



Urban Forest Plan





The City of Stirling acknowledges the Wadjak People of the Nyoongar Nation as the traditional custodians of Mooro Country. We pay our respects to Aboriginal and Torres Strait Islander Elders past, present and emerging for they hold the memories, the traditions, the culture and hopes for Aboriginal Australia.

Snapshot of our plan

Our vision

The City of Stirling is shaded by a diverse canopy of trees which cools our City, provides habitat for wildlife, creates attractive leafy, green streets, and maintains liveability as our climate changes. Our canopy is distributed across the City, allowing all members of our community to benefit from the urban forest. Our buildings and infrastructure are designed to support tree health and growth, which maximises the benefits that the canopy provides.

Our community values, protects and cares for existing trees, plants new trees, and is provided with assistance, rewards and recognition by the City.

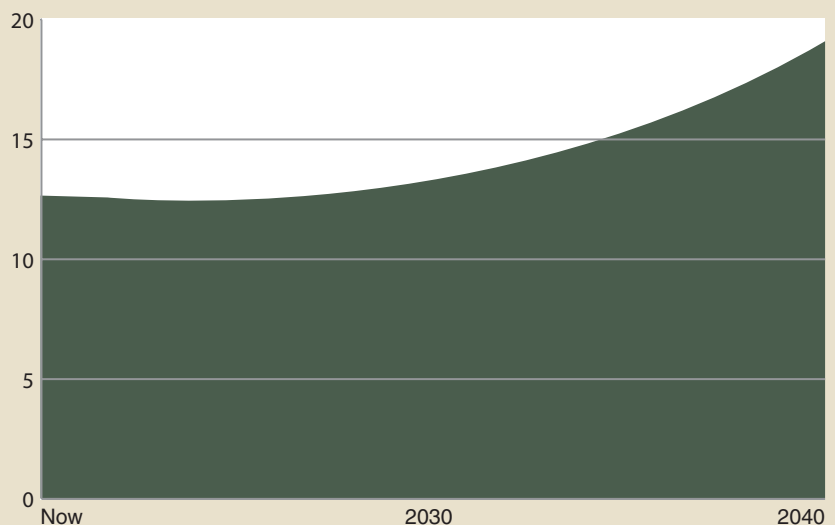
City trees receive the best possible care to ensure a long and healthy life. The City leads by example in its own projects and works to embed protection of our urban forest within the values of our community, our organisation and other tiers of government.

Our canopy cover:
12.6 per cent average
City-wide

Our canopy target:
18 per cent average canopy
cover City-wide by 2040

**Our strategies to grow the
urban forest:**

- 1 Engage the community
- 2 Plant more trees
- 3 Retain more trees
- 4 Maximise canopy growth and benefits



Our challenge

Each year the City of Stirling loses four times more canopy than we grow. In the last six years the City has lost 1.2 million square metres of canopy. Two-thirds of this loss has occurred on residential land, primarily as a result of development. If these trends continue, many suburbs will lose between 50 and 85 per cent of tree canopy on residential land in the next 10 years.

What the City is already doing

Action area 1 – City Land

Delivering the Million Trees Planting Program

Increasing the number of trees on verges and in parks, prioritising tree planting adjacent to new homes, and trialling the planting of new tree species. Around 10,000 new trees are planted annually.

Increasing protection for street trees

The Street and Reserve Trees Policy includes requirements for Tree Protection Zones and Tree Bonds to reduce tree damage during development.

Trialling tree-friendly infrastructure projects

Reducing conflicts between tree roots and paths.

Action area 3 – Government

Advocating for State Government action

Including increased tree retention, protection and planting on State land, by State agencies, and by utility providers.

Canopy modelling tool

The City developed a tree planting and canopy retention modelling tool and shared it with local governments to improve canopy planning for the future.

Action area 2 – Community

Providing opportunities for participation and action

The City provides up to 1,200 free trees annually for residents' gardens. We run Community Tree Planting projects, with more than 6,000 participants and 6,500 new trees planted since 2013, and the Stirling Tree Trail event with 4,000 attendees in 2018. We also offer tree-planting support with tree canopy mapping services for 22 local schools in 2018 – 19.

Providing incentives and support

The City is trialling a free arborist service for residents to assess selected trees for health and structure, to encourage tree retention and enable better tree management.

Requiring new tree-planting as a part of development

One tree for every six car bays is required on commercial and industrial land. One tree per 500 square metres is required for all developments over \$100,000 with minimum planting areas, deep soil and setbacks.

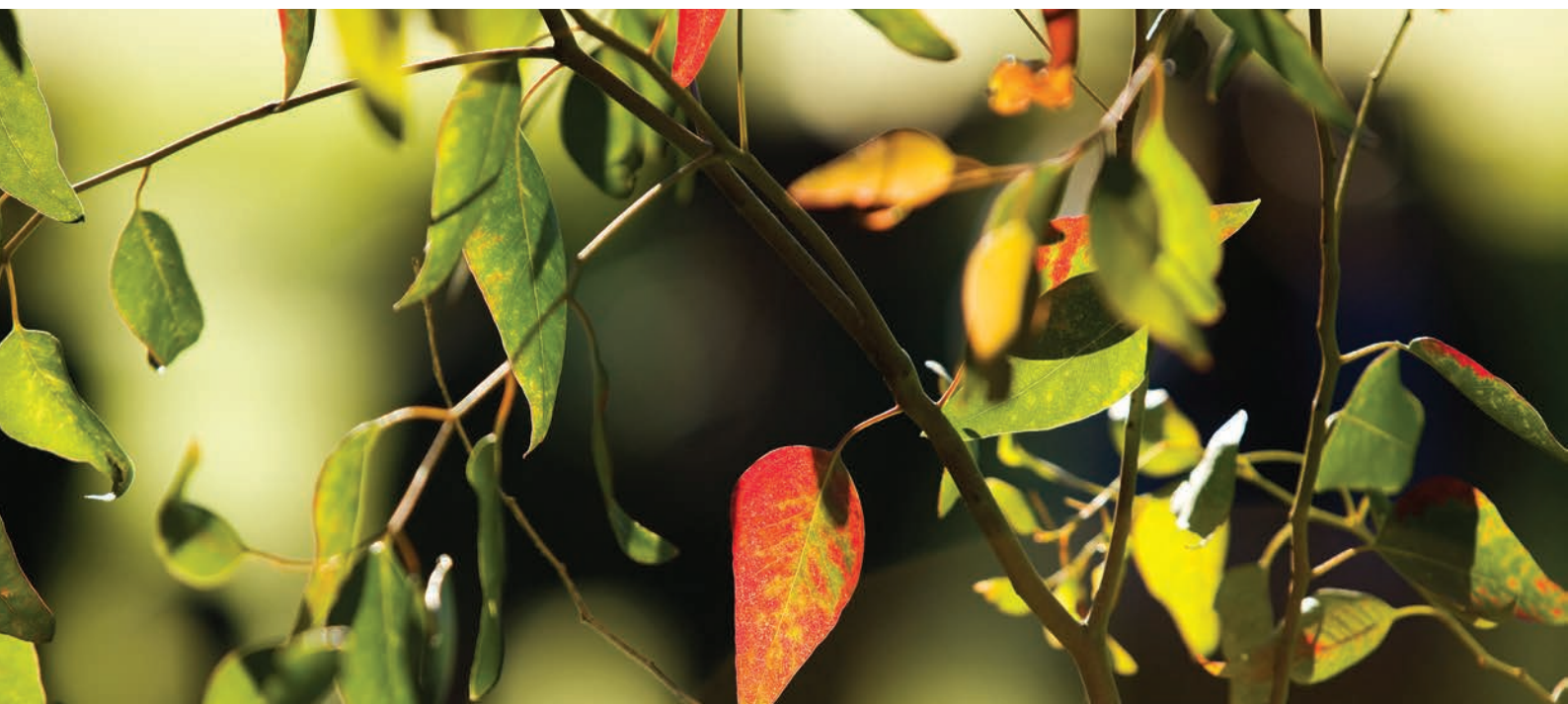
Action area 4 – Monitoring, Research and Communications

Collecting data to inform decision making and future action

The City has been monitoring and reporting canopy changes since 2012 and modelling long-term implications of continued loss. Partnerships have been established with universities to carry out research, and the City has undertaken financial valuations of street trees since 2012 using Helliwell and iTree valuation methods.

Sharing knowledge with others

Including presentations at workshops and events, liaison with other local governments and the WA Local Government Association (WALGA), and contribution to the State Government Urban Forest Guidelines.





What else we will do

Action area 1 – City Land

Expand the Million Trees Planting Program

- Preserve existing space and create new space for trees, with a focus on resourcing, tree resilience, biodiversity and optimum health.

