyakov, M., Tapsuwan, S., Moran, T. (2013) The effect of street trees on property value in Perth, Western Australia. *Landscape and Urban Planning*. Volume 110, February 2013, Pages 134–142

Plant, L. (2016) The economic value of greenspace. *Real Green – The Brisbane Experience Case Studies*

Richards, N.A., (1993). Reasonable guidelines for street tree diversity. *Journal of Arboriculture* 19(6). 344-350.

Rosenzweig, C., Solecki, W.D., Parshall, L., Lynn, B., Cox, J., Goldberg, R. Hodges, S., Gaffin, S., Slosberg, R.B., Savio, P., Dunstan, F. and Watson, M. (2009). *Mitigating New York City's heat island*. *Bulletin of the American Meteorological Society* 90: 1297-1312

Simpson, J. R. and E. G. McPherson (1996). "Potential of tree shade for reducing residential energy use in California" *Journal of Arboriculture* 22 (1): 10-18.

Conference Proceedings 7th. Metropolitan Tree Improvement Alliance (METRIA) 7:57-65.

Van Wassenauer, P. J. E., Satel, A. L., Kenney, W. A., & Ursic, M. (2011). A framework for strategic urban forest management planning and monitoring. *Trees, people and the built environment*. Proceedings of the Urban Trees Research Conference 13–14 April 2011.

Wolf, K. L. (2005). "Business district streetscapes, trees and consumer response." *Journal of Forestry* 103 (8): 396-400.