# City of Bayswater
Greening our Garden City

Urban Forest Strategy
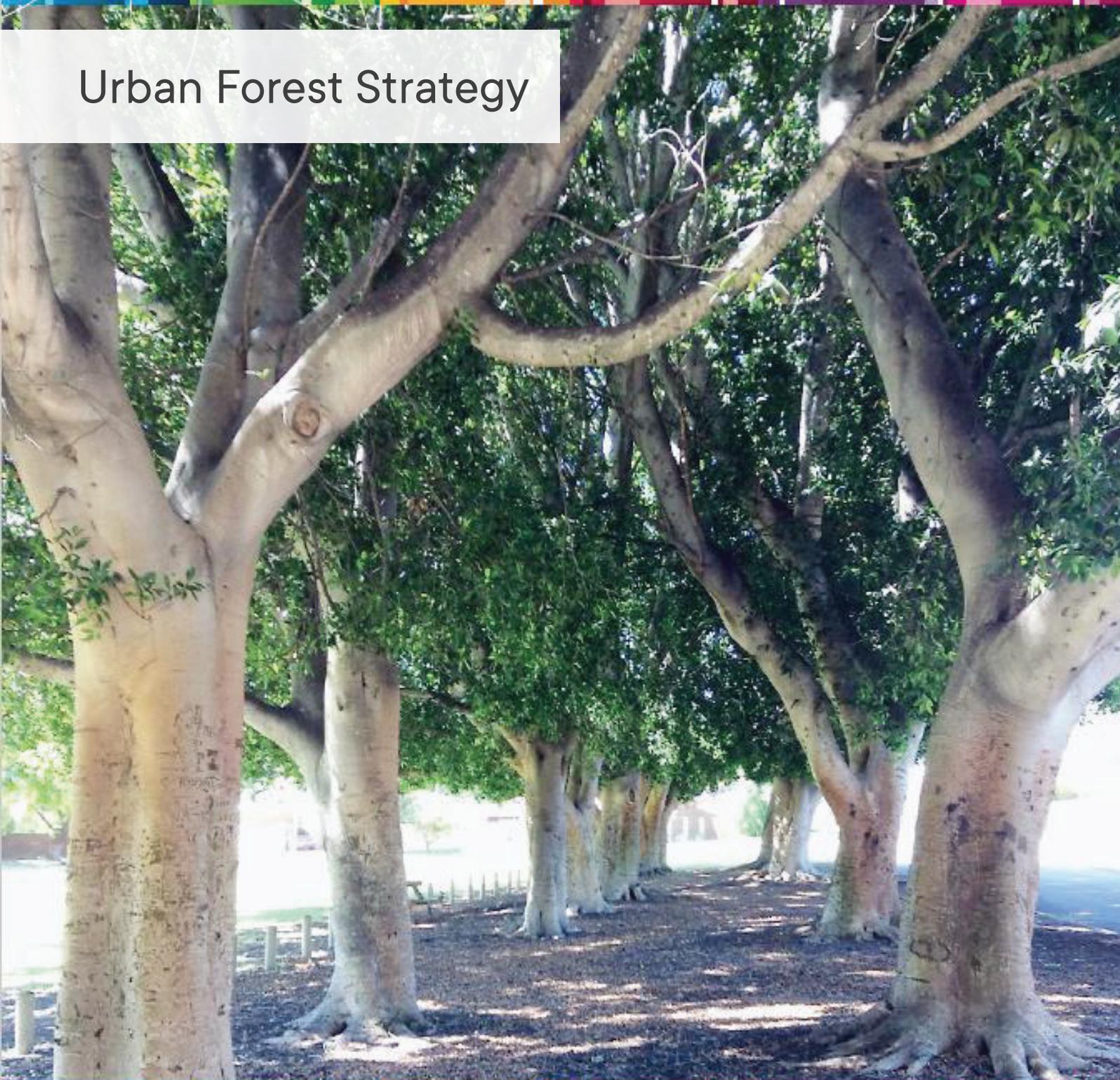
We acknowledge the Whadjuk People of the Noongar Nation as the traditional owners of this land

Vision

To create a resilient urban forest that is both diverse and vigorous whilst improving the liveability values for the greater community for now and for future generations

Executive Summary

This Strategy puts forward objectives, actions and principles to guide the planning, advancement and management of the City of Bayswater's Urban Forest.

As a relatively new discipline and in a time of unprecedented climatic changes, urban forestry must continually evolve to deliver successful outcomes. Urban forest planning and undertakings need to be based on robust research; promote best practice implementation and management techniques; allow for a range of options and practices to be trialled; and to be sufficiently resourced.

The **protection and retention of existing trees** will help to reduce the unnecessary removal of established and often remnant tree species, whilst aiming to halt any further reduction of canopy in the City.

At the initial stage the City aims to **increase tree canopy coverage** from 13.2% to an aspirational target of 20% by the year 2025 through street, parks and natural area plantings.

Increasing tree species diversity will assist in building a more resilient urban forest that has a greater potential to withstand the deleterious impacts of climate change and exposure to pests and diseases.

Achieving age diversity of our urban forest will reduce the likelihood of significant tree canopy loss at the localised level and reduce the potential for an increase in thermal hotspots within the City.

Informing and consulting with the Community will assist in promoting the benefits of the urban forest and encourage private land owners to plant more trees.

There are fundamental actions presented within the Urban Forest Strategy (UFS) that are based on the principles of adaptive management. As such, the strategy will require routine review and may require modification. Changes to planned activities should be driven by the results of monitoring activities indicating change could be beneficial or is necessary; and where there have been advances in knowledge of urban forestry.

Although rigorous analysis and assessment of the health of our urban forest and its ability to cope in a warming and drying climate is yet to be undertaken, we do know one thing for certain- it is important that Bayswater's urban forest is both maintained and expanded to increase tree canopy coverage throughout the City as part of a multi-faceted approach to adapting to climate change and improving liveability standards for the whole community.

Council direction

Council has provided the directive for the development of an urban forest strategy with instruction to increase tree canopy cover and protect existing trees.

The development of this strategy has required the consideration of the other relevant Council policy documents including the overarching Greening Bayswater Strategy and implementation documents such as the Draft Street Tree Policy and Management Practices.

Ordinary Meeting of Council - 23 September 2014

'That in order to mitigate the Urban Heat Island effect and to provide considerable environmental benefits, City Officers investigate options to increase the City's tree canopy coverage from the 13.2% to 20% by 2025'.

Ordinary Meeting of Council - 15 December 2015

"That City Officers provide the Council and residents of the City of Bayswater an update as to the progress of the 20% by 2025 Tree Canopy Vision with a view to arranging a public forum which is to be facilitated by an appropriately qualified facilitator and allow for appropriate and broad community and stakeholder consultation and input."

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Bayswater's Urban Forest Overview

Estimated number of trees: Approximately 33,000

Annual maintenance costs: $1.7 million

Estimated value of the urban forest: In excess of $300 Million

Percentage of tree canopy cover: 13.2%

Areas within the City of Bayswater identified with the lowest rate of tree canopy cover: Noranda & Morley

1   Introduction

The City of Bayswater is characterised by its well established parks, gardens and public open spaces - the Garden City. The trees, vegetation and green spaces managed by the City contribute substantially to the character and identity of the City of Bayswater.

As with cities worldwide, the City of Bayswater is facing three significant environmental challenges - climate change, the urban heat island (UHI) effect and population growth.

A healthy urban forest can play a significant role in assisting the City to deal with both climate change and the UHI effect whilst ensuring that the City of Bayswater maintains a high level of liveability for its growing population. Improving liveability and community cohesion whilst reducing energy and resource usage, are just some of the benefits provided by urban forests. The City's urban forest also provides critical ecosystem services such as carbon sequestration, nutrient cycling, air and water filtration, shade, habitat and oxygen production.

Urban forestry is a relatively new discipline and is more complex than just horticulture or aboriculture alone. Urban forestry can be defined as the science of managing trees, vegetation and ecosystem functions within urban and unnatural environments, whilst ensuring maximum benefits to the community (Schwab, 2009).

Traditionally tree installation and maintenance has been the responsibility of the 'Parks & Gardens' section within the City, with a focus on individual trees rather than viewing the urban forest as a whole and interconnected canopy. In order to develop a resilient urban forest, input and expert advice from multiple disciplines is required including planning, engineering, economics, parks and gardens, sustainability and above all, the community.

It is also important to recognise that urban forest management has substantial resource and cost implications associated with it, however, it should also be noted that these costs can be negated when an economic value is placed on the benefits derived from urban forests.

Fundamental to this strategy is the vision to build upon the 'Garden City' and the City of Bayswater's 'quality lifestyle' to create a resilient and diverse urban forest that pays homage to the unique character of Bayswater, adapts to climate change and improves liveability for the wider community.

The guiding priniciples of the City of Bayswater's Urban Forest Strategy are to:

- plan to maintain and improve the liveability of the City of Bayswater;
- mitigate and adapt to climate change;
- reduce the UHI effect; and
- create healthier ecosystems

1.1   What is an urban forest?

An urban forest can be defined as all of the trees and vegetation within a local government area including grass, green walls and gardens on roofs. No distinction is made as to whether the urban forest contains native or exotic plant species, where the plants are located or the ownership of the land and the vegetation it contains.

Urban forests have many benefits to society including improving air quality, carbon sequestration and providing habitat for fauna. As global warming has been a major factor in land managers developing urban forest strategies, with a focus on mitigating the UHI effect, the cooling benefits of trees from the shade they provide means that trees and their associated canopy coverage are generally the main focus of urban forestry strategies. The City of Bayswater defines a tree generally as a 'long lived woody perennial plant that has undergone secondary growth, is greater than 2m in height and typically has a single woody stem or trunk'.