Establish a Tree-Friendly Infrastructure Program

- Fast-track the delivery of underground power lines.
- Develop an Urban Forest Innovation Fund.
- Establish minimum tree planting standards, canopy offset requirements and canopy targets for all City projects.

Action area 3 – Government

Advocate for a whole-of-government approach to tree retention

- Facilitate the development of a code of conduct and canopy replacement plantings for utility services and government agencies during public works projects.
- Expand local government partnerships to share knowledge.
- Advocate for changes to State planning policies and the Residential Design Codes to reduce site coverage, enable greater tree retention and create space for trees.

Action area 2 – Community

Establish a Leafy Neighbourhoods Program

- Deliver more awareness promoting the benefits of trees and additional workshops, events and arborist advice services.
- Expand opportunities for community action and participation including a voluntary Protected Tree Register and more free trees.
- Provide rewards for planting and retaining trees and support to maintain protected trees.
- Engage more schools in tree planting and canopy mapping.

Establish a Tree-Friendly Development Program

- Provide clear policies, new support services, subsidies and guidance for development to make it easier to plant trees, retain trees and use tree-friendly building materials and methods.
- Recognise and reward best practice.
- Increase canopy cover requirements in carparks and investigate a Canopy Offset Scheme to reduce long-term canopy loss from demolition and development.

Action area 4 – Monitoring, Research and Communications

Establish a Growing Knowledge Program

- Refine City-wide annual aerial vegetation mapping to better monitor canopy with results being reported in annual reports and on the City's website.
- Fund new research partnerships to grow knowledge on urban forests in a Western Australian context, and facilitate knowledge sharing among stakeholders.

Background

The City of Stirling has long recognised that canopy cover and a resilient urban forest are essential for the wellbeing of its residents and the liveability of its suburbs; however, tree loss is becoming more significant and is increasing each year.

The City believes that future residents should have the same opportunity to enjoy cool, leafy neighbourhoods that past and present residents have enjoyed. Our consultation shows that our community shares this belief.

The City values the benefits our urban forest provides. Our trees help shade and cool our City. They have cultural and historical value, provide homes and food for wildlife, influence health and wellbeing and improve overall liveability in the City.

This plan aims to set a clear direction to support positive change and lay the foundation for cool, leafy suburbs into the future.

Million Trees Program

In 2009, the City committed to plant one million new trees and shrubs as a first step towards ensuring cool, leafy communities into the future. As of 2018, the City is on track to achieve this target by 2025, with almost 643,000 trees and shrubs planted to date.

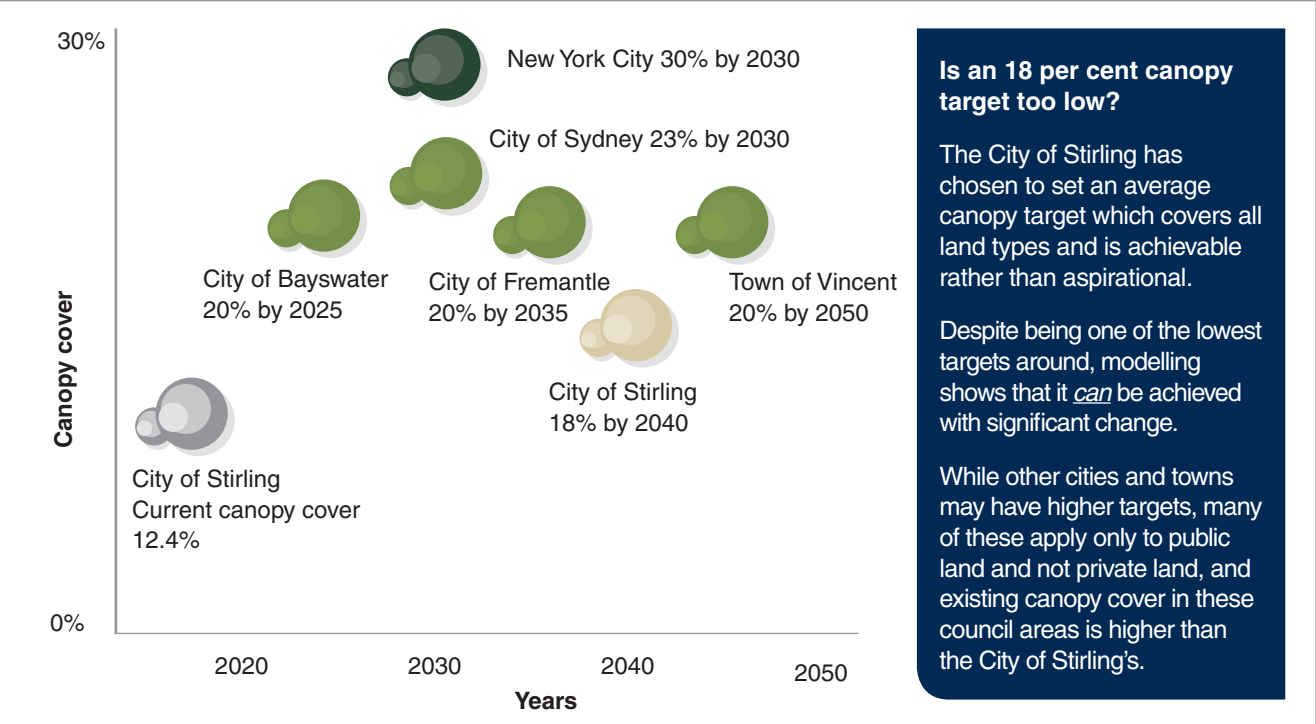
Canopy target

The City has a canopy target of 18 per cent by 2040, a 50 per cent increase on our existing canopy cover of 12.6 per cent. Despite the target and tree-planting programs, tree canopy across the City is declining. A new approach is required if we are to create cool, leafy suburbs into the future.

The urban forest is owned and managed by both the City and the community, and the City cannot reverse canopy decline alone.

If tree canopy is to increase then the community and the City must work together to develop solutions, embrace change and take positive steps to create the cool, leafy liveable suburbs that our community wants.

Over the past six years, suburbs across the City have lost more than 1.2 million square metres of tree canopy.



Canopy targets shown above apply to all land types including private land.

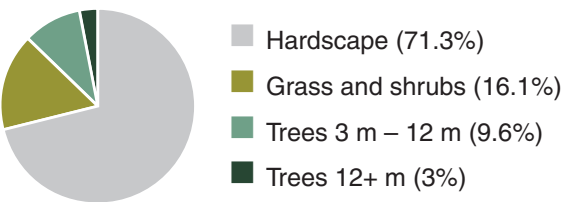
Our urban forest today

What is the Urban Forest?

The urban forest is made up of all trees on private land, City land, and State Government land.

Hardscape

Almost three-quarters of land in the City is covered in hardscape such as roofs, roads and paving. Hardscape absorbs heat, prevents rainwater infiltrating, and cannot support trees.



What is tree canopy?

Tree canopy consists of all the branches and leaves of a tree above three metres in height. Canopy cover refers to the area of ground hidden by a tree's canopy when viewed from above. Canopy cover is an easy way to measure the size of the urban forest based upon the canopy width.

Canopy cover

As of 2018, The City has an average of 12.6 per cent canopy cover across all land types

Where is our canopy?

One-third of our canopy is on residential land, and half is on City land.

Street trees

The City has more than 100,000 street trees which have a combined Helliwell value of over \$440 million. Our street trees comprise more than 229 species including both exotics and Australian natives.

Reserve trees

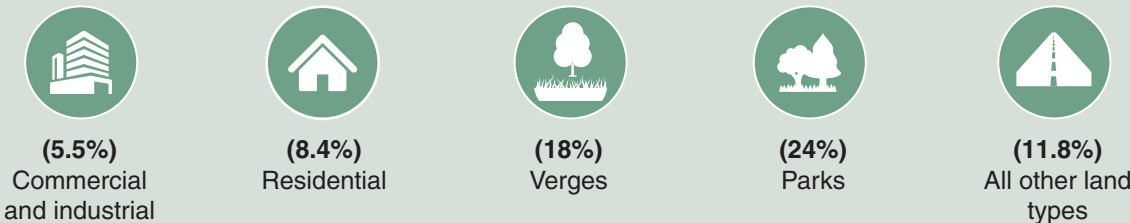
The City monitors trees in its almost 500 parks and reserves annually as part of its aerial canopy mapping. An audit of each individual tree is yet to be undertaken.

What is Helliwell?

The Helliwell system calculates a tree's financial amenity value using a number of criteria including its life expectancy, canopy size, rarity and visual impact. The Helliwell system is recognised worldwide as a way of valuing the amenity of trees as important community assets.

