

Our Urban Forest Plan for Ōtautahi Christchurch

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Introduction

“Tāne Mahuta is the atua of the forests and birds, and the son of Ranginui and Papatūānuku. It is Tāne that broke the tight embrace of his parents, forcing Rangi high into the heavens and leaving Papatūānuku on earth to care for their children...

Indigenous flora and fauna has sustained tāngata whenua for hundreds of years, providing food, fibre, building materials, fuel, medicine and other necessities. The relationship between tāngata whenua and indigenous biodiversity has evolved over centuries of close interaction and is an important part of Ngāi Tahu culture and identity.”¹

Today's trees - tomorrow's forest

Trees are on the job for us, 24 hours a day, seven days a week, working to improve our local neighbourhoods, our wellbeing and helping to mitigate the effects of our changing climate.

Urban trees are a key tool to help us meet the challenge of our climate and ecological emergency. They are central to enhancing our wellbeing and the pleasantness of our urban environment as well as providing a network of habitat for other wildlife.

Our Urban Forest Plan sets out how - over 50 years - we will grow our tree canopy and sustain a thriving urban forest of healthy, diverse and resilient trees. Achieving this will require strong action across Council activities and by the whole community – working together to nurture the forest, harnessing community participation and strengthening partnerships.

This Plan sets our direction and priority for planting, nurturing and protecting our city's trees for now and the future. It forms a key component of the city's response to climate change challenges and integrates with other Council plans directing the future intensification of urban form and a well-functioning city.

Why trees are important

Globally and within New Zealand, the number of adverse weather events is on the rise. While trees in general play an important role in reducing climate change through sequestering carbon, the benefits of urban trees have a much stronger focus on mitigating the effects of climate change.

Trees provide space for us to relax and play, a home for birdlife, insects and other wildlife, enhancement of our environment, a source of food to nourish and heal us, and improve our wellbeing. Just as roads, footpaths, drains, public buildings and recreational facilities are a part of our community's infrastructure, so are trees.

Trees define our parks, neighbourhoods, and streets and are an essential part of Ōtautahi Christchurch's character and identity. Many of us appreciated the value of trees in our lives during the Covid-19 pandemic, when getting outdoors and into green public spaces was important for our wellbeing. And, many people will recall how green and open spaces provided refuge and gathering places for residents and emergency services following the Christchurch earthquakes. Trees also bring many other benefits also, such as reducing temperatures, aiding in stormwater management and filtering out air pollutants. However, for some, there are negative aspects to trees within our urban places. They create shade which, particularly in winter months, can be seen as a nuisance. Due to the high number of deciduous trees in the city, leaf drop is common resulting in occasional blocked drains and gutters. Mature tree roots can damage nearby infrastructure such as footpaths and underground pipes, however, this can be avoided through improving both the design and the tree

¹ Mahaanui Iwi Management Plan, 2013

species selected. Adhering to a rule of thumb of 'right location, right plant, right function' can avoid many of these problems. This means better integrated design and planning to select the right species and ensure the space is appropriate for the tree.

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The Plan in a nutshell

The Urban Forest Plan focuses on the growth and management of both public and private trees.

The Plan sets out how we can increase tree canopy cover across all of our urban area, over 50 years. By meeting the goals within this plan we will make a significant contribution to mitigating the impacts of climate change, bring multiple benefits to the liveability of our neighbourhoods, our wellbeing and help to better sustain flora and fauna.

Vision and guiding principles

A vision: **To preserve, value and grow our urban forest, to sustain Ōtautahi Christchurch.**

By upholding these principles:

- **Right location, right tree, right function** – Trees are grown in locations that allow them to reach maturity and benefit the local environment.
- **Working together** – We collectively manage the urban forest on both public and private land to improve environmental, economic, social and cultural benefits.
- **Guardianship** – Our actions today will provide and protect a sustainable urban forest for future generations.
- **For everyone** – The urban forest will be distributed across the city to support the wellbeing of our residents and the natural environment.