Traditionally trees have been valued for their aesthetic qualities. Tree lined streets and parklands are considered desirable places to live and to gather in. More recently trees are being valued holistically for their economic, environmental and social benefits.

Improving the amenity of our streets through the provision of shade, clean air and noise pollution reduction is a perceived benefit of urban forests at a local level. The application of economic rationale to the value of residential street trees has shown that trees can increase property values by 15-30% (202020 Vision).
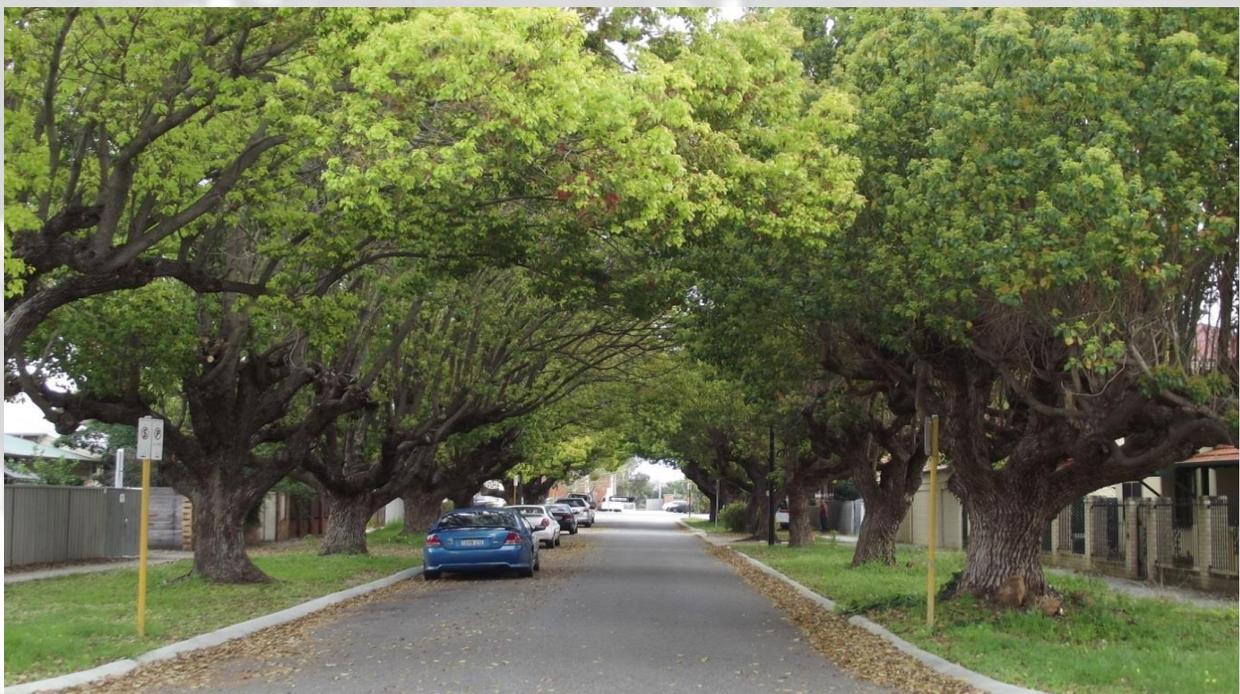
Figure 1: Verge plantings not only provide shade and cooling benefits for residents and infrastructure but also adds to the character of an area, improving amenity values.

1.2   The benefits of urban forests

Urban forests are valuable assets that deliver a range of benefits to the community. These benefits are as follows:

Economic benefits
- **Increased amenity value**
  Trees visually enhance an area, increase property values and add to the landscape character.
- **Reduce energy usage**
  Trees strategically planted to provide shade from the sun can cool buildings by up to 7°C which can reduce air conditioning costs.
- **Increased life span of infrastructure and assets**
  Tree shade can increase the life span of infrastructure such as roads which in turn reduce maintenance and replacement costs.
- **Reduced health care costs**
  Studies indicate that greener suburbs encourage people to exercise more and provides better mental health outcomes. Increasing the physical and mental health of people results in a reduction to community health care costs.

Environmental benefits
- **Shading and cooling**
  Trees provide shade and reduce the surrounding air temperature through the process of evapotranspiration.
- **Improving air quality**
  Trees trap and absorb air pollutants such as dust and particulate matter which improves air quality.
- **Reduces stormwater runoff**
  Trees slow stormwater flow rates, reduce stormwater runoff and improve water quality by capturing and filtering water through their leaves and root systems.
- **Carbon sequestration**
  Trees help to mitigate the impacts of global warming by capturing and storing carbon and removing it from the atmosphere.
- **Provision of food and habitat for wildlife**
  Trees provide food sources and shelter for animals such as birds, mammals, insects and other wildlife.

Social benefits

- **Creating a sense of place**
  Tree lined streets and well designed green spaces enhance the urban form which facilitates a strong sense of community connection to an area.
- **Reduces sun and heat related illnesses**
  The provision of shade and a subsequent reduction in air temperature can help reduce mortality rates, especially amongst the most vulnerable e.g. the young, the elderly and homeless people.
- **Supports community cohesion**
  Green urban spaces, especially those providing well shaded areas, encourage the local community to gather and interact and this facilitates community cohesion.
- **Improves physical and mental health**
  Providing green spaces within urban areas encourages people to undertake outdoor activities such as exercise and promotes interaction with others which has a variety of positive health effects for both physical, mental and social wellbeing.
- **Reduction in anti social behaviour**
  Research indicates that green spaces have a positive influence on the social behaviour of a community and can reduce the level of particular illegal activities.
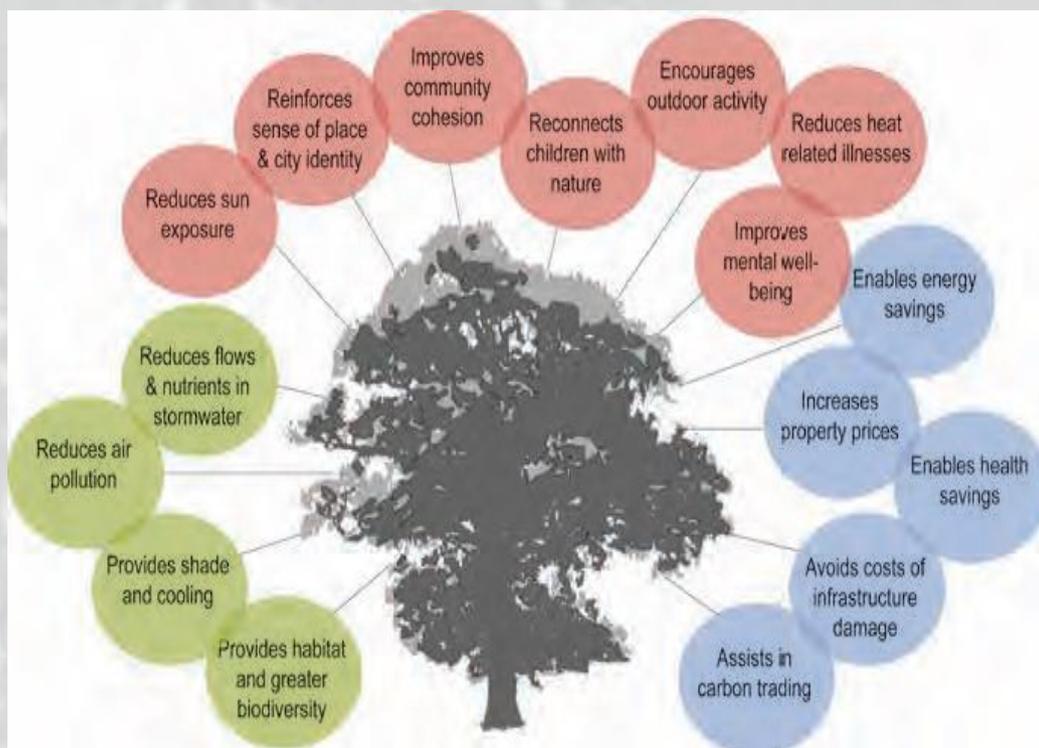

Figure 2: Summary of the range of benefits provided by trees
(*Source; Woodland Trust, UK adapted by the City of Melbourne, 2012*)

> **The real value of urban forests**
>
> *The City of Melbourne undertook i-Tree assessment of 982 trees located within Melbourne's CBD. The results indicated that there are significant dollar values associated with the benefits derived from the urban forest, outlined as follows:*
>
> - *0.5 metric tonnes of air pollution removed annually at a value of $3,820*
> - *838 metric tonnes of carbon stored annually at a value of $19,100*
> - *Carbon sequestration of 24 metric tonnes annually valued at $548*
> - *Energy savings of $6,370 annually through shading of infrastructure in summer and the provision of solar access in winter*
> - *Carbon admission avoidance through energy use reduction value at $114 per year*
> - *A replacement cost or structural value of the trees at $10.4 million dollars*
>
> *The City of Melbourne contains 70,000 trees within the urban forest with an estimated value of approximately $700 million dollars.*
>
> **The City of Bayswater has approximately 33,000 trees. Utilising these figures, the City of Bayswater urban forest has an estimated value of over $300 million dollars.**

2   Elements of urban forests

2.1   Canopy coverage

Canopy coverage is the amount of physical coverage of tree canopy over an area of land. Generally measured as a percentage to indicate a given area shaded by trees, it is regularly used as an indicator to measure the success of an urban forest. It is important to remember that increasing the level and quality of canopy cover is a more complex area to address than just simply planting more trees.