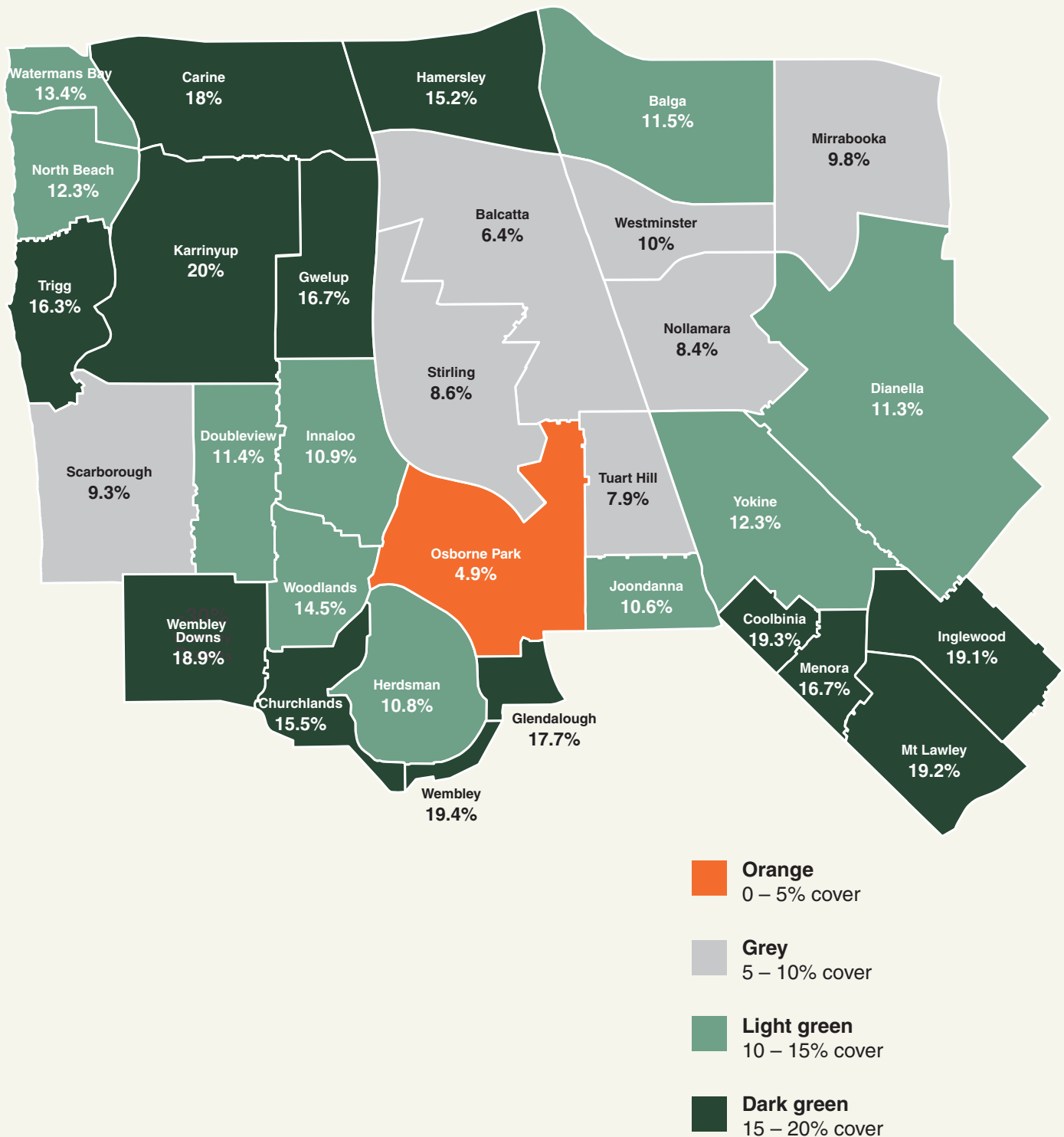
Some land types have more canopy cover than others

Many home gardens contain no trees, lowering average canopy cover on residential land.



Some suburbs have more canopy than others

Suburbs with higher rates of canopy cover often have more public open space and/or low-density housing, while suburbs with less canopy cover often have less public open space and/or higher-density housing.



Our urban forest is declining

In 2012, the City began monitoring tree canopy cover and measuring vegetation changes. In 2017 a detailed analysis of five years of data was undertaken to identify trends in canopy changes and to model the potential long-term implications of these trends.

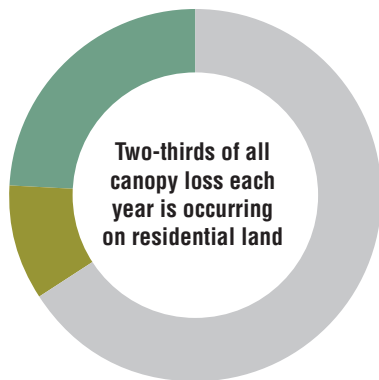
What we learnt from five years of canopy change data

We are losing around 200,000 square metres of canopy each year

In a five-year period, suburbs across the City lost more than **one million** square metres of tree canopy. That's around 200,000 square metres of canopy being lost each and every year.

The majority of canopy loss is occurring on residential land

Two-thirds of all canopy loss each year is occurring on residential land, and a further 12 per cent is lost from the City's verges. A majority of loss is occurring as a result of redevelopment and is linked to the construction of larger homes and multiple homes.



- Residential land – 68%
- Verges – 12%
- All other land types – 20%

High-development suburbs are losing canopy more quickly than others

Suburbs with high rates of development are losing canopy at four-and-a-half times the rate of suburbs with low rates of development. Many of these suburbs already have lower than average tree canopy and are at risk of losing up to 85 per cent of their private trees in the next 10 years.

The City's tree planting will not compensate for the loss of trees on private land

The City plants on average 10,000 new trees in reserves and on verges each year and by 2035 all available spaces will be fully planted. However, if the rate of loss on private land continues at the current rate, the canopy provided by these new trees will simply offset some of the loss occurring on private land, rather than increasing our tree canopy as intended.

Who is developing?

It is widely believed that professional developers are responsible for much of the tree loss occurring in the City. In fact, on average only 10 per cent of residential development is being driven by professional developers: the remaining 90 per cent is a combination of residents building homes (around 40 per cent) and 'mum and dad investors' developing an investment property (around 50 per cent).

Data derived from analysis of 1125 Development Applications approved between 2013 and 2019 in high-development suburbs.

It's just one tree... or is it?

Canopy loss in the City of Stirling is not the result of large tracts of bushland being cleared, but is instead happening one tree at a time, and one development at a time.

The individual choices and actions of each resident may not seem that important – 'it's just one tree' – but the cumulative impact and scale of these individual actions and decisions is now showing at a City-wide level.

Each year the City loses 200,000 square metres of tree canopy, the equivalent of 3,800 medium sized trees or 3,800 residents each making a decision that results in the removal of 'just one tree'.

What does this mean for our future urban forest?

If the City, community and State Government do not make significant changes, it will not be possible to reach our 18 per cent target by 2040.

The City is currently losing four times more canopy than we are growing each year. If canopy loss continues at its current rate, we will have less canopy than we have today until at least 2030.

Canopy cover will continue to decrease before it increases

Trees grow slowly. Even if a new tree is planted each time an existing mature tree is removed, it will take **at least** 30 years for the new tree to grow as large as the existing tree was. For those 30 years, our canopy

cover will be lower than it is today. Every time we remove a tree, we increase the time we will have to wait for our canopy cover to return to its current level.

Canopy distribution will change in a way which provides less benefit

Trees provide most of their services and benefits to the areas closest to where they are planted. Continued canopy loss on residential land coupled with increased tree planting on verges and parks will redistribute

our canopy towards public land, reducing the benefits of our urban forest. Parks and streets will become cooler and shadier, but residents' homes will become hotter and more exposed.

If we don't act now, there will be very few private trees left in some suburbs

In 10 years' time, suburbs with high rates of development are predicted to lose up to 85 per cent of the residential canopy which existed in 2012.