Goals and targets

The Urban Forest Plan has four goals:

- **Plant** - Our urban forest canopy cover is growing sustainably (Goal 1).
- **Nurture** - Our urban forest thrives with healthy, diverse and resilient trees (Goal 2).
- **Protect** - Our urban trees are valued and looked after as critical infrastructure (Goal 3).
- **Involve** - Our urban forest is nurtured by partnerships and participation (Goal 4).

Targets for increasing tree canopy cover over 50 years take into account current land use and its capacity to sustain an increasing tree canopy.² They are higher for open spaces and waterways, which generally have the greatest capacity for increasing canopy cover and are incorporated into Council planting programmes. Achievable targets for other land, including residential, commercial, industrial and streets, will encourage new tree planting while avoiding unreasonable constraints on their primary use.

Actions and progress

An Action Plan (Appendix 1) will drive progress towards achieving the goals and targets. As we work towards our goals, we will need to monitor and report on the status of the urban forest and the wider benefits to the city and our communities. The Action Plan requires the ongoing commitment of the whole of Council and the community to reach the canopy cover targets and the healthy urban forest we want for our city.

² Using land use types based on the zones in the current Christchurch District Plan.

Benefits of urban trees

Benefits of urban trees



Trees have been shown to **intercept** between 9 and 61% of **rainfall**. They also **reduce erosion and sediment** into our stormwater systems.



Trees **protect biodiversity** by providing habitat



Two medium-sized healthy trees produces oxygen required for a single person for one year



Landscaping, especially with trees, can **increase property values** by 20%



A tree can absorb up to 150kg of CO₂ per year, sequester carbon and consequently **mitigate climate change**



Trees properly placed around buildings can **reduce air conditioning needs** by 30% and **save energy** used for heating by 20-50%



Large urban trees are excellent **filters for urban pollutants** and fine particulates