2.2   Species selection

Different tree species have different values. Traditionally species that were aesthetically pleasing, hardy and could cope with unnatural environments (surrounded by pavement, roads and underground infrastructure) have been utilised in the City's planting regimes. With a need to increase canopy coverage, balanced with growth rates, longevity and water usage in a warming and drying climate, the species list of trees that can be utilised will need to be reviewed and refined. It is important that potentially invasive tree species are not utilised within the urban forest to avoid compromising the ecological values of nearby natural areas and to prevent weed infestations throughout the City.

2.3   Tree health

Healthy canopies are the result of healthy trees and as such species selection needs to consider all the requirements a tree needs to establish and survive. In a changing climate we are entering an unknown space in terms of how tree species will cope in harsher environmental conditions. Therefore continued assessment of tree health is required.

2.4   Tree spacing

Tree spacing has a significant effect on the health of a tree. Trees spaced too close together will impede canopy development which in turn can promote the spread of diseases and pests. Sufficient spacing between trees allows air flow and sunlight to reach the foliage, thereby maximising tree health. In contrast, developing a continuous and connected canopy is ideal in particular areas, therefore consideration of health whilst maximising canopy coverage needs to be balanced and well planned.
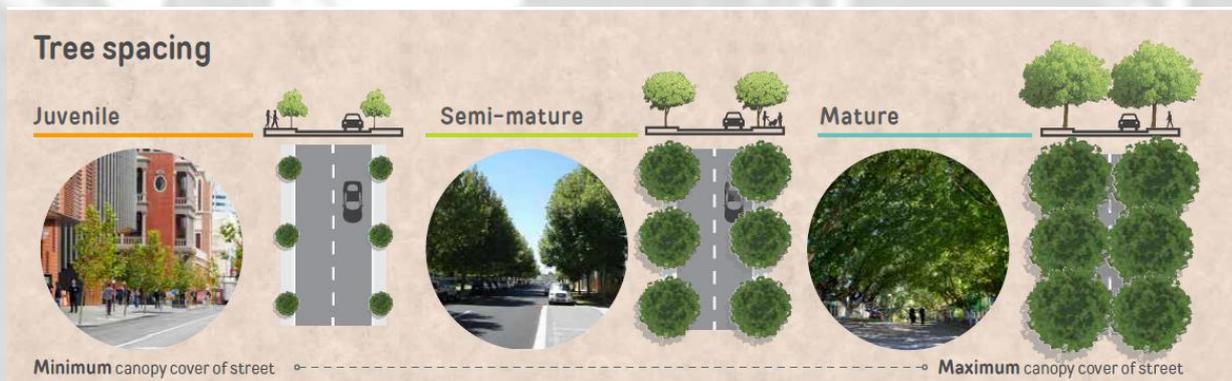
Figure 3: Tree spacing and canopy coverage (City of Perth, 2016)

2.5   Tree size

There is a great deal of evidence to suggest that the level of benefits derived from trees is directly proportional to the size of the tree. The main benefits of retaining larger trees within the urban forest are that larger trees:

- provide more shade due to the increased surface area of the canopy;
- have the ability to provide shade to buildings due to their height;
- capture and filter a greater amount of particulate and gaseous air pollutants due to having a higher total mass of leaves;
- provide greater benefits proportional to the ground intrusion from the trunk, stems and lower branches than that of smaller trees;
- are generally less likely to be targeted by vandals and careless trampling; and
- allow for higher canopy clearance over infrastructure such as roads and footpaths.

Although larger trees may cost more to maintain, the actual costs are comparable to those associated with the purchase, installation and establishment of young trees (City of Sydney, 2013).

3   Challenges of managing urban forests

3.1   Climate change

It is now widely accepted that climate change is occurring and that the primary cause of this change is human emissions of greenhouse gases.

The Bureau of Meteorology has divided Australia into four super clusters to assist in summarising the impacts that climate change will have on different parts of Australia. Perth falls within the 'Southern Australia' super cluster. The changing characteristics for the southern cluster are as follows:

- increased average temperatures with temperature increases continuing in all seasons;
- increased number of hot days and warm spells, with fewer frosts;
- decreases in winter and spring rainfall with changes to autumn and summer unclear;
- increased drought periods;
- average sea level will continue to rise and height of extreme sea level events will also increase;
- increased fire risk.

Although the effects of climate change are only just becoming discernible, there is no doubt that they will become increasingly prominent.
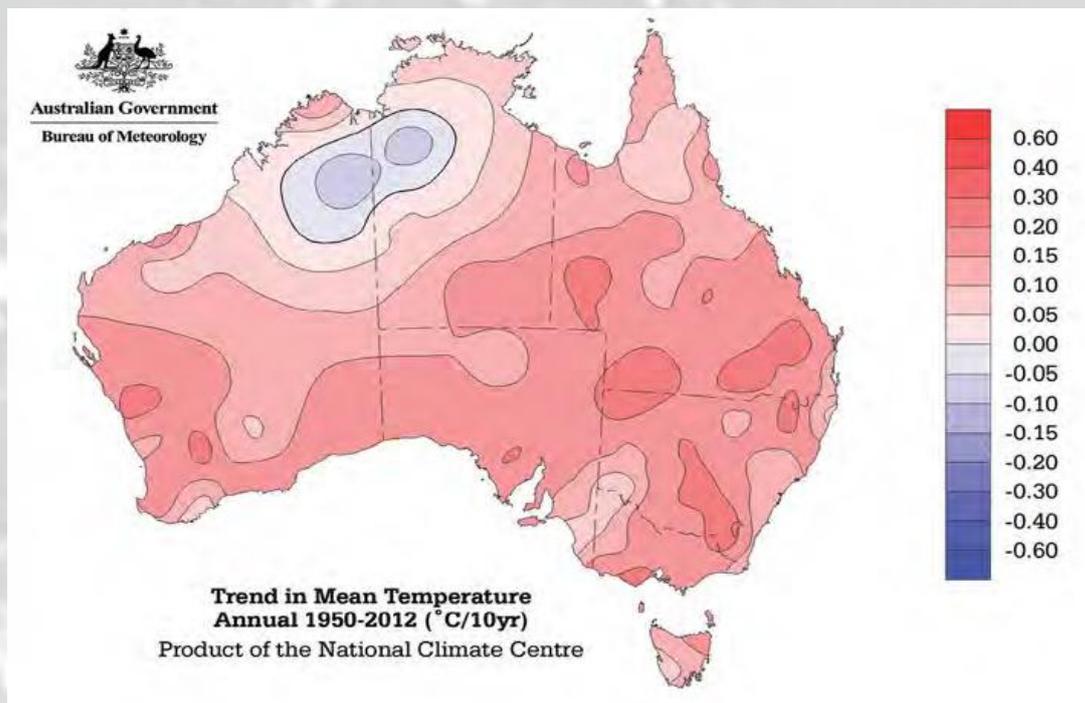

Figure 4: The trend in average annual temperature changes each decade for Australia from 1950 until 2012 (Source: BoM, 2013)

It is important to remember that while the urban forest plays a key role in developing ecosystem resilience in terms of climate change and the subsequent extreme weather conditions that result, it is highly likely that these extreme weather conditions will also have deleterious impacts on the health and structure of the urban forest. This reiterates the need for comprehensive planning and maintenance regimes now and into the future .

3.2   Urban heat island (UHI) effect

The UHI effect is a phenomenon affecting cities worldwide and results in city temperatures being on average four to seven degrees higher than surrounding rural areas, particularly at night.

The three main causes of the UHI effect are:

- **Impervious hard surfaces**: buildings, paving and roads are generally impervious surfaces with a high capacity to trap and retain heat.
- **Low vegetation cover**: with the removal of trees and other vegetation to install hard structures, cities do not receive shade and natural cooling from evapotranspiration.
- **Anthropogenic activity**: In hot weather motorised transport is a major contributor to increased greenhouse emissions through the use of vehicle air conditioners.

To date, heat waves kill more Australians than any other natural disaster. Combined with a warming climate, the need to address the UHI effect is of greater significance to ensure the health of our community and natural environment. Urban forests and the associated canopy coverage they provide is the most cost effective way of dealing with the UHI effect.
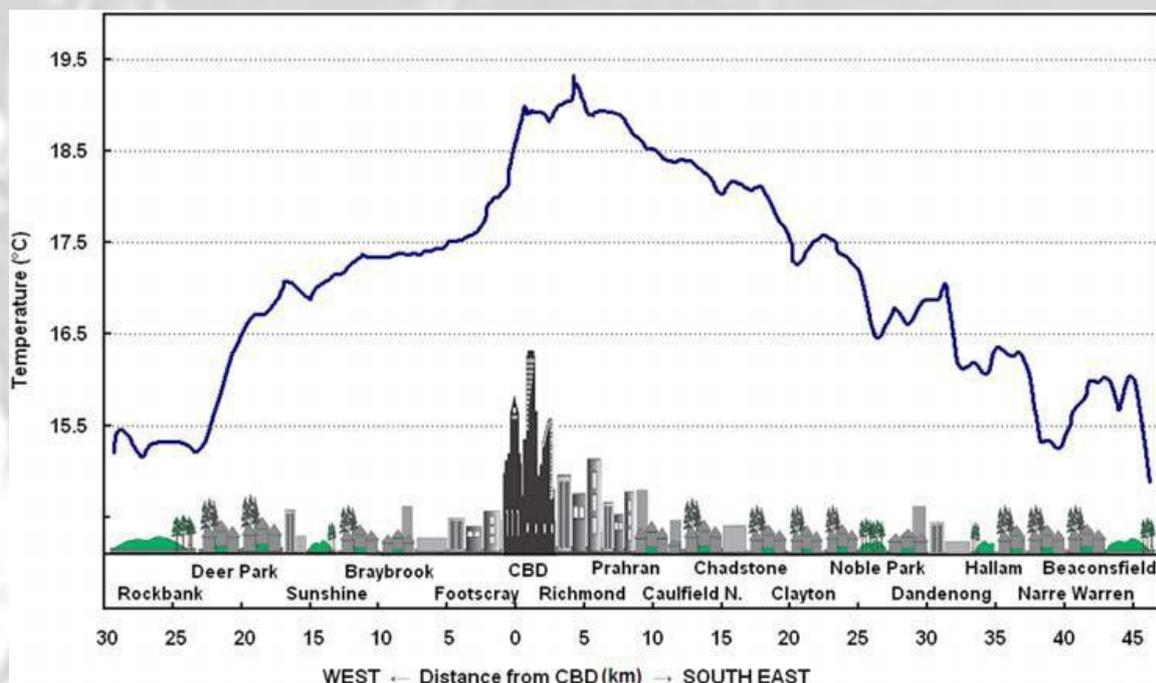
Source: Coutts et al 2010

Figure 5:. Urban heat profile in Melbourne clearly illustrating increased temperatures surrounding the CBD with clear decreases in temperature moving away from the city centre.

3.3   Population growth in the City of Bayswater

European settlement began in the 1820's with the introduction of market gardening, poultry and dairy farming. The population remained stable until the 1870's when a population increase can be attributed to the construction of the railway from Perth to Guildford. Residential expansion and industrial growth continued in the City of Bayswater until the 1920's. During the post war period, population growth and significant development occurred due to immigration and the construction of public housing for returning soldiers. Commercial development and rapid residential growth continued in the 1950's and 1960's. Although growth in the City of Bayswater was fairly stable in the early 1990's, growth increased gradually. In 1996 the population was estimated to be at approximately 53,531 with figures from the Australian Bureau of Statistics estimating that the population of Bayswater had increased to 66,079 by 2016. This equates to a 23.44% increase in the population of Bayswater over a 20 year period.

Infill development in the City of Bayswater began in the 1990's and was driven by numerous factors including Perth's increasing population and the need to reduce urban sprawl. The original residential development style within Perth was of a moderate size house on a quarter acre block, which enabled at least one, if not more additional homes to be built on what was previously a single dwelling property. Below is a common example of urban infill development within Perth's older suburbs clearly illustrating the impact that infill development has had on canopy coverage in urban areas.
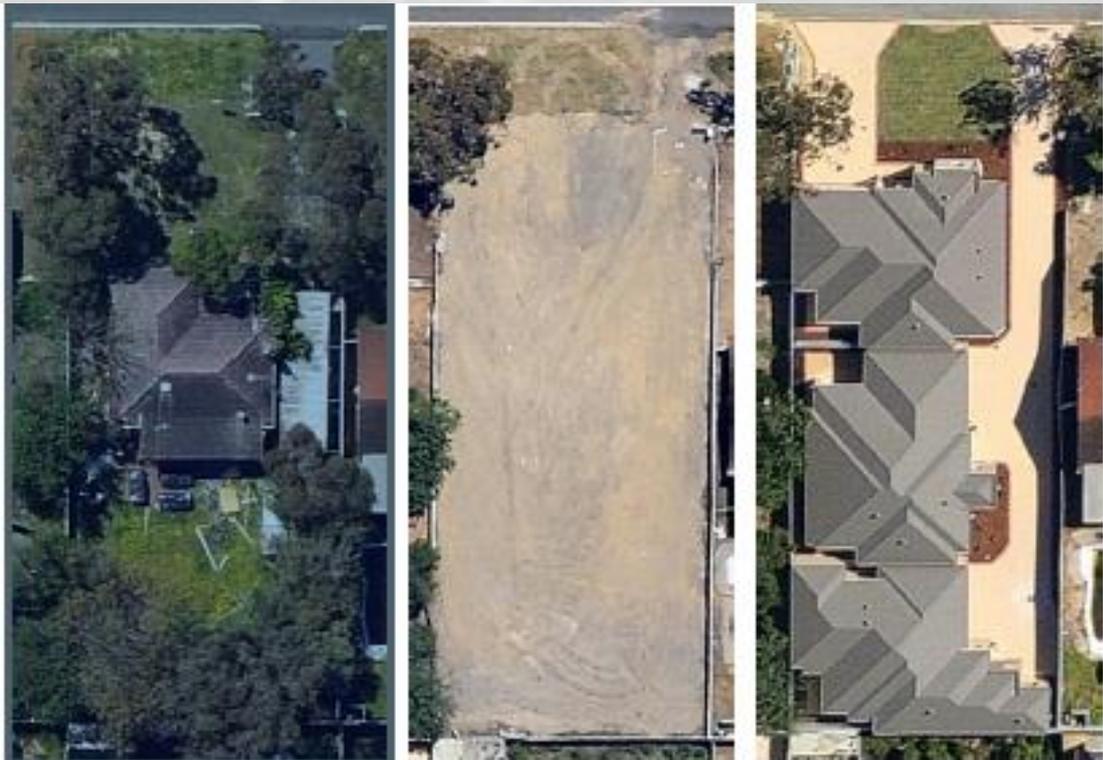

Figure 6: An example of infill development in the Perth metropolitan area clearly illustrating the limited potential for both the retention and replacement of trees within the development. The reduction in shade and increase in hard or impervious surfaces results in an increased temperature at a localised level for all three dwellings (Brown et al., 2013)

In addition to reduced block sizes through infill development, housing styles changed with more emphasis on larger living spaces and a subsequent reduction in the potential for retaining existing trees and for green spaces to be established following development. The increase of impervious surfaces and reduced shade levels results in increased temperatures at a localised level relative to the previous building form with significantly higher vegetation coverage.

Rapid population growth and the demand for new dwellings across Perth will mean that many people are likely to be attracted to the location, existing services, public transport connections and lifestyle options available in the City of Bayswater. This growth is both reflected in and supported by the State Government's draft planning framework. The draft Central Sub-Regional Planning Framework focuses on achieving higher infill and densities of residential and employment development within the existing built environment by making better use of established infrastructure. Under this framework The City of Bayswater is expected to accommodate an additional 15,800 dwellings through infill development by 2050.

Increased temperatures due to development practices combined with a warming and drying climate needs to be given serious consideration as it is clear that there is an inverse relationship between population growth and canopy coverage. That is to say, that as the City of Bayswater's population has increased with infill development; the level of canopy coverage has decreased significantly.

3.4 Lack of physical space

Trees and their canopy require room to grow to maturity above and below ground. In urban environments hard infrastructure and utilities are a significant threat to the urban forests, impeding their ability to expand upwards and below ground.

Significant volumes of canopy are lost each year due to the need to prune for overhead power line clearance. Ideally, power lines would be placed underground to allow for full canopy development. To address this issue the City of Sydney (2013) has funded and managed an Aerial Bundled Cabling (ABC) program. The conversion of multispan wires into one cable has resulted in a significant reduction in the need to prune canopy to the required nominal line clearance. Prior to the ABC program, pruning of up to 5.5m from the centre of tree was required, whereas this has been reduced significantly to 1m in streets where the program has been undertaken.

Methods in increasing rooting volumes, such as the use of structural soils and 'root cell' need to be considered in new construction projects and infrastructure upgrade projects. These methods not only improve tree health, but aids in preventing the disturbance of infrastructure from root activity.

3.5   Maintenance practices

Tree health is an important factor in any urban forest for an array of reasons. Healthy trees provide increased visual amenity; are more likely to achieve their expected life span; and are able to acquire higher levels of canopy growth.

Some past and current management practices and policies may be contributing to the poor health of the City's trees. It is well known that inattentive mowing and brush cutting techniques can damage the bark and surface roots which is detrimental to tree health.

Poor quality tree stock may also be attributing to reduced levels of tree health and establishment. It is highly important that all tree stock is purchased from accredited nurseries and an inspection is undertaken at the nursery for the following reasons prior to its receival:

- to reduce pest, disease and fungal infection
- to ensure appropriate stem taper
- to ensure the presence of lower laterals
- to ensure a suitable ratio of height to root volume
- to ensure an appropriate length of time in the bag or pot

Currently the City is reviewing its tree maintenance hygiene practices. This includes the sterilisation of pruning equipment between each tree maintenance activity.

It should be noted that issues regarding changes in maintenance regimes may require an adjustment period and some flexibility. For example, the City in a bid to increase canopy cover passed a resolution to cease the pruning of trees that were not under powerlines in December 2015. As a result the City received numerous complaints as some people felt that this was a reduction in Council services and there were issues relating to the shading of solar panels and tree litter. This reiterates the need to inform and consult with the community prior to taking on the ground action.

3.6   Pests and diseases

Tree pest and disease infestations can have deleterious impacts to our urban forest, primarily being a significant loss of canopy coverage at a localised level. It is important to note that although maximising canopy coverage is desirable, trees placed closely together can result in an increased rate of transmission of pests and diseases via the canopy.

Tree species diversification reduces the risk of tree mortality from diseases, fungal infections and pests. Increased species diversity brings increased genetic diversity within the urban forest and improves the potential for the forest to be able to adapt to changes in the environment such as severe droughts.

Species selection poses somewhat of a challenge in a changing climate, reiterating the need to undertake adaptive management to establish the most suitable species balanced with a considerable range of species being utilised within the urban forest.

Current management policies within the City of Bayswater may actually be unintentionally attributing to the spread of pest, disease and fungal infections. This is due to the fact that the City's Arborists need to seek approval to remove diseased or structurally unsound trees. Whilst Parks and Gardens advocate and promote the retention of healthy trees, it may be beneficial to have the discretionary ability to remove an infected tree quickly where remedial treatments are not an option, to prevent the spread of disease to healthy established trees.

3.7   Aging tree populations

A significant proportion of trees coming to the end of their useful life results is an increased public safety risk and can require significantly higher management costs. A health and condition assessment by a Consulting Arborist is required to monitor the progression of aging trees. This assessment is used to determine whether a tree is post mature (of a substantial age and in structural decline) or is moving into the veteran categories (of a significant age and maintaining structural integrity). This process will ensure that trees posing a high level of risk to the community are managed appropriately to address the safety hazard. Where removal is required, this is ideally undertaken in a planned fashion that includes replacement tree installation where appropriate, and preferably well before the post mature tree is removed so as to allow for some development of replacement canopy.

3.8   Achieving and measuring targets

Although increasing tree canopy coverage from 13.2% to 20% by year 2025 may not seem to be unattainable, this needs to be balanced with any tree canopy loss from development; the replacement of aging trees; vandalism; and the loss of trees due to poor health potentially caused by numerous factors. Furthermore, trees take a long time to grow to a size where the benefits derived from canopy coverage are obtained and maximised.

A range of people influence the present and future canopy levels within the City. This is through direct and indirect decisions made by Local Government Officers and landowners who choose to remove trees or not plant them at all. Our changing climate and the associated weather extremes has and will continue to impact on the health of some trees with irreversible effects.

Potential unplanned losses of canopy needs to be factored in when trying to achieve canopy targets. Due to the uncertainty of these unknown factors, it would be considered wise to compensate for potential loss with further increases of tree installation than thought required to meet the target of 20%.

A target of 20% canopy coverage may not be met by the year 2025. Regardless, immediate and ongoing action is required to ensure the health and well being of the community into the future. It is also important to remember that 20% is an initial target and that once reached, the City may want to consider increasing this even further as with many USA targets being at 30-40%.

Currently officers within 'Parks and Gardens' are unable to undertake some of their established and planned maintenance tasks due to under resourcing. Therefore increased investment is required if both onground actions and evaluation targets are to be met.

3.9   Available information & resources

Urban forestry is a relatively new discipline in Australia and as such is yet to be well researched, applied and measured. Research findings from overseas, especially the USA, Europe and Asia are often utilised to supplement a lack of information in the local context (City of Melbourne, 2012).

In saying that, Australian cities have been managing urban trees for a significant time. The challenge will be adapting current arboriculture and horticulture knowledge into the future to evolve with a warming and drying climate.

Working with Local Government Authorities throughout Perth, specifically those located on the Bassendean Sands soil type, to share information and findings will assist in maximising available resources.

3.10   Community expectations

The City of Bayswater has a wide and diverse population including people living in multi storey apartments, small and large residential blocks and commercial properties. Everyone has their own perspective on the value of trees. People's attitudes towards trees can also be influenced by age, cultural background, income, education and past experiences with natural environments.

At the extreme end of the spectrum are individuals that may have an accentuated fear of trees, particularly limb drop, whilst other people may just find certain aspects of trees annoying such as leaf litter; obstruction of views; the clogging of pipes; and shaded spaces.

These concerns are all valid and need to be addressed through information that advises on the most appropriate techniques to deal with the issue. Generally there are solutions that can be found without having to remove the tree. Community engagement and education also needs to inform people of the importance of trees in terms of liveability for now and into the future, and their importance in adapting to climate change. There is a need to focus on barriers to behavioural change and not just raising awareness within the community. Having information available in other languages and provided in a range of formats (electronic and hard copies); and available at a range of forums and public places is highly beneficial.

On the other end of the spectrum are people that inherently love trees and fully appreciate the ecosystem services and visual display they provide. As trees are living organisms they will develop, reach maturity and eventually die. The removal of trees from the environment, especially urban environments where trees can be an integral part of the landscape character can be a traumatic and emotional experience for some within the community.   As trees age and reach either post maturity or veteran status they will require an increased level of maintenance and will eventually require removal.

Ultimately there will come a time where the costs of managing post mature trees is greater than the benefits derived from the tree. When undertaking the management of urban forests it is important to remember that the needs of the whole community will have to be prioritised over the desires of some. It is also important to remember that the removal of a unhealthy, post mature specimen will, aid preventing the spread of pest, disease and fungal infections, remove high levels of risk to the public and allow for the installation of new trees that in time will go on to provide those same benefits to future generations.

3.11   Valuation of the urban forest

In recent years many land managers have begun to value urban forests holistically, considering not only the amenity values of trees but the full range of economic, social and environmental benefits that the urban forests provide the community. This has seen some Perth Council's value individual trees in excess of $50,000.

The City of Bayswater utilises the Helliwell method. The Helliwell method traditionally focused on the visual amenity of trees utilising expert judgement (Sarajevs, 2011) and has been revised over time (Helliwell, 2008).

The Helliwell method is well established and is a commonly used technique among Australian Local Government Authorities and internationally. A significant benefit of this method is its relative simplicity in undertaking tree valuations and its ability to easily be adapted to include factors such as the actual cost of installing and maintaining trees, which was not a component of the original method (Sarajevs, 2011). In addition, there are established base values utilised in the calculation of tree values which can easily be adjusted.

The City of Melbourne has estimated the amenity value of their urban forest at $700 million. In addition, the US based i-Tree method is utilised to determine the environmental value of their urban forest. The initial valuation of 982 trees located within the CBD indicated that these trees had a total worth of $10.4 million dollars. If these calculations are applied to the City of Bayswater's urban forest which is estimated to be at over 33,000 trees, the value of our forest is easily in excess of 300 million dollars

Applying modernised evaluation techniques to urban forests can assist in justifying the significantly higher costs associated with urban forestry programs.

4   Development of the urban forest strategy

Urban forests play an important role in the economic sustainability of cities as well as the social, health and environmental amenities they provide. The conceptual shift of managing trees as a collective and integrated connected canopy, rather than dealing with trees on an individual basis can be managed through the development of an urban forest strategy. There has been significant focus from Council and the community to investigate ways in which canopy coverage can be increased throughout the City, with Council making a commitment to increase canopy coverage from 13.2% to 20% by the year 2025. The development of an urban forest strategy is a critical step in outlining how an increase in canopy coverage can be achieved. Engaging the community is considered integral to the development of the strategy.

4.1   Community engagement

In considering Council's concerns of past community engagement activities not attracting a broad enough cross section of the community to provide meaningful feedback, the City developed a different approach. To ensure a wider spectrum of the community were involved in the community engagement process, three separate workshops were held targeting three specific stakeholder groups as follows:

Workshop 1: *12 November, 2016* Community environmental groups.

Workshop 2: *19 November, 2016* Residents that had contacted the City regarding tree maintenance issues.

Workshop 3: *7 December, 2016* Local businesses and developers.

This approach was developed with the intention of providing an open discussion for participants to communicate their concerns regarding trees and their management, and to provide input as to their visions for the City of Bayswater's urban forest.

The community were asked to discuss their:

1. **Concerns** and **issues** to be considered in formulating the City of Bayswater's urban forest strategy.
2. **Vision** for the urban forest strategy (UFS) and
3. **Initiatives** that should be considered in developing the strategy.

Common themes amongst all three workshops as well as themes common to two workshops were identified and are presented in Table 1 below.

It was identified that there was only one common point amongst all three workshops within the 'vision' category and two common points within the 'initiatives' category. **'Increasing canopy coverage on public land**' featured as a common point raised in both the 'vision' and 'initiatives category with **'improved maintenance regimes'** also a common point within the 'initiatives' category.

Common points amongst two out of three workshops were also identified. It should be noted that the **use of inappropriate species, with the need to review and improve species selection** was a theme common to all three categories.

Discussion point	Theme		Workshops that identified this
Concerns & Issues	1.	*The use of inappropriate species*	*1 & 3*
	2.	*Poor pruning /maintenance practices*	*1 & 2*
	1.	**Increase canopy coverage on public land**	*1,2 & 3*
Visions	2.	*Improved liveability*	*1 & 3*
	3.	*Improve species selection*	*1,2*
	4.	*Improve maintenance methods*	*1,2*
	1.	**Increase canopy coverage on public land**	*1, 2 &,3*
Initiatives to be considered	**2.**	**Improve maintenance regimes**	*1, 2 & 3*
	3.	*Incentivise tree retention on private land*	*1& 3*
	4.	*Review the tree species list*	*1 & 2*
	5.	*Raise awareness of the benefits of urban forests*	*1& 2*
	6.	*Increase community engagement*	*1& 2*
	7.	*Apply a dollar value to trees (economic value)*	*1& 3*

Table 1: Common themes identified amongst the 3 Urban Forest Strategy workshops held by the City of Bayswater in late 2016 with themes common to 2 out of 3 workshops also identified

In addition to the three stakeholder workshops, an online survey was conducted with approximately 70 anonymous participants.

The online survey participants were asked to rank the importance of particular benefits of urban forests that the City of Bayswater's UFS should focus on, with the results as follows

Ranking	Benefits of the urban forest
1.	Environmental benefits from trees
2.	Cooling our streets in summer
3.	Creating a healthier and happier City for people
4.	Creating nice streets to walk in
5.	Creating a place for people
6.	Creating an attractive City

Table 2: Ranking of the importance of particular benefits of urban forests

Respondents were then asked to rank the following goals in terms of importance with the results as follows:

Ranking	Goals
1.	Reducing the loss of trees on private land
2.	Increasing canopy cover within the urban forest
3.	Protecting existing trees on verges in public places
4.	Prioritising tree planting to streets with limited trees
5.	Increasing the number of trees on public land
6.	Raising community awareness on the importance of the City's urban forest
7.	Protecting existing trees on private land
8.	Maintaining trees
9.	Increasing funding levels
10.	Promoting different species of trees
11.	Replacing aging trees
12.	Preventing trees becoming a nuisance
13.	Maintaining funding levels
14.	Regular tree pruning to maintain shape and limit leaf drop
15.	None of the above. This issue is not important to me

Table 3: Ranking of the importance of the goals in reference to the development of the urban forest strategy

Respondents were asked whether the City should investigate measures to limit the loss of trees on private land. This attracted a positive reaction to over 79% of respondents.

Respondents then provided their opinions on what methods Council could utilise to limit the loss of trees on private land. The results indicated the following:

- *A balance of both approaches (incentives & regulation)*   *55.39%*
- *Provide incentives for people who retain trees on their land*   *24.61%*
- *Requiring people to retain trees on their land*   *15.39%*
- *No actions to retain trees on private land*   *4.61%*
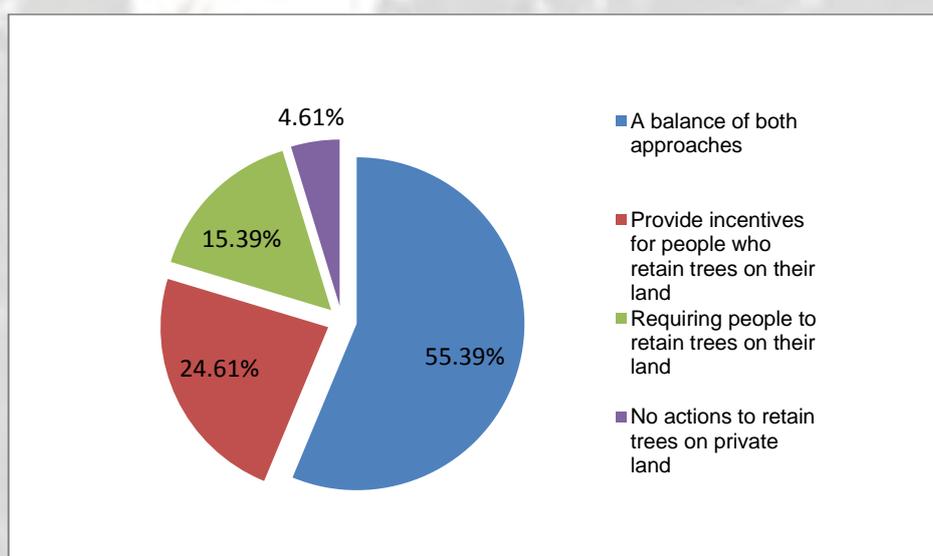
There are numerous commonalities amongst the information acquired through Stage 1 of the consultative processes which are recapitulated as follows:

- Increase canopy cover on public land;
- Increase species diversity;
- Protect and value existing trees on public and private land;
- Improved liveability;
- Provide incentives for residents to retain and install canopy on private land;
- Investigate methods to retain trees on private land;
- Engage the community and raise awareness; and
- Improving maintenance regimes.

The most significant difference between the workshop participants and the anonymous online survey results is that the workshop participants rated **'an increase of canopy coverage on public land'** as the most significant theme whereas the online survey results indicated that 55.38% of participants wanted to see Council take action in '**preventing the loss of trees on private land**'.

Stage 2 of the community consultation process comprised of a community forum held on the 25 February 2017 at the Bayswater Civic Centre. The primary aim of the forum was to present the strategic objectives and actions of the draft Urban Forest Strategy to the community.

Overall the strategic objectives and actions were viewed as suitable and reflected both common sense and undertakings which are in line with other urban forest strategies nationally and internationally.

It is important to note that although there were some strong opinions expressed that the City should be taking more of a regulatory approach in retaining trees on private land, there was equally held community opinion that the City should not regulate on private land. This is due to the perceived unfairness of allowing past developments to maximise their profits whilst potentially limiting the profits made on future developments. This contrast of opinion in retaining trees on private land is reflected in both the results of Stage 1 of the City's community engagement process and that of the experience of other Local Government Authorities throughout Perth.

The introduction of a significant tree register for public land was widely accepted whereas a significant tree register for private land was viewed as controversial by some and necessary by others. It should be noted that a tree listed on a significant tree register does not equate to a tree not being able to be removed for either developmental or public safety risk reasons. The aim of a significant tree register is to provide a layer of protection through the requirement of an application to remove the tree if needed; allows for a more comprehensive tree inventory to be maintained; and may be a tool utilised to allow for incentives to be directed to property owners that retain and install trees in the future.

Research undertaken by Treelogic for the City of Melbourne (2012) supports the view that the development of a significant tree register is the most effective way of protecting trees on private land.

4.2   Research

To date, research into what other Councils internationally and nationally have undertaken to expand their urban forests in efforts to adapt to climate change and mitigate the UHI effect has been reviewed. This approach enables the City to not only gain an understanding of urban forestry principles and benefit from the findings of other local governments, but also allows the City to assess where cost savings may be achieved, allowing more resources to be directed to on ground actions.

In addition to reviewing other strategies, City of Bayswater Officers have also met with other Councils that are at varying stages of developing and implementing their UFS to gain an understanding of the challenges and successes experienced by these front runners.

The fundamental themes common to most urban forest strategies worldwide are:

- Increase canopy coverage;
- Increase species diversity; and
- Engage the community.

Common strategic objectives undertaken in Australia and specifically in Perth, in addition to the aforementioned objectives are:

- Protecting existing established trees; and
- Replacing aging trees.

The information gained through the review of urban forest strategies and community engagement processes has been utilised to develop the strategic objectives for the City of Bayswater's Urban Forest Strategy.

5 Strategic Objectives

In considering the outcomes of the research undertaken and community feedback, the following strategic objectives have been developed.

5.1 Strategic Objective 1: Protection and retention of existing trees

Trees take many years to grow and to provide the subsequent social, environmental and economic benefits that have been acknowledged in recent times. Therefore it makes sense to protect and retain established trees that are in good health and condition. Maintaining the health of our established trees needs to be a priority of any urban forest maintenance regime.

It is obvious that larger established trees with larger canopies have more value than smaller trees with smaller canopies. The increased benefit of established trees has been estimated to be up to 75% more than that of smaller trees (City of Melbourne, 2012) and further supports the need to retain existing established trees.

Climate change

It is important to remember that our trees are facing unprecedented changes of a drier and hotter climate with a reduction of 15% in rainfall over the last 40 years (Towie 2011). Investigations into soil moisture indexes and the health of our established trees are advisable to avoid the loss of well established trees, as was experienced in Perth's Hills over the summer of 2011. These findings may require changes to our watering regimes. Traditionally established trees have not been watered as their extensive root systems have tapped into groundwater supplies. However, in a drying climate this situation may need to be reviewed.

Development

There are many examples of trees being removed unnecessarily due to reasons ranging from ease of development; complaints regarding leaf litter; or fears relating to the loss of tree limbs and the potential damage that this could cause. Reviewing Council tree removal policies to ensure trees are removed only when deemed necessary is considered essential.

Maintenance

Past tree maintenance regimes lacking consistent hygiene procedures such as the routine cleaning of pruning tools may have attributed to the decline of health and subsequent removal of some trees. Currently the City is reviewing its tree maintenance hygiene practices. This includes the sterilisation of pruning equipment between each tree maintenance activity.

Trees on private land

The loss of trees in the private sector is a far more contentious and problematic area to address. Research in Australia and internationally has indicated that the highest area in which tree canopy coverage is being lost is mainly within urban areas on private land and is due to both urban infill and the tendency to build bigger houses on subdivided blocks (Brown et al. 2013). This is in line with preliminary investigations within the City of Bayswater through the review of aerial images and anecdotal evidence. Furthermore, this is also consistent with patterns of tree canopy loss in suburbs with similar characteristics (older suburbs that have seen a high level of infill development over the last 20 years) such as the Cities of Stirling and Belmont.

The retention and protection of trees on new developments within the private landowner realm requires support from Council at a policy level. Several options are currently being considered by local governments including but not limited to programs aimed at educating the community and developers of the value of retaining established trees; the provision of incentives for developers to retain onsite trees; and the creation of significant tree registers that require Council approval before clearing of the trees can be undertaken. Additionally, as part of the State Governments Design WA initiative, the Draft Apartment Design Guide which will replace the Multi-Unit Housing Codes - Part 6 of the Residential Design Codes (R-Codes) contains guidance and incentives for tree protection during development and the provision of deep root zones on private land to allow for tree planting.

Actions that need to be undertaken

1. *Develop a significant tree register for trees on public land*
2. *Develop a significant tree register for private land*
3. *Conduct routine tree health assessments to inform adaptive management practices*
4. *Review and develop tree protection guidelines and policies to manage requests for vegetation pruning for inappropriate reasons e.g. additional access to private blocks; to gain or retain views*
5. *Develop practices which embed the retention of trees as a high priority for all City public works*
6. *Develop Management Practice to standardise the valuation of trees (e.g. Helliwell method) which enables the assessment of the economic, health and environmental contributions that trees make to the City*
7. *Review and consider potential policies and incentives available to encourage private landowners and developers to retain established trees and plant new trees.*

5.2   Strategic Objective 2: Increasing tree canopy cover

Canopy coverage is the amount of physical coverage of tree canopy over an area of land, generally measured as a percentage to indicate any given area shaded by trees. Increasing shade and canopy biomass is considered one of the most effective ways of mitigating the UHI effect. The cooling benefits of trees are not only a result of the shade they provide but are also achieved through the process of evapotranspiration. Tree canopy coverage is a key element in measuring the urban forest's ability to produce health, environmental and economic benefits to the community.

Preliminary assessment of tree canopy coverage within the City of Bayswater indicates that canopy coverage is approximately 13.2%. The City has made an aspirational commitment to increase tree canopy coverage to 20% by the year 2025.

Increasing the number of trees in the City of Bayswater is important, but this must be undertaken in a coordinated way to ensure that the benefits derived are maximised. Research into the ways in which maintenance regimes and species selection can maximise canopy coverage throughout the City of Bayswater is recommended.

It is imperative to remember that maximising canopy coverage is not necessarily achieved just through the installation of more trees. In saying that, it is obvious that areas that currently have a relatively low amount of canopy coverage should be the focus of Council tree plantings projects as an initial phase of the urban forest program. There are numerous areas that have been identified as lacking verge trees and general canopy coverage through both aerial photography and thermal mapping, such as parts of Noranda and Morley.

Although the City currently has an optional 'Free Street Tree' program, this has traditionally not had a high participation rate. Informing residents of the value and benefits derived from installing trees and the canopy coverage benefits they provide is one method that can be explored to encourage residents to participate in this program. Another avenue to be investigated is the introduction of a compulsory verge tree policy such as the policy introduced by the City of Stirling in 2014.

A compulsory verge tree policy, may be met with resistance by some, however it will not only assist in increasing canopy coverage levels throughout the municipality but will also demonstrate to the community that the City of Bayswater is committed to increasing canopy coverage and expanding on our urban forest.

Actions

1. *Undertake spatial analysis to identify areas containing low canopy cover to direct future plantings*

2. *Ensure optimal planting conditions for new tree installations to maximise canopy growth including sufficient ground space*

3. *Conduct routine tree health assessments and incorporate adaptive management practices*

4. *Develop a policy statement which identifies the need to retain adequate spaces for tree installation in municipal work projects*

5. *Develop, fund and implement an aspirational tree planting program to increase the canopy coverage from 13.2% to 20% over an eight year period. This plan will include :*
   a) Parks and streetscape plans;
   b) The development of town centre plans specifying locations and species selection;
   c) The incorporation of the biodiversity corridors; and
   d.) Natural area & green space restoration plans

6. *Encourage open spaces for tree installation in new developments*

7. *Promote the benefits of and encourage increases in canopy coverage on private land e.g. the 'Plants to Residents' program.*

8. *Consider a compulsory 'Verge Tree' policy*

5.3   Strategic Objective 3: Increasing tree species diversity

Species diversity is a significant component to consider in managing an urban forest. A high level of species is advantageous as it reduces the potential for catastrophic tree loss due to disease or pests that generally target a particular species, genus or family.

Urban environments are highly modified compared to natural landscapes resulting in far harsher conditions for trees and vegetation to establish and grow. Urban areas generally contain compacted soils; have more severe heating and shading periods; provide smaller areas for root development and have routine disruptions to canopies and root systems. All of these elements have negative impacts to tree health and are a consistent threat to urban forests.

Not many tree species cope well in these harsh conditions and this has resulted in a limited number of tree species used in streetscapes and public open space plantings. This equates to a lower rate of species diversity.

Although these species were selected for their resilience and ability to cope in harsh conditions, limiting species diversity results in an urban forest that is more vulnerable to disease and pests, which is further amplified by climate change stress.

A good example of this can be found in the City of Melbourne's central business district where the majority of trees are Plane trees. The Plane tree is susceptible to extreme heat; a recently established pest known as the Sycamore Lace Bug and diseases such as Plane tree canker stain, cinnamon fungus and anthracnose. As Plane trees comprise nearly 10% of Melbourne's urban forest, a large scale loss of these trees would have substantial visual and environmental impacts including an intensified UHI effect.

To address this issue, the City of Melbourne has made a commitment to work towards having an urban forest that contains:

- No more than 20% of any one family;
- No more than 10% of any one genus; and
- No more than 5% of any one species.

The City of Sydney has introduced a tree species diversity policy that is similar but less stringent with an urban forest that contains:

- No more than 30-40% of any one family;
- No more that 20-30% of any one genus; and
- No more than 5-10% of any one species.

This family, genus and species range has been developed as a guide rather than a prescriptive policy and as such, the aspiration for increased diversity should not override the need to select the most appropriate species for any particular site.

Currently the City of Bayswater promotes the use of 18 tree species as shown in the table below.

Scientific name	Common name
Lophostemon confertus	Queensland Box
Agonis flexuosa	WA Peppermint
Eucalyptus ficifolia	Red Flowering Gum
Eucalyptus torquata	Coral Gum
Melaleuca quinquenervia	Paperbark
Callistemon Kings Park Special	Bottlebrush
Olea europaea	Olive
Hymenosporum flavum	Native Frangipani
Fraxinus excelsior 'Aurea'	Golden Ash
Tristaniopsis laurina	Water Gum
Eucalyptus platypus	Eucalyptus platypus
Fraxinus griffithii	Flowering Ash
Fraxinus raywoodii	Claret Ash
Prunis dulcis	Almond
Pyrus ussuriensis	Manchurian Pear
Sapium sebiferum	Chinese Tallow
Jacaranda mimosifolia	Jacaranda
Pyrus nivalis	Snow Pear

Table 4: Species list of trees utilised in City of Bayswater tree planting programs

The City of Bayswater will need to review and assess the species utilised in their planting regimes in an effort to increase overall species diversity. This will ensure the long term viability of the urban forest in terms of the ability to adapt and cope in a warming and drying climate, and to avoid potential significant loss of species from pests and diseases.

Species selection will also need to consider allergens through pollen production. Many people believe that Australian native plants are a major contributor of pollens. In reality most Australian native species are nectar rich plants, rather than pollen producers. Non native trees such as conifers, oaks, maples, poplars and grasses produce significantly higher amounts of pollen than native plants (Australasian Society of Clinical Immunology and Allergy, 2015) and are thereby a major factor in allergy levels in the community. Avoiding particular tree species and utilising female tree specimens where possible instead, of pollen producing male specimens could be considered when investigating suitable tree species for the urban forest.

Actions to be undertaken

1. *Review and develop a recommended tree species list most suitable for use in:*
   - parks and streetscapes;
   - town centres; and
   - private land holdings (detailing benefits provided by individual species).

2. *Monitor and identify existing and new tree species that perform well within the urban forest to inform future planting programs.*

3. *Conduct a tree audit of all public trees which includes species, age and health data.*

4. *Establish a standard for the percentage of any one tree family, genus and species that can be utilised in City's overall planting program.*

5.4   Strategic Objective 4: Achieving age diversity of trees

The age diversity of trees is considered an important element of a durable urban forest and ensures that succession is planned for once a tree begins senescence.

Many of the iconic trees in the City of Bayswater and throughout Perth were planted around the same period, often by town planning visionaries. There are also many remnant native trees that were retained on private and public land. Therefore it is a reasonable view that they will come to the end of their life about the same time and this will result in a sudden loss of tree canopy coverage at a localised level.

The useful life expectancy (ULE) of a tree is a measure of the potential timeframe in which a tree can be expected to survive in situ. ULE is an important tool utilised in urban forestry (City of Melbourne, 2012) as it facilitates the long term planning for the replacement of aging trees by having the potential to prevent significant gaps in canopy coverage and a reduction in the benefits it provides.

ULE assessment at the species level can assist in identifying species within the urban forest that are relatively poor performers. This information can be utilised to either reassess the maintenance regime of that particular species or review whether or not it is viable to have that particular species within the urban forest (City of Perth, 2016). ULE is a useful tool in developing a recommended species list of plants most suited to be utilised within the urban forest.

It is reasonable to suggest that the impacts of climate change and the urban heat island effect could also result in established trees coming to the end of their useful life expectancy prematurely. Assessment of the age and health status of trees within the City and the development of a Post Mature Tree Replacement program is suggested to attempt to reduce the potential for large scale canopy loss.

Actions to be undertaken

1. *Undertake assessment of individual tree age and life expectancy (ULE);*

2. *Development of a Post Mature Tree Replacement Program*

3. *Develop a community program assisting residents to plan for the succession of established tree(s) on private property*

5.5   Strategic Objective 5: Inform and consult with the community

Successful urban forestry management requires a community that is supportive (Schwab, 2009). Maintaining the Community's connection with nature is a primary need and has significant benefits for urban communities (Urban Environment Project).

The urban forest provides benefits to everyone within the community regardless of whether or not it is recognised by individuals. Some people inherently value trees for their aesthetic values and the range of benefits they provide society, whilst others may focus on the less appreciated aspects of trees such as leaf litter, allergies, obstruction of views and the potential for loss of tree limbs, which incites fear in many people (City of Perth, 2016).

Ultimately the presence of trees within our City has become a necessity rather than a personal preference or choice and this need to maximise our urban forest and the benefits provided requires effective information delivery, especially to those who do not value trees currently. It is important that the wider community is engaged and informed about the importance and benefits derived from green infrastructure and the role it plays in the City of Bayswater's liveability, sustainability and cultural identity.

Community consultation on the development of an urban forest strategy held in November and December 2016, as well as an online survey provided the preliminary information utilised to develop this strategy.

The City of Bayswater aspires to provide leadership and be a strong advocate for the urban forest. Bringing the wider community along for the journey to explore all options and expanding on our urban forest to improve liveability and ensure our survival in a changing climate is essential.

Actions to be undertaken

1. Continued community engagement to facilitate community input into future greening projects.
2. Foster further research into urban forestry.
3. Work with neighbouring Councils to enhance the urban forest in the greater Perth Metropolitan area.
4. Establish health and well-being indicators to benchmark the function that the urban forest plays.
5. Partner with traditional owners to develop programs that increase awareness of the cultural significance of the land.
6. Promote the health, economic and eviornmental benefits of trees and encourage increases in canopy coverage on private land.
7. Develop a community tree care program for urban streets.

6   Summary

This Strategy puts forward objectives, actions and principles to guide the planning, advancement and management of the City of Bayswater's urban forest.

It is important to remember that for urban forest planning to evolve and deliver successful outcomes it needs to be based on robust research; promote best practice implementation and management techniques; allow for a range of options and practices to be trialled; and to be sufficiently resourced.

The following priority actions have been identified:

- Undertake canopy coverage mapping of the City and by suburb
- Undertake health and age assessments of trees within the urban forest
- Review of urban forest valuation methodology to ensure the inclusion of the economic, social and environmental benefits of the City's urban forest
- Develop a significant tree register for public land
- Develop a significant tree register for private land
- Develop an evidence based implementation plan that reflects the proposed objectives and actions, and includes a monitoring framework

Canopy mapping will enable the City to determine the precise canopy coverage percentage throughout the City of Bayswater and to accurately assess in increases or decreases in canopy over time. Mapping will also enable the difference in canopy coverage between suburbs in the City to be determined, allowing planting activities to be directed to areas most in need of trees.

Health and age assessments of individual trees within the urban forest will assist in planning for short and long term activities based on the assessment of suitable species to be utilised; trialling adaptive management techniques; and planning for the replacement of aging trees.

There has been some concern within the Community that the City's current tree valuation method does not reflect the full range of benefits delivered by the urban forest. The under valuation of trees can be linked with the premature or unnecessary removal of trees. A comprehensive system of tree valuation will not only result in a higher economic value placed on individual trees, will assist in preserving existing trees and may promote the installation of trees on private property.

A significant tree register for both public and private land will provide a layer of protection over the most valuable trees within the City's urban forest and complements an increased tree valuation program.

The development of an urban forest implementation plan will provide the main tool in which the vision, objectives and actions of the City of Bayswater's Urban Forest Strategy will be delivered. The plan will also include a monitoring framework to allow for the progression of the urban forest program to be tracked and reviewed.

There are fundamental actions presented within the UFS that are based on the principles of adaptive management. As such, the strategy will require routine review and may require modification. Changes to planned activities should be driven by the results of monitoring activities indicating change could be beneficial or is necessary; and where there have been advances in knowledge of urban forestry.

Although rigorous analysis and assessment of the health of our urban forest and its ability to cope in a warming and drying climate is yet to be undertaken, we do know one thing for certain- it is important that the City of Bayswater's urban forest is both maintained and expanded on to increase canopy coverage throughout the City as part of a multi-faceted approach to adapting to climate change and improving liveability standards for the whole community.

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Appendix 1

Summary of the proposed Strategic Objectives & Actions for Bayswater's Urban Forest Strategy

Objectives	Strategic Actions
1. Protection and retention of existing trees *Maintain and maximise the level of canopy coverage already present*	1. Develop a significant tree register for trees on public land
	2. Develop a significant tree register for trees on private land
	3. Conduct routine tree health assessments to inform adaptive management practices
	4. Review and develop tree protection guidelines and policies to manage requests for vegetation pruning for inappropriate reasons e.g. additional access to private blocks; to gain or retain views
	5. Develop practices which embed the retention of trees as a high priority for all City public works
	6. Develop a Management Practice to standardise the valuation of trees (e.g. Helliwell method) which enables the assessment of the economic, health and environmental contributions that trees make to the City
	7. Review and consider potential policies and incentives available to encourage private landowners and developers to retain established trees and plant new trees.
2. Increasing Canopy coverage *The City will aim to increase the canopy cover from 13.2% to 20% by the year 2025*	1. Undertake spatial analysis to identify areas containing low canopy cover to direct future plantings
	2. Ensure optimal planting conditions for new tree installations to maximise canopy growth including sufficient ground space
	3. Conduct routine tree health assessments and incorporate adaptive management practices
	4. Develop procedures which identify the need to retain adequate spaces for tree installation in municipal work projects

	5. Develop, fund and implement an aspirational tree planting program to increase the canopy coverage from 13.2% to 20% over an eight year period. This plan will include:
	  a. parks and streetscape plans;
	  b. the development of town centre plans that include tree installation, specifying locations & species selection;
	  c. the incorporation of the biodiversity corridors; and
	  d. natural area & green space restoration plans

	6. Encourage open spaces for tree installation in new developments
	7. Promote the benefits of and encourage increases in canopy coverage on private land e.g. the 'Plants to Residents' program
	8. Consider the possibility of a compulsory 'Verge Tree' policy

Objectives	Strategic Actions
3. Increasing tree species diversity *Increase species diversity to ensure resilience from diseases and pests.*	1. Review and develop recommended tree species lists most suitable for use in: 　- parks and streetscapes; 　- town centres; & 　- private land holdings (detailing benefits provided by individual species)
	2. Monitor and identify existing and new tree species that perform well within the urban forest to inform future planting programs - providing amenity outcomes; & - providing biodiversity outcomes
	3. Conduct a tree audit of all public trees including species, age and health
	4. Establish a standard for the percentage of any one family, genus and species that can be utilised in City's overall planting program.
4. Achieving age diversity of trees *Increase the age spread of trees within the City to ensure a stable succession plan*	1. Undertake assessment of individual tree age and life expectancy (ULE)
	2. Develop a Post Mature Tree Replacement Program
	3. Develop a community program assisting residents to plan for the succession of established trees on private property
5. Informing and consulting with the community *Ensure that the local community is involved in continually improving the urban forest strategy*	1. Continued community engagement to facilitate community input into future greening projects
	2. Foster further research into urban forestry
	3. Work with neighbouring Councils to enhance the urban forest in the greater Perth Metropolitan area
	4. Establish health and wellbeing indicators to benchmark the function that the urban forest plays.
	5. Partner with traditional owners to develop programs that increase awareness of the cultural significance of the land.
	6. Promote the health, economic and environmental benefits of trees and encourage increases in canopy coverage on private land
	7. Develop a community tree care program for urban streets

Appendix 2

Detailed Action List of the proposed strategic focus points for the City of Bayswater's Urban Forest Implementation Plan

Strategic Objective	Strategic Actions	2017	2018 - 2019	2019- 2021	2021 - 2025	Cost (one off)	Cost (Annual Ongoing)
1. Protection and retention of existing trees	1. Development of a Significant Trees registry for trees on public land						
	2. Development of a Significant Trees registry for trees on private land						
	3. Conduct routine tree health assessments to inform adaptive management practices						
	4. Review and develop tree protection guidelines and policies to manage requests for vegetation pruning for inappropriate reasons e.g. Additional access to private blocks; to gain or retain views						
	5. Develop practices which embed the planting and retention of trees as a high priority for all City public works.						
	6. Develop a Management Practice to standardise the valuation of trees (e.g. Helliwell method) which enables the assessment of the economic, health and environmental contributions that trees make to the City						
	7. Review and consider potential policies and incentives available to encourage private landowners and developers to retain established trees and plant new trees						
2. Increasing tree canopy coverage	1. Undertake spatial analysis to identify areas containing low canopy cover to direct future plantings						
	2. Ensure optimal planting conditions for new tree installations to maximise canopy growth, including sufficient ground space						
	3. Conduct routine tree health assessments and incorporate adaptive management						
	4. Develop procedures which identify the need to retain adequate spaces for tree installation in municipal work projects.						
	5. Develop, fund and implement an aspirational tree planting program to increase the canopy coverage from 13.2% to 20% over an eight year period. This plan will include: ▪ Parks and streetscape plans, ▪ Town centre plans that include tree installation, specifying species & location ▪ Incorporating the biodiversity corridors, ▪ Natural area & green space restoration plans.						

Strategic Objective	Strategic Actions	2017	2018 - 2019	2019-2021	2021 - 2025	Cost (one off)	Cost (Annual Ongoing)
3. Increasing tree species diversity	1. Review and develop recommended tree species lists most suitable for use in: - parks and streetscapes; - town centres; and - private land holdings (detailing benefits provided by individual species)						
	2. Monitor and identify existing and new tree species that perform well within the urban forest to inform future planting programs - providing amenity outcomes - providing biodiversity outcomes						
	3. Conduct a tree audit of all public trees including species, age and health						
	4. Establish a standard for the percentage of any one family, genera and species that can be utilised in City's overall planting program.						
4. Achieving age diversity of trees	1. Undertake assessment of individual tree age and life expectancy (ULE)						
	2. Develop a Post Mature Tree Replacement Program						
	3. Develop a community program assisting residents to plan for the succession of established trees on private property						
5. Informing and consulting with the community	1. Continued community engagement to facilitate community input into future greening projects						
	2. Foster further research into urban forestry						
	3. Work with neighbouring Councils to enhance the urban forest in the greater Perth Metropolitan area						
	4. Establish health and wellbeing indicators to benchmark the function that the urban forest plays.						
	5. Partner with traditional owners to develop programs that increase awareness of the cultural significance of the land in which we reside						
	6. Promote the benefits of and encourage increases in canopy coverage on private land						
	7. Develop a community tree care program for urban streets						