It can take 30+ years to replace the canopy lost when a mature tree is removed



5 years



20 years



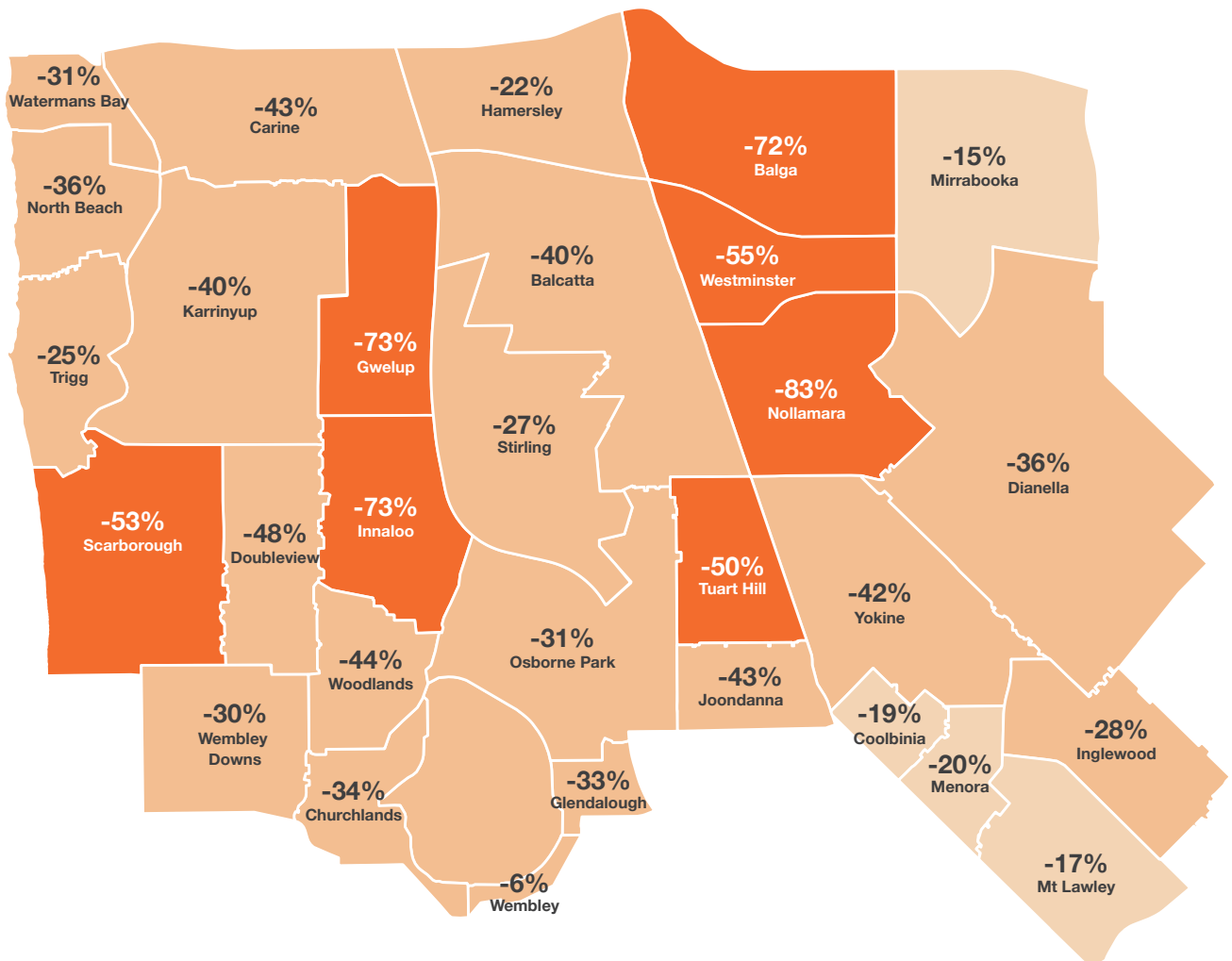
30+ years

Some suburbs will not be able to significantly increase residential canopy cover for 30 or more years.

In many residential developments, the entire site is taken up with building and hardscape. This means even if home owners wanted to plant a tree it would not be possible, as there is simply no room available.

It may be another 30 or 40 years until these homes are demolished and rebuilt, and space for trees could then be created.

Percentage of canopy on residential land which existed in 2012 predicted to be lost in 10 years



Urban deforestation in the City of Stirling

Deforestation: the cutting down of trees in a large area, or the destruction of forests by people.

– *The Cambridge Dictionary*

The term deforestation often conjures images of the Amazon rainforest and the impacts of its destruction, including the widespread loss of habitat for wildlife. However, the gradual and continued removal of trees from land within the City of Stirling to make way for homes, driveways and other infrastructure could be described as **urban** deforestation.



The role of the R-codes in urban deforestation

The Residential Design Codes (R Codes) are a State Government planning tool which influences how development occurs. Since the 1980s a number of changes have been made to the R Codes including:

- Reductions in the amount of open space required on each lot.
- Changes in the definition of open space to include outdoor living areas which have a solid roof, areas under building eaves, and spaces which contain hardscape instead of landscaping.
- Reductions in the setback or distance required between buildings and lot boundaries.

Cumulatively, these changes have encouraged the construction of larger single-storey homes and the hardscaping of all remaining space on a lot, leaving no room for trees. In medium density residential areas it is almost impossible to develop to the level permitted by the R Codes and to retain existing trees or plant new trees after development.

Section 2 of the R Codes was revised in February 2019 and now requires that new apartment developments retain existing trees where possible, plant new trees where retention is not possible, and provide open spaces and deep soils which will support tree growth and health.

Section 1 of the R Codes influences single and grouped dwellings, the type of development permitted on the majority of residential land in the City of Stirling. Section 1 does not contain requirements for tree retention, deep root zones or new tree planting; and no revision date has been announced by the State Government.

Local government has little ability to change the R Code requirements. Action is required by the State Government to improve development standards, improve liveability and support tree retention.

The City of Stirling currently contains approximately 100,000 homes. The State Government's Perth and Peel @ 3.5 Million Plan requires the City to accommodate **an additional 60,330 homes**. Unless significant changes are made to State planning tools such as the R-codes, each of these new homes is likely to result in further canopy loss and increase the time taken to reach 18 per cent canopy cover.

People need trees

Why does urban deforestation matter?

Trees and canopy cover are essential for liveability, especially in hot, dry climates like Perth's. Trees provide a range of services that are often taken for granted and unnoticed until the trees are gone and life has become uncomfortable for people and wildlife.

In cities around the world where canopy cover has dropped to low levels, a range of unexpected consequences have resulted. These include increases in heat-related illness and death, respiratory diseases and breathing problems, low biodiversity and even an increase in the severity of storms and tornadoes. In response to these challenges, urban forest plans are being developed by cities globally to help restore tree canopy cover.

People need trees

Trees and canopy cover are essential for human health and wellbeing.

Trees and canopy cover:

- **Provide shade and cooling for homes**
Canopy cover can reduce summertime heat by up to five degrees.
- **Clean the air**
Trees can reduce the frequency of respiratory illness such as asthma.
- **Reduce heat-related illnesses and death during heat-waves**
Almost three times as many people die each year from heat-related illness than from traffic accidents.
- **Improve our mental health**
Studies show spending time around trees can reduce depression, anxiety and stress.

- **Improve our physical health**
People who live in suburbs with increased tree canopy are less likely to be overweight and more likely to participate in vigorous exercise.
- **Increase our wealth**
Homes located on a tree-lined street are, on average, worth \$16,000 more than homes on streets without trees.

Size does matter!

When it comes to trees, bigger is most definitely better. The benefits trees provide are directly related to the size of their canopy – large mature trees with dense canopies provide many more benefits than immature smaller trees. This is why it is so important that we retain more of our mature trees, and why small newly-planted trees are no substitute for the larger trees which are being removed.



Cities need trees

Trees and canopy cover:

- reduce the urban heat island effect
- provide a sense of place and visual amenity
- combat climate change by storing and sequestering carbon
- provide food and homes for native wildlife
- reduce flooding and the need to invest in infrastructure for stormwater control.

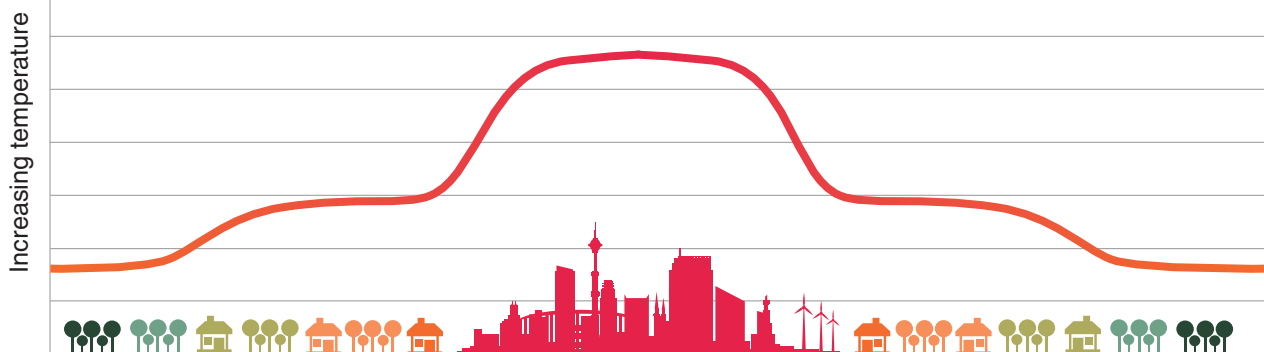
Urban Heat Island

Hard surfaces such as roads and roofs exposed to the sun absorb and store heat, creating localised pockets of heat.

In urban areas, this concentration of heat is referred to as an urban heat island, which can increase temperatures by up to 12 degrees compared to the surrounding rural areas. People living in heat islands are at increased risk of heat-related illnesses and death, have increased air conditioning costs, and are less likely to exercise outdoors.

One of the best ways to reduce the urban heat island effect is by increasing the amount of vegetation and canopy cover in a city.

Benefits like shade and cooling are localised to the area around a tree. We need trees spread throughout the City and on all land types to ensure everyone receives the benefits from our urban forest. Simply planting more trees in our parks won't provide as much shade and cooling for our homes as trees in backyards will.

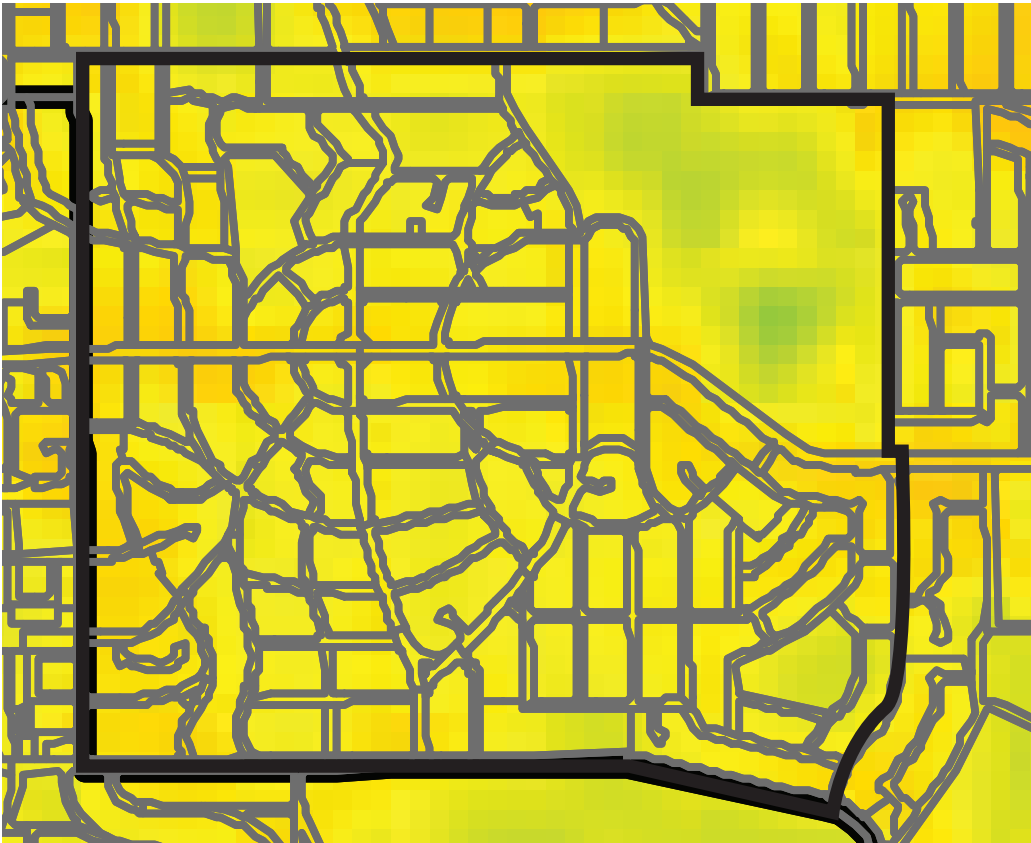


Heat absorbed by buildings and hard surfaces not shaded by tree canopy increases air temperatures and contributes to urban heat. This effect is especially noticeable at night when warmed surfaces radiate their stored heat resulting in increased night-time air temperatures.

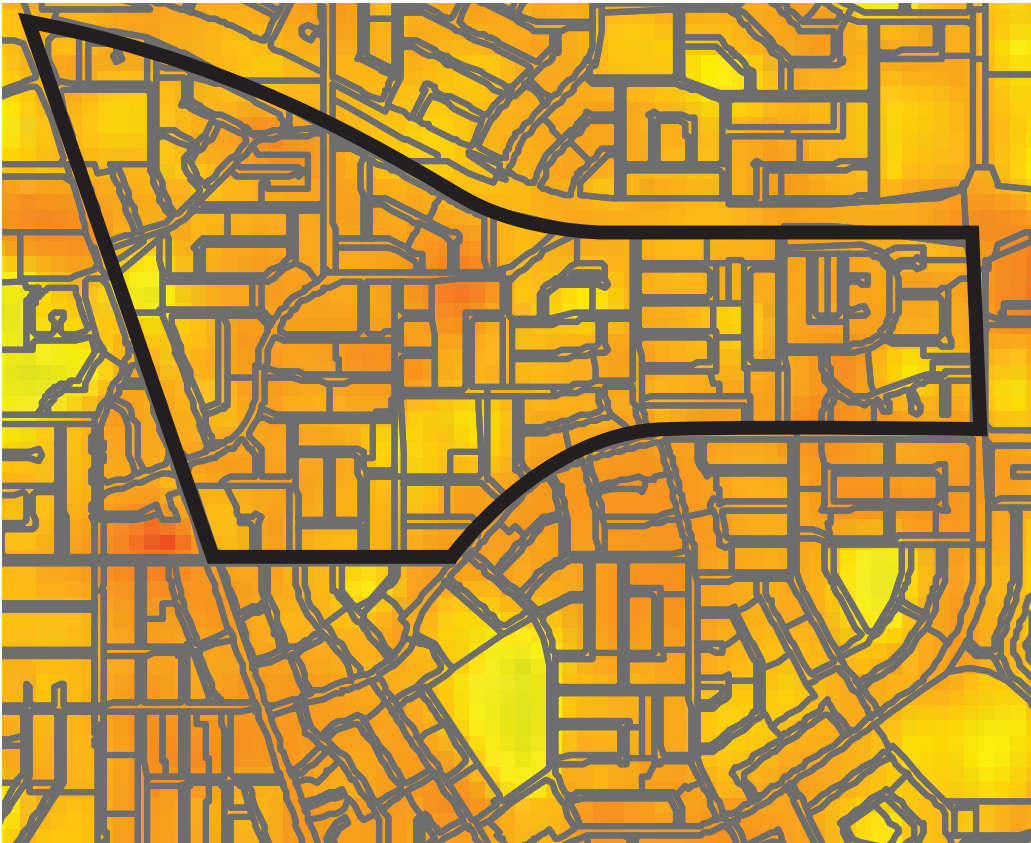
Shading vs cooling

Both trees and man-made structures can provide shade on a hot day, but only trees will actually cool the air too. Tree leaves absorb and use the part of sunlight which creates heat, leaving the leaves cool to the touch, while transpiration (trees 'sweating') releases water vapour and actively reduces air temperature.

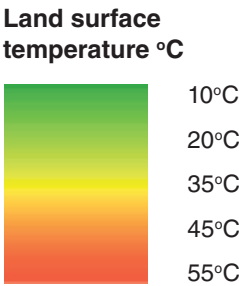
Low-canopy suburbs are hotter than high-canopy suburbs



Wembley Downs is cooler with 18.9% canopy cover, and summer surface temperatures between 20°C to 40°C on residential land.



Westminster is hotter with only 10% canopy cover, and summer surface temperatures between 40°C to 55°C on residential land. Public open space which has higher levels of canopy cover is cooler than surrounding residential land.



Source: Caccetta, Peter; Devereux, Drew; Amati, Marco; Boruff, Bryan; Kaspar, Joseph; Phelan, Kath; Saunders, Alex (2017): Land surface temperature and urban heat island estimates for Australian urban centres. v2. CSIRO. Data Collection. <https://doi.org/10.4225/08/59bf0ce837385>

Community input into the Urban Forest Plan

In 2017/18, the results of the City's five-year canopy mapping and modelling were presented to residents and key stakeholders. We asked the community about their values and vision for the City's urban forest, their ideas about how more trees can be retained and planted on private land, and how street trees can be better protected.

Who did we listen to?

- **Community workshops**
Four community workshops with residents across the City and a youth workshop with more than 100 local students.
- **Industry workshops**
One workshop with building industry representatives.
- **Urban Forest Advisory Panel**
Panel of 18 representatives from key stakeholder groups to advise on the community consultation outcomes, and provide feedback on the draft Urban Forest Plan.
- **Resident survey**
Opt-in resident survey with 900 residents participating.
- **In-depth interviews**
Twenty-seven in-depth interviews to learn more about the factors which influence tree retention or removal during residential development, and to identify how the City can best encourage tree retention on private land.

Key community engagement findings

Our urban forest must grow

Amenity and liveability are key priorities for our community, with residents wanting to live in cool, shady and tree-filled suburbs.

There is widespread concern about tree loss across the City

A majority of people consulted are concerned about the current rate of tree removal in the City. Ninety-five per cent of surveyed residents are concerned about tree loss across the City, and 93 per cent are concerned about tree loss in their suburb. Young students expressed concern about inheriting hot and treeless suburbs because of decisions being made by adults today.

Understanding reasons for tree loss and lack of tree planting

Our consultation provided the following insights into why trees are being removed from private land, and why the rate of tree planting is lower than required to replace the loss.

Development:

Trees are almost always removed during development for a range of reasons including:

- Site clearing has become standard practice and tree retention is often not prioritised.
- Designing and building around trees is complicated – removing them is much easier.

- Larger homes, smaller blocks, in-fill development and relaxed planning requirements mean most of the land on development sites is hardscaped and there is no room for trees.
- Common building practices, materials and compliance requirements can damage tree roots.
- Retaining trees may increase costs and reduce the profitability of development and is something most investors are not voluntarily prepared to compromise on.

Lifestyle:

Residents are choosing to remove trees and not to plant trees for lifestyle reasons including:

- The services, value and benefits trees provide are not widely understood.
- Perceptions that trees can be a safety risk.
- Choices between a larger home or a tree will often favour a larger home.
- Preference for solid roofs rather than tree cover over entertainment and alfresco areas.
- Preference for low-maintenance lifestyles, e.g. 'lock and leave' homes.



How to reduce tree loss on private land

Consultation participants suggested three ways to reduce tree loss on private land:

- **Option 1** – provide support, assistance and incentives to encourage and enable private tree retention.
- **Option 2** – introduce financial penalties for private tree removal, with the monies collected used to fund tree planting and retention programs.

- **Option 3** – introduce legal mechanisms to prevent private tree removal without prior approval.

There were varied opinions between different groups about which option should be implemented – students and the wider community favoured Option 2 and Option 3, while builders, developers and residents with large trees on their land favoured Option 1.

Support the community to make positive change

There is widespread support for the City to provide services, assistance and recognition for residents to plant, retain and manage the trees on their land. Residents also wish to participate in tree-related programs and activities, and to learn more about trees and the benefits that they provide.

Reversing the deforestation of the City

Tree canopy takes minutes to remove but decades to grow. To reverse current deforestation trends and achieve our vision of cool, leafy suburbs, action is required now.

Canopy mapping shows we have 10 years to take action to reverse current deforestation trends. If we fail to act, an entire generation of residents will not have access to the services and benefits that trees provide.

Modelling shows we cannot achieve our target of 18 per cent average canopy cover by 2040 without change, however we may be able to achieve it if we do the following:

Engage our community

Our urban forest is owned and managed by the community, the City, and the State Government. Increasing our tree canopy is a shared responsibility that will require action and a commitment from our whole community.



Retain more of the trees which exist today

Retaining more of our existing trees will be challenging and require our community to think differently, act differently and to value the services and benefits that trees provide for us.

To reach 18 per cent canopy cover by 2040 we must reduce the current rate of canopy loss by 50 per cent.



Plant more trees to grow additional canopy

The City is committed to planting every available planting space in parks and on street verges and will achieve this goal around 2035, but it won't be enough.

New trees are also needed in gardens, in courtyards, in car parks, along the freeway, in school grounds, around business premises, and anywhere else that a tree can fit.

To reach 18 per cent canopy cover by 2040, 16,000 new trees must be planted each and every year: 6,000 on private or State Government land and 10,000 on City land.



Allow trees to grow as large as possible, and to live as long as possible

Trees must be provided with the best possible growing environment and be cared for in order to thrive and provide maximum services and benefits.

To reach 18 per cent canopy cover by 2040, we must reduce the number of trees which die due to poor health or poor growing environments by 50 per cent.

An incentives-based approach

After considering all relevant factors, the City has chosen to initially trial an incentives-based approach to private tree retention rather than introduce regulation. Professional support and services will assist developers to retain trees, residents will receive help to manage and maintain trees on their land, and tree protection will be recognised and rewarded.

The success of this approach will depend upon the willingness of the community to embrace the opportunities presented and to voluntarily make positive changes for the future.

Why not just regulate tree retention?

Introducing rules which mandate the retention of private trees may seem like the most effective option available, but it could result in unintended consequences such as preventing landowners from managing their gardens as they wish.

In addition, regulation introduced only in the City of Stirling may result in resistance from the building and development industry and could devalue properties with trees.

Many other local governments in the Perth metropolitan area are also experiencing urban deforestation and are developing urban forest plans to address this issue. If regulation of tree removal is required it should occur either at the State level or be introduced simultaneously across multiple local authorities to ensure effectiveness and community acceptance, and to minimise poor outcomes.

Protection for our most valuable trees

Trees which are especially large or old, provide food and homes for wildlife or which are especially cherished by their owners deserve special consideration.

A voluntary Significant Tree Register will ensure these trees are retained for the benefit of all community members. To reward owners who choose to protect trees

on private land the City will provide assistance with the cost of the tree's management and maintenance and professional support to design and develop around the tree if required.

Determining the success of an incentives-based approach to tree retention

The City will report each year on the progress and effectiveness of delivering the actions contained within the Urban Forest Plan.

In 2022, after three years of implementation, the City will undertake modelling to predict the likely long-term canopy

outcomes of its Urban Forest Plan and specifically an incentives-based approach to private tree retention, assuming that the outcomes of the previous three years continue in future years.

The results of this modelling and the successes achieved after three

years of implementation will be presented to Council and will determine whether the incentives-based approach is continued, or whether a stronger and more regulatory-based course of action is considered.

Who should pay to grow our urban forest?

The City of Stirling is committed to planting almost 200,000 additional trees in parks and on verges over the next 20 years to improve liveability and increase canopy cover. At today's costs, this represents an investment of more than \$100 million by City ratepayers – an investment which will be returned many times over through the benefits that trees provide each and every year.

However, if private canopy loss continues at the current rate, this investment in new public trees will only offset the private losses occurring and not increase our canopy as intended. Further investment through increased planting or incentives to encourage retention will be required if we are to

increase our canopy – but who should fund this investment? City ratepayers? The people responsible for removing trees? Both?

If we choose not to take further action, residents living in low-canopy suburbs will pay through heat-related sickness and deaths, increased air conditioning costs, reduced mental and physical health and low-value, low-amenity neighbourhoods.

The City believes that the costs of increasing tree canopy should be apportioned fairly. While all residents will contribute to the cost to plant 200,000 new trees, the costs to replace the canopy being lost should be borne by those who have removed it.

Developers who remove private trees are already required to plant new advanced trees on their land at their own expense, and to cover the cost of the City planting a new street tree if one does not already exist. They are also required to cover the cost of removal and the lost Helliwell amenity value if a street tree has to be removed to enable development.

These measures are a good start but are not sufficient to replace the canopy being lost. Additional measures which discourage tree removal or require increased contributions to tree planting efforts will be considered through the Urban Forest Plan.



Doubleview 2012



Doubleview 2017

A typical Doubleview street before and after redevelopment. Existing canopy has been removed, blocks are covered with buildings and hardscape, and there is little room for new trees. Increased number and width of crossovers has reduced room for street tree growth and planting opportunities.

Action area 1 – City Land

Key challenges

- Planting spaces on verges are being fragmented and lost due to increased crossovers.
- Overhead powerlines limit canopy growth and shading/cooling opportunities.
- Street trees are damaged by public works and conflicts with infrastructure.
- City trees are vulnerable to environmental stresses and future climate changes.
- City trees can impact footpaths through root growth, leaf, seed and flower debris.

What is the City already doing?

- **Planting 10,000 trees annually**
Native and exotic species are planted to boost diversity.
- **Ensuring new trees thrive**
Trees are watered for up to three years and pruned for optimal health and canopy growth.
- **Protecting street trees**
Street and Reserve Trees Policy, including requirements for tree protection zones and tree bonds to reduce tree damage during development.

What else will we do?

Expand Million Trees Program

- **Priority plantings**
Prioritise street and reserve tree plantings to low-canopy suburbs in industrial and commercial areas and along walking routes.
- **New planting spaces**
Remove excess hardscape, investigate planting more densely and in Rights of Way.
- **Street tree loss audit**
Annually monitor reasons for street tree canopy loss.
- **Street tree protection**
Further protect street trees during subdivision, demolition, when activities occur on the verge and from vandalism.
- **City tree management guidelines**
Plant, water, prune and maintain City trees following best practice, and support our trees to survive future climate challenges.
- **Urban forest health**
Monitor tree health, investigate and act when trees are declining.
- **Street Tree Master Plan**
Increase the number of species planted, develop street themes, create green corridors for wildlife, and select trees suitable for future climate challenges.
- **Room to grow**
Increase separation between trees and infrastructure, review site coverage and hardscape permitted, implement consistent requirements across all land types.
- **Footpath maintenance**
Increase frequency of cleaning and debris removal.

Tree-Friendly Infrastructure Program

- **Underground power**
Fast-track undergrounding to allow maximum canopy growth.
- **Infrastructure Innovation Fund**
Trial the use of tree-friendly materials and technologies.
- **Tree-friendly infrastructure standards**
Require tree-friendly design, construction, materials and technologies for City-run projects.
- **Water-sensitive urban design**
Maximise infiltration of stormwater in tree root zones.
- **City Green Asset Register**
Track and report on the amenity and ecological value of the City's trees and the services they provide.
- **Protecting planting spaces**
Reduce on-verge infrastructure, crossovers and hardscape, review setback requirements, and require tree-friendly parking bays.
- **Canopy offsets**
Introduced for City projects requiring retention or replacement plantings – internal documentation and approval required for tree removal.
- **Canopy targets**
Establish for City-run projects.
- **Urban forest education for City staff**
Increase knowledge and skills and embed a culture of tree protection, planting and canopy maximisation.

Action area 2 – Community

Key challenges

- Trees are almost always removed when development occurs.
- Trees are often provided with poor growing environments leading to damage to infrastructure, damage to trees and reduced canopy growth.
- Forty-five per cent of residential land in the City is zoned for medium density, and permitted development type in these areas leaves little room for trees.
- Low-maintenance lifestyles mean the number of new trees being planted is not sufficient to replace the canopy being removed.
- The value and benefits of canopy cover are poorly understood by the community

What is the City already doing?

- **Free Tree Scheme**
Provides up to 1,200 free trees annually for residents' gardens.
- **Local Planning Policy 6.11**
Requires retention or planting of one new advanced tree per 500 square metres on all developments over \$100,000. Minimum areas, deep soil and setbacks required.
- **Landscaping Policy**
Requires one tree per six car bays on commercial and industrial land.
- **Tree-retention development concessions**
Has granted variations to planning requirements to enable tree retention above minimum requirements.
- **Community Tree Planting Program**
Supports community tree planting, with 1,400 residents planting 6,500 street trees since 2013.
- **Living Green Schools Program**
Offers tree-planting and canopy-mapping initiatives for local schools, with 22 schools participating in 2018 – 19.
- **Urban forest engagement**
Delivers the Stirling Tree Trail event, which attracted 4,000 attendees in 2018.



What else will we do?

Leafy Neighbourhoods Program

- **Significant Tree Register and services**
Enable residents to voluntarily register trees on their land. Assist residents to maintain, manage and care for registered trees.
- **Free Tree Scheme**
Expand the scheme, prioritise low canopy suburbs, diversify the range of trees available, and provide quick growing and habitat species.
- **Your Tree Portal**
Enable residents to obtain estimated valuations for their trees.
- **Rewards and incentives**
Recognise and reward tree planting and retention, and investigate mechanisms to offer rates discounts for canopy cover.
- **Tree-friendly neighbours**
Investigate mechanisms to notify tree owners of developments on neighbours' land.
- **Arborist advice service**
Professional advice around tree safety and perceived risk.
- **Community Tree Champions**
Recognise and celebrate community action.
- **Urban forest education**
More information and workshops on how to select, plant, prune, maintain and care for trees.

- **Urban forest engagement**
Increase opportunities for community participation in tree-themed events, activities, programs, workshops and training.
- **Urban forest awareness campaign**
Build community awareness of the value and benefits of trees and canopy cover.

Tree-Friendly Development Program

- **Development support service**
Provide information and professional services to identify options for tree retention, planting and canopy growth when planning a development.
- **Canopy offsets**
Investigate 'no net loss' canopy offset requirements for development and demolition via additional plantings or financial contributions to urban forest programs.
- **Tree retention through land changes**
Investigate mechanisms to require tree retention when land is rezoned or subdivided.
- **Review LPP 6.11**
Update to achieve improved outcomes.

- **Tree-friendly infrastructure subsidy**
Provide financial support for materials and technologies which enable tree retention, planting and growth.
- **Tree-friendly builder/developer**
Showcase examples of tree retention during development to inspire others and create cultural norms.
- **Arborist advice service**
Provide professional assistance to retain and care for trees during development on private land.
- **Tree-friendly development guide**
Provide advice on tree-friendly design, construction, materials and technologies in private development projects.
- **Planning controls**
Review and revise all City planning controls, policies and processes to maximise opportunities for tree retention on private land.
- **Tree canopy in car parks**
Increase canopy cover, improve growing environments and prohibit alternatives to trees for ground-level car parks.
- **Room to grow**
Increase separation between trees and infrastructure, review site coverage and hardscape permitted, implement consistent requirements across all land types.



Action area 3 – Government

Key challenges

- Residential Design Codes for single and grouped dwelling developments do not require soft landscaping, deep root zones, tree retention or tree planting.
- The City is unable to prevent tree removal on State Government land but is often blamed when it occurs.
- Tree removal as a result of land use and planning decisions made by other regulatory authorities is often incorrectly blamed on the City.
- Street trees are damaged or removed by public works agencies and utility companies.

What is the City already doing?

- **Canopy advocacy**
Tree retention and planting requested of State agencies and departments.
- **Parks Manager forum**
City chairs forum of local government parks managers.
- **Knowledge sharing**
City developed a tree planting and canopy retention modelling tool and shared it with other local governments to improve canopy planning for the future, and delivered presentations at industry events on actions and successes to date.

What else will we do?

Government Advocacy Program

- **Better urban forest guidelines**
Advocate for State guidelines to become mandatory requirements.
- **Code of conduct**
Require that utility companies protect street trees from damage and undertake replacement plantings when removal is unavoidable due to essential public works.
- **Canopy offsets**
Facilitate canopy replacement planting by public works agencies and utility companies when tree removal is unavoidable during public works.
- **Local government support**
Advocate for Western Australian Local Government Association (WALGA) to adopt a policy position around urban forest issues and support for local government.
- **Tree-friendly subdivision**
Work with the Western Australian Planning Commission (WAPC) to increase tree retention and protection.
- **Tree-lined streets**
Work with Main Roads WA to increase plantings on medians and verges and reduce unnecessary clearing.
- **Develop partnerships**
Support collaborations which enable planting by third parties on State Government land.
- **State-wide tree consideration**
Work with the Department of Planning to amend the R-codes and embed tree retention and tree planting requirements in State planning policies.
- **Power-line pruning**
Advocate to Western Power for alternative approaches to power-line clearance pruning.
- **Perth urban forest network**
Establish networking groups and forums to share knowledge and develop a cohesive approach to local government advocacy.

Power-line pruning by Western Power





Monitoring canopy loss ■ Loss of canopy and vegetation ■ Growth of canopy and vegetation

Action area 4 – Monitoring, Research and Communications

Key challenges

- There is little existing knowledge and research on urban forestry topics specific to the Perth context, and information which exists is not widely shared.
- Monitoring of tree retention and planting on private land is logistically challenging.
- There is a lack of coordination in approaches to urban forest issues between stakeholders.

What is the City already doing?

- **Canopy mapping**
Mapping canopy through annual aerial monitoring since 2012 to detect and quantify canopy changes.
- **Canopy analysis**
Modelling future implications of current canopy loss and planting trends.
- **Tree valuations**
Conducting financial valuations of street trees since 2012 using Helliwell and iTree valuation methods.
- **Urban forest reporting**
Reporting canopy changes in the City's annual reports since 2014.
- **University partnerships**
Undertaking research and building knowledge on urban forest issues leading to the publication of journal articles.

- **Raising awareness**
Highlighting challenges faced and future implications of business as usual, among peak industries and State agencies.

What else will we do?

Growing Knowledge Program

- **Canopy mapping and analysis**
Monitor development-required tree retention and planting.
- **Loss audit**
Require documentation of tree removal during demolition and development, and during City projects.
- **Citizen science**
Support community-based research and data collection by local residents including through Tree Carers Program.
- **Knowledge sharing**
Foster networks between academics, stakeholders, other local governments.

Implementation timeframe

Project / Activity	2019 /20	2020 /21	2021 /22
Million Trees Program			
Footpath maintenance	✓	✓	✓
Room to grow	✓	✓	✓
Street tree loss audit	✓	✓	✓
Street Tree Master Plan	✓	✓	✓
Urban forest health	✓	✓	✓
Priority plantings		✓	✓
City tree management		✓	✓
New planting spaces			✓
Street tree protection			✓
Tree-Friendly Infrastructure Program			
Infrastructure Innovation Fund	✓	✓	✓
Urban forest education for City staff	✓	✓	✓
Canopy offsets and targets	✓	✓	✓
Underground Power		✓	✓
Water-sensitive urban design		✓	✓
Protecting planting spaces		✓	✓
Tree-friendly infrastructure standards		✓	✓
Green Asset Register			✓
Leafy Neighbourhoods Program			
Urban Forest Plan launch	✓		
Free Tree Scheme	✓	✓	✓
Community Tree Champions	✓	✓	✓
Urban forest education	✓	✓	✓
Urban forest engagement	✓	✓	✓
Urban forest awareness	✓	✓	✓
Arborist advice service	✓	✓	✓
Protected Tree Register	✓	✓	✓
Your Tree Portal	✓	✓	✓
Tree support services		✓	✓
Rewards and incentives		✓	✓
Tree-friendly neighbours		✓	✓

Project / Activity	2019 /20	2020 /21	2021 /22
Tree-Friendly Development Program			
Development support service	✓	✓	✓
Tree-friendly builders/developers	✓	✓	✓
Tree canopy in car parks	✓	✓	✓
Arborist advice service	✓	✓	✓
Review LPP6.11		✓	✓
Tree-friendly infrastructure subsidy		✓	✓
Tree-friendly development guide		✓	✓
Planning controls		✓	✓
Tree retention through land changes		✓	✓
Room to grow		✓	✓
Canopy offset		✓	✓
Government Advocacy Program			
Tree-friendly subdivision	✓	✓	✓
Tree-lined streets	✓	✓	✓
Develop partnerships	✓	✓	✓
Better urban forest guidelines		✓	✓
Code of conduct		✓	✓
Canopy offsets		✓	✓
Local government support		✓	✓
State-wide tree consideration		✓	✓
Power line pruning		✓	✓
Perth urban forest network		✓	✓
Growing Knowledge Program			
Canopy mapping and analysis	✓	✓	✓
Loss audit	✓	✓	✓
Knowledge sharing	✓	✓	✓
University partnerships and citizen science	✓	✓	✓



Project developed and implemented



Ongoing



City of Stirling
City of Change

Tree Trail

**The Message
Tree Mailbox**

Share why you think our
trees are tops, and pop it
in my mailbox!

Measuring our progress

Long-term canopy targets

To achieve our 18 per cent **average** canopy target, we have set long-term canopy targets for each of our land types to ensure that the maximum benefits of our urban forest are realised.

City land Our vision Streets and footpaths in residential and shopping areas are cool and shady. Our targets • All available verge spaces which can accommodate trees are planted by 2040. • 40 per cent canopy cover and shade on verges (currently 18 per cent).	Private land Our vision Every home is shaded and cooled by at least one tree. Our target 10 per cent canopy cover on residential land (currently 8.4 per cent).	Tree health Our vision Our urban forest is healthy, achieves maximum lifespan and canopy growth. Our target 90 per cent of City trees are assessed as being in good health.	Diversity Our vision Our urban forest is diverse and provides homes and food for wildlife. Our target Each suburb's urban forest contains no more than • 30 per cent of its trees from any family • 20 per cent of its trees from any genus • 10 per cent of its trees from any species.
City land Our vision Parks and natural areas have twice as much canopy as they do now. Our targets 40 per cent canopy cover in parks and reserves (currently 23 per cent).	Private land Our vision: Car parking bays are shaded by tree canopy. Our targets 60 per cent canopy cover over new car parks within 20 years.		

Short-term measures

A number of short-term measures will be tracked annually for the next three years and used to determine the likely success in achieving our long-term canopy targets through an incentives-based approach to tree retention.

Urban Forest Plan

- Rate of significant canopy loss

Million Trees Program

- Number of trees planted on verges and in City reserves

Tree-Friendly Infrastructure Program

- The total number of actual and potential street trees does not decrease
- Percentage of street trees needing to be planted in less than 9m² space

Leafy Neighbourhood Program

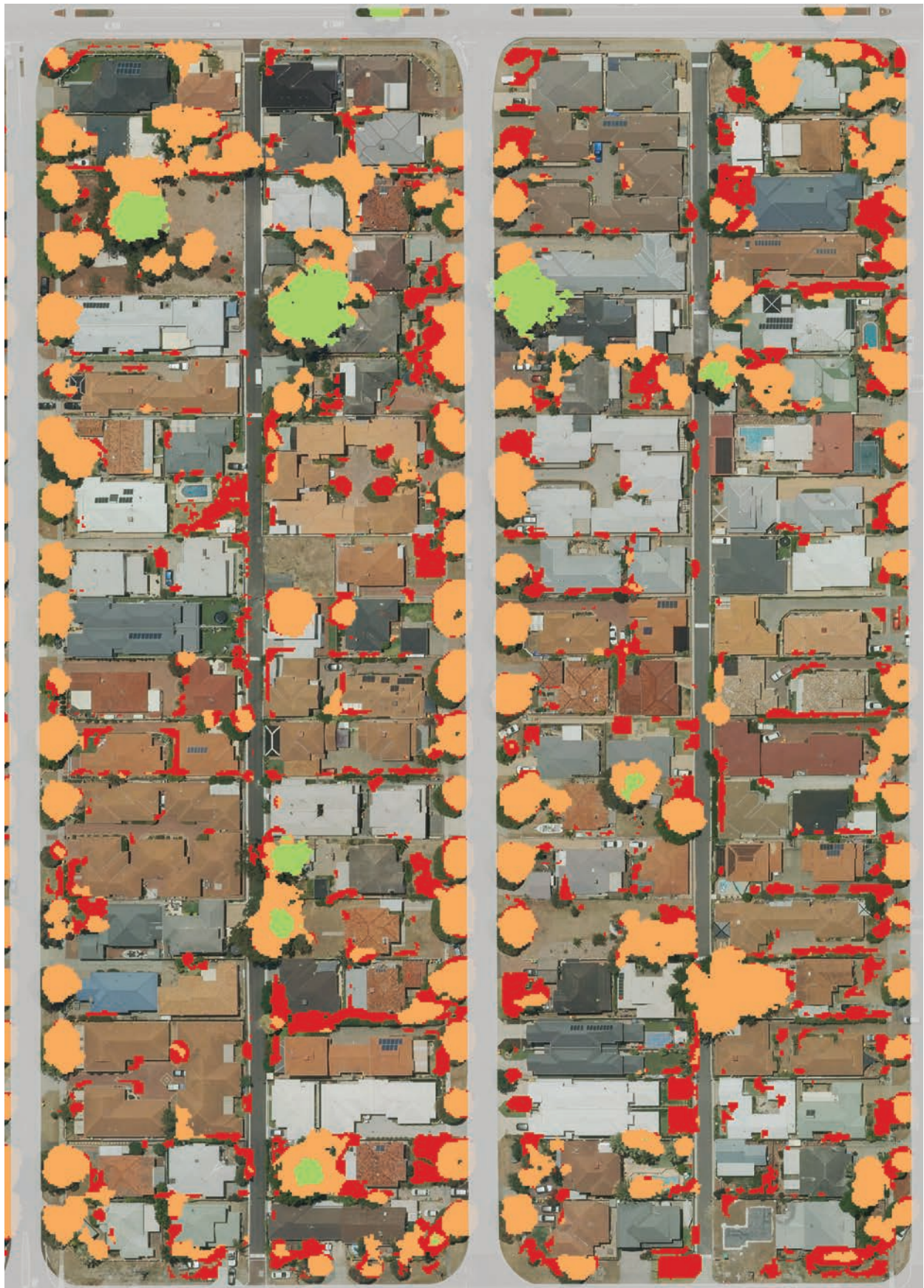
- Number of residents who register their trees on the protected tree register

- Number of residents accessing urban forest resources, services, engagement and education activities
- Number of trees planted on private land

Tree-Friendly Development Program

- Number of Development Applications where at least one tree is retained
- Number of street trees lost for development-related reasons

The City's aerial canopy imagery



Lack of canopy on a typical Doubleview street after development. Street tree height is constrained by overhead power lines, and only mature trees on undeveloped blocks have canopy 12m and above.

The City's aerial canopy imagery ■ Vegetation 0m – 3m high ■ Canopy 3 – 12m high ■ Canopy 12m + high

Conclusion

Our Urban Forest Plan is the first step in a long journey towards increasing our tree canopy. Action is required to address the challenges identified on City-controlled land, on private land and on land controlled by the State Government.

The City has committed to reviewing its own policies and processes, to embrace new opportunities and ways of operating, to engage with its community and stakeholders, and to lead by example in order to achieve the best possible outcomes for trees on City land.

In relation to trees on private land, based on extensive community feedback, the City of Stirling has chosen to take an incentivised and supportive approach. The City will offer support to assist community members to make positive changes to the way that they manage their land, their trees and their developments, in order to increase the retention of existing trees and the planting of new trees

The success of this course of action will be carefully monitored and alternative courses of action

considered, if and when they are needed. It is vital that the City of Stirling's community embraces the opportunities presented and takes positive action to preserve and enhance our urban forest for ourselves and for future generations.







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