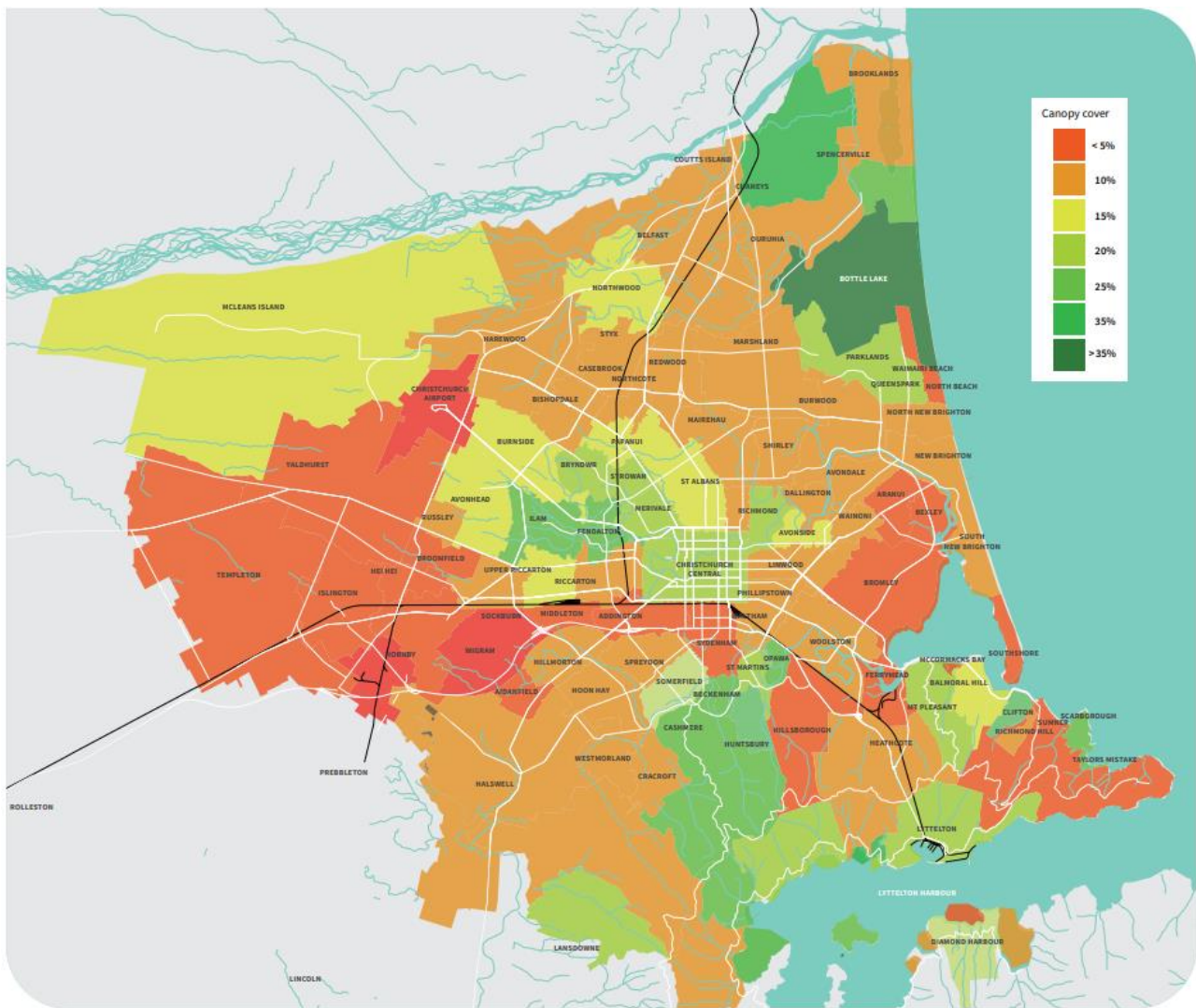


Spending time near trees **improves physical and mental health** by increasing energy levels and speed of recovery, while decreasing blood pressure and stress



Strategic placement of trees in urban areas can **cool the air** by between 2°C and 8°C

Distribution of canopy cover across the city as 2018/2019



Looking across our district

Our urban forest is a unique, complex natural system that extends across urban Ōtautahi Christchurch. It is a vital part of the green infrastructure that supports our built and natural environment. Of course, our district includes *Te Pātaka o Rākahautū* Banks Peninsula, which requires a different approach to forest planning, outside of the urban context.

This Urban Forest Plan has a strong focus on built environment areas, which relate more to the urban areas of the city and Banks Peninsula. A more targeted approach to the Banks Peninsula rural land will need to be developed (this will be completed in 2023/24).

The urban forest comprises native and exotic trees, other vegetation, and also the surrounding or supporting environment - air, soil, fungi and water. All the trees in our streets, parks and other open spaces, along our waterways and wetlands are part of our urban forest, as are the trees and vegetation we grow at home that provide us with shade, food and natural beauty. The urban forest includes isolated trees like those in shopping centre car parks, or small groups of trees in parks or reserves and forests, such as the remnant kahikatea trees at Pūtaringamotu Riccarton Bush.

Tree heritage

Indigenous flora and fauna has sustained mana whenua for hundreds of years, providing food, fibre, building materials, fuel, medicine and other necessities. The relationship between mana whenua and indigenous biodiversity has evolved over centuries and is an important part of Ngāi Tahu culture and identity.³

The forest is central to mana whenua values. A well-managed native forest also has the potential to provide high quality timbers for traditional purposes. Access to indigenous the forest enables mātauranga (traditional knowledge) to be retained and passed on to future generations.

While this is the first Urban Forest Plan for Ōtautahi Christchurch, the concept of planting our urban areas is a long-established practice (which is reflected in the number of significant trees). Our city's urban forest story has been influenced by natural events, settlement aspirations (milling and beautifying), and native and exotic diversity.

The vision of organisations such as the Christchurch Beautifying Association, successive Council agencies and the citizens of Ōtautahi Christchurch, have culminated in the area of urban forest cover being more than 1000 times greater today than it was in the mid-1800s. Though dominated with exotic tree species, native forests have had a renaissance in recent years, in particular within restoration planting projects.

³ Mahaanui Iwi Management Plan, 2013

Trees and our city

Canopy cover is the area of vegetation over 3.5 metres in height, proportionate to the land area, determined through the use of aerial photography and LIDAR⁴. It is often expressed as a percentage of the total city's area and is the most commonly used measure to quantify an urban forest.

Measuring our canopy cover helps us understand our urban forest coverage, how it has changed and how it compares to other New Zealand and overseas cities. This in turn helps to inform what canopy cover targets we set for our city and measure the benefits it provides.

The differences in geography, land use, climate, natural vegetation and soils all affect a city's urban forest. Our city is located on a largely flat plain, in an area that was predominantly grass and wetlands at the time of European colonisation. However, prior to human arrival the area of modern day Ōtautahi Christchurch would have been a much more forested landscape interspersed with swamps and shrub land.

Our last two canopy cover surveys (2015/16 and 2018/19) show a decrease of approximately 2% (from 15.59% to 13.56%). As the survey only accounts for trees that are over 3.5 metres in height, it excluded many of the tree planting projects that had been undertaken in the five years prior. Regardless of this, it reflects a trend of declining canopy cover which we would like to see reversed.

Our landscape makes it more challenging for us to naturally reach canopy cover similar to other cities, such as Auckland (18%) and Wellington (30%), which were primarily forested areas prior to European colonisation. There is very little natural generation of tree canopy in Ōtautahi Christchurch - for trees to grow or establish, intervention is normally required.

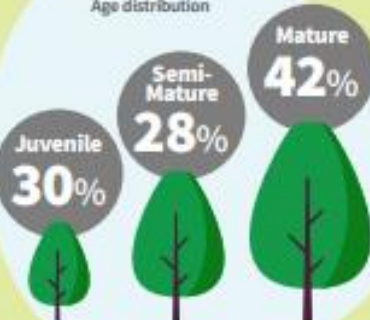
⁴ Light Detection and Ranging – a remote sensing method used to examine the surface of the Earth.



Species distribution (top ten species in database)



Age distribution



Height distribution based on canopy cover



Seeking diversity

Range of species

Tree species' diversity is important to maintain a healthy tree population, and biodiversity within our ecology. The greater the diversification, the more resilient our urban forest will be to threats, particularly the effects of climate change and pests and diseases. In line with best practice urban forestry to achieve diversity of tree species across the city, there should be no more than 30% from one family, 20% from a single genus or 10% of trees from a single species. We must also take steps to protect the natural diversity of our local indigenous fauna through the use of locally-sourced plants.

Trees of various ages

Age diversity is important for maintaining a relatively stable urban forest population over time and reflects a natural forest environment. This prevents the tree population from declining, deteriorating and having to be replaced around the same time, which can have significant impacts and costs.

Currently 52% of our trees listed in the Christchurch City Council database are still in their growing phase (juvenile and semi-mature) and 48% have reached maturity. This means we have an ageing tree population that will require a significant and consistent tree planting programme.

Mix of heights

A range of tree sizes provides scale and interest against the built environment. With bigger canopies and root systems, larger trees maximise benefits, including more carbon sequestration, stormwater management and shade. While our urban forest canopy cover prioritises large trees, smaller trees are equally an important element of urban design where there is restricted space for greening (e.g. a risk of conflict with overhead infrastructure or buildings).

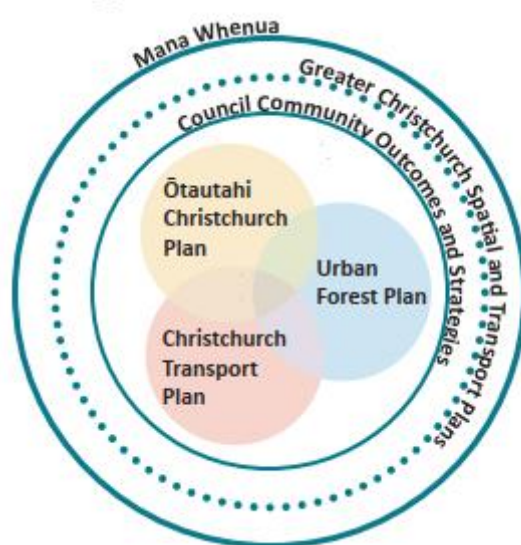
The survey of tree canopy cover shows that in Ōtautahi Christchurch more than 38% of our trees are over 12 metres tall. The height of the tree canopy varies between approximately 3.5 metres to over 45 metres, with many of the tall trees found in clusters throughout the city (e.g. plantation forests, Pūtarangamotu/Riccarton Bush, shelterbelts, parks).

What we need to do

Taking a strategic view

The Urban Forest Plan is part of wider city planning for how we make use of land and waterways, and provide infrastructure to live, do business, move around, enjoy the outdoors and respect mana whenua values for whenua and wai. How, what and where we plan affects individual and community wellbeing, and our resilience to the impacts of climate change.

The Urban Forest Plan underpins the Council's Strategic Framework, which sets out the the strategic priorities and longer-term community outcomes we aim to achieve for Ōtautahi Christchurch. The Framework highlights the need to prioritise accessibility, alongside wellbeing and connection, in putting people at the centre of city development. It also reflects the Council's commitment to reducing emissions, investing in adaptation and resilience and to leading a city-wide response to climate change. One of the Council's six priorities for the next three years is to protect and enhance indigenous biodiversity, water bodies and the tree canopy. The Urban Forest Plan underpins the Council's Strategic Priorities of 'Meeting the challenge of climate change through every means available' and 'Enabling active and connected communities to own their futures'. It supports our key Community Outcomes of Resilient Communities, Liveable City, Healthy Environment, and Prosperous Economy.



The principles and policies set out in the Ngai Tahu Mahaanui Iwi Management Plan 2013 are reflected in the Urban Forest Plan's actions and objectives, particularly in relation to the chapter on Tane Mahuta as atua (god) of the forest and birds. The Iwi Management Plan outlines issues of importance to tāngata whenua with regard to trees and biodiversity, climate change and resource management issues. It also provides guidance on consultation, assessment of effects and the protection of mana whenua values.

Also, there is alignment with key Council and sub-regional plans already completed or underway, including:

- ~~○ Draft Ōtautahi Christchurch Plan and draft Ōtautahi Christchurch Transport Plan (and Greater Christchurch spatial and transport plans in development)~~
- Kia tūroa te Ao Ōtautahi Christchurch Climate Resilience Strategy
- Te Haumako Te Whitingia Strengthening Communities Together Strategy
- Biodiversity Strategy
- Te Wai Ora o Tāne Integrated Water Strategy
- Tree Policy
- Ōtakaro Avon River Corridor Regeneration Plan
- Draft Greater Christchurch Spatial Plan and Mass Rapid Transit business case development; ongoing integrated Council spatial and transport planning. Ōtautahi Christchurch Plan and draft Ōtautahi Christchurch Transport Plan (and Greater Christchurch spatial and transport plans in development)
- Canterbury Pest Management Strategy

Actions in the Urban Forest Plan will inform business cases and investment planning for Council work programmes and projects through annual and long-term planning processes.

Issues we need to consider

Trees as part of core infrastructure

We need to take an integrated approach to infrastructure provision. Urban forest requirements need to be accommodated and treated on an equal par with other infrastructure (such as footpaths, pipework and cables within the road corridor) when planning, designing and developing our city.

Increasingly, due to urban intensification, there is reduced space for gardens and trees on developed residential land and narrower, more congested streets. We need to take opportunities to embed development of our urban forest into urban design and regeneration so that it is compatible with public and private land uses.

Competition for space

Trees require space to grow, both above and below ground. As our population grows there is increasing pressure on how we use land - for housing, recreation, infrastructure or commercial development. Planting more trees will have to compete in this environment.

For the city to achieve its targets for tree canopy cover, the Council will need to maximise use of existing public land as well as considering acquisition of suitable land for planting trees.

Our current estimated residential population is 395,000. This is projected to increase by 21% to approximately 480,000 by 2050. As land is developed to accommodate this growth, our urban forest will be vulnerable to removal, as there are currently limited mechanisms to protect trees on private land.

Damage to adjacent infrastructure and property

We need to provide suitable spaces for trees to grow, so that we avoid damage to adjacent infrastructure and property (that often results in tree removal) and the health of the tree is optimised. This includes minimising conflicts with above and below ground infrastructure and pruning to improve sightlines or for crime prevention purposes. It also means that the pits in which new trees are planted suit the specific tree and its surrounding environment, including improving

soil moisture and water quality through the use of permeable surfaces. Updating the Council's Infrastructure Design Standards and better coordination of below- and above-ground infrastructure works are important ways to better manage and avoid negative impacts of tree planting on public land.

Trees, especially large ones, have the potential to be perceived as a nuisance due to issues such as blocked views, leaf and fruit/nut debris, cracked paving and excessive shading. It is important that we engage with the community not only about the critical benefits of trees, but also about how we manage our urban forest in the future, to ensure a liveable, sustainable Ōtautahi Christchurch.

Equitable tree coverage

Building sustainable communities needs to be at the forefront of our thinking. Currently our urban forest is not spread across our communities evenly, so the benefits are not able to be shared by everyone to the same extent. In part, this is due to land use zoning, where often the areas with lower tree canopy cover are in, or near, commercial or mixed-use zones with little open space. There is also an international trend that shows an imbalance of canopy cover between wealthy and economically deprived areas, this has been reflected in the recent canopy cover surveys within Christchurch with wealthier suburbs having higher canopy cover. As we increase tree canopy cover across our district we will need to prioritise neighbourhoods which are lacking trees and support businesses and communities to take stewardship of their role in contributing to urban forest growth.

Changing climate conditions and impacts on the urban forest

Over time, our summers are becoming hotter, drier and longer, and our winters shorter and milder.⁵ We are likely to experience more extreme weather events. Sea level rise and changes to ground water levels have an impact on what trees will be suitable in coastal areas. With the changing climate, some tree species that we're used to seeing in Ōtautahi Christchurch may no longer be suited to our environment. This will not only have a significant impact on indigenous biodiversity, but will have a particular impact on mana whenua and their ability to maintain ancestral links with indigenous biodiversity and mahinga kai.

A warmer climate can bring new pests and diseases. A diversity of species and healthy trees will create an urban forest that is more resilient to these pests and diseases. Natural regeneration is also important in building genetic resistance to disease in native and exotic tree species.

The Council has set a target of Ōtautahi Christchurch having net zero greenhouse gas emissions by 2045 (with separate targets for methane) and to halve our district's emissions by 2030, from 2016-17 levels. Our district emitted around 2.72 million tonnes of carbon dioxide equivalent (tCO₂-e) in FY2018/19. When forestry is taken into account, total net greenhouse gas emissions were around 2.53 million tonnes of tCO₂-e. While the government and Council are currently focused on reducing our emissions, we will still need to substantially increase the amount of carbon we sequester to achieve our net zero goals through programmes such as the government's Emissions Trading Scheme. Trees are one of the most cost-effective ways to do this, and provide numerous co-benefits for the community and the environment at the same time.

⁵ Kia tūroa te Ao Ōtautahi Christchurch Climate Resilience Strategy (2021). Appendix A: Changing temperatures and seasonality: predicted local changes to climate

Reducing urban heat islands

The heat island effect is due to the large amount of human-made materials, such as roads and buildings, which absorb and retain heat for longer than natural surfaces, making cities much hotter than surrounding areas. Trees are able to cool their surrounding environment through shading and transpiration (releasing water from their leaves into the air) which in turn reduces the surface and air temperature. Furthermore, shading provided by trees has been shown to extend the life of infrastructure such as asphalt.

Due to climate change, average maximum temperatures in our city will be up to 3-4°C hotter by the end of this century, and if large emission reductions are not achieved the occurrence of individual heat waves is potentially much higher. As these temperatures increase, the 'heat island effect' is likely to impact on urban centres even more.



Increase in storm events

Climate change won't just mean increasing temperatures – it will also lead to more frequent droughts, interspersed with more frequent storm events and extreme rainfall. This is likely to add increased pressure on existing stormwater systems across the district.

Trees can help absorb and retain water during rainfall, reduce strain on stormwater networks and decrease the risk and duration of surface water flooding. Trees also help prevent erosion of hillsides, which is predicted to increase with more droughts, coupled with sudden extreme rainfall events. Through careful infrastructure design of rain gardens and basins, trees can be incorporated in to stormwater management systems and contribute to addressing a range of climate change impacts.

The way forward

Trees take time to mature. Our planting programme needs to allow for trees to grow and mature. A sustained increased in tree planting means we can avoid having all trees reaching the end of their lifecycle at the same time.

We also need to be more strategic in our planning to ensure that trees are planted appropriately, to suit their environment and help achieve the Council's other plans and strategic objectives, such as improved neighbourhood amenity and safety. Our [Tree Policy](#) provides clear guidance in managing Council trees to meet community aspirations and service requests. It also provides clarity for decision making, while maintaining consistency in the approaches taken by Council and our contractors. This ensures that we adhere to best practice in tree management and maintenance, which maximises the health of the tree and minimises exposure to risks.

We need to create suitable planting sites and select species that are able to thrive in their immediate environment, and suit future challenges such as climate change impacts. In recent years, native species have been planted, mostly as part of ecological restoration programmes in regional parks and along waterways. ~~Through planting more a stronger mix of native tree species and exotic trees within our Planting more native trees in~~ high-use areas, such as local parks and streets, ~~we~~ will not only increase the ~~visibility of native trees within~~ ~~presence in~~ the landscape, but also ~~improve our network of the resilience of indigenous vegetation across~~ ~~the urban forest~~ ~~city~~. ~~whilst maintaining the large deciduous landscape that Ōtautahi Christchurch is known for.~~

-We want all people and groups to have a sense of ownership over the long-term wellbeing of our urban forest, so we need to continue to increase the opportunities for local communities to be part of the management and growth of our urban forest.

Goal 1: Plant - Our urban forest canopy cover is growing sustainably

A sustained increase in planting over the long-term will increase our urban forest while maintaining age diversity of trees.

Sustainable growth needs to be appropriate for the land type and take into account the lifecycle of the trees.

In order for us to grow our canopy cover we need to take a two-pronged approach. First we need to retain what is already there; and second, we need to plant more trees.

The retention of our trees is covered by Goal 3 and focuses on both protecting our trees and also improving their status to ensure they are retained during development.

Next, the growth of our urban forest requires an increase in tree planting across the city. We have set targets to increase canopy cover throughout the district across all land use types. If we meet these targets, we would have a city-wide canopy cover of >20% by 2070.

Planting within our streets will be one of the more challenging environments but will also result in the largest benefits to the city. A strong focus on roadside tree planting and taking innovative approaches to planting trees as part of local street renewal projects (e.g. Greening the East) will help the city to reduce air pollution, heat island effects, manage stormwater and support green corridors.

The Ōtakaro Avon River Corridor (formally known as the residential redzone) provides another opportunity to increase canopy cover within the city however, we must acknowledge that large parts of this area will be converted to wetland and storm water basins which may not be appropriate for trees. The Ōtakaro Avon River Corridor (OARC) regeneration plan provides details on how this area will be developed including the provision of trees.

Christchurch city and Banks Peninsula are also home to a number of ecological systems that do not naturally support trees, such as our native grasslands or wetlands. In such areas, tree planting may not be appropriate and should be excluded from any canopy cover targets.

We will review our canopy cover targets as Ōtautahi Christchurch develops and changes over time, or to meet any government policy direction, and as new research becomes available to ensure our urban forest is sustainable and best meets our needs.

Finally as a large portion of the Banks Peninsula is rural land, and only a small portion is made up of urban communities, we need to develop an appropriate target for rurally-zoned land.

To achieve Goal 1, we need to:

- 1.1 Grow our urban forest and achieve and maintain canopy cover targets;
- 1.2 Distribute canopy cover equitably, with no ward having less than 15% total canopy cover;
- 1.3 Increase planting requirements within our streets; and
- 1.4 Develop targets for Banks Peninsula rurally-zoned land.

Table 1: Targets for canopy cover by land use type

Note: It should be expected that there will be variation between components of each land type for example, within open spaces, some parks may not achieve 40% cover whereas others will exceed it. The target will be evaluated based on the entire land use type area and its canopy cover.

Land use type	Current canopy cover 2018/19	Targeted Canopy cover by 2030	Targeted canopy cover by 2070
Open spaces	23%	25%	40%
Street	8%	9%	15%
Waterway	21%	30%	75%
Residential	13%	15%	20%
Commercial (including industry and mixed use)	4%	5%	10%
Rural (excluding Banks Peninsula)*	11%	12%	15%

Goal 2: Nurture - Our urban forest thrives with healthy, diverse and resilient trees

With a healthy, diverse native and exotic and well-distributed urban forest we will meet the needs of both the built and natural ecosystem for generations to come.

Through the creation of suitable planting sites (right location) and the selection of species (right tree) that are able to thrive in their immediate environment, we will have a more resilient urban forest that is better equipped to meet future challenges (right function).

Planting more native trees in public space enhances Ōtautahi Christchurch's indigenous biodiversity and sustains mahinga kai, as well as providing a food source and movement corridors for indigenous wildlife.

A well-managed and diverse urban forest will safeguard against the risk of large-scale loss from the introduction of pests and/or diseases.

To achieve Goal 2, we need to:

- 2.1 Grow an urban forest that is resilient and contributes to mitigating the effects of climate change;
- 2.2 Safeguard our urban forest by ensuring a healthy, diverse range of tree species and ages;
- 2.3 Base tree selection on species' needs and attributes that benefit the immediate environment;
- 2.4 Increase the visibility of native tree species and create ecological corridors; and
- 2.5 Select and design planting sites to enable a tree to reach maturity and minimise conflicts with the surrounding area.

Goal 3: **Protect**- Our urban trees are valued and looked after as critical infrastructure

Protecting trees can come in many different forms from regulatory protection, such as trees listed within the Christchurch District Plan, through to improving the status of trees to see them treated with equal importance to other critical infrastructure.

Often when areas are developed tree retention is not considered to be a priority, even though, unlike most assets, a mature tree is not able to be replaced like for like (they take time to grow).

Another form of tree retention is extending the life of our existing trees. This can be achieved through improved maintenance programmes which focus on creating the correct tree structure to ensure they are less prone to storm damage or collapse. Mulching trees and protecting them during nearby construction work will also help extend the life of existing trees.

Through prioritising the importance of trees, and improving the way we protect and maintain them, we will retain more of our existing trees and those we continue to plant.

To achieve Goal 3, we need to:

- 3.1 Use tree protection mechanisms (such as the district plan) to improve tree retention on both public and private land and existing canopy cover;
- 3.2 Consider trees as critical infrastructure; and
- 3.3 Care for and maintain trees to extend their life.

Goal 4: *Involve* - Our urban forest is nurtured by partnerships and participation

We are proud of our Garden City identity, but we need to do more to ensure that it reflects our natural environment, culture and community needs. The Council plays a leading role in growing and managing our urban forest, but success also requires collaboration and partnerships with mana whenua, community groups and property owners.

We need to recognise the role of mana whenua as kaitiaki of the urban forest and work towards enhancing and protecting indigenous biodiversity, including sustaining mahinga kai.

Working collaboratively we will further the work towards meeting the goals of this Urban Forest Plan. Through greater engagement with all parts of our communities - many of whom are already working towards the vision and goals of this plan - we will look for opportunities to collaborate in the management and growth of our urban forest.

By providing ongoing education and awareness of the importance of our trees, our communities will have the tools to care for our urban forest. We want all people and groups to have a sense of ownership over the long-term wellbeing of our urban forest.

There is a strong cultural and community connection between our urban forest and the people who live in and visit Ōtautahi Christchurch. We understand the significance of our forest/urban forest to mana whenua, and the protection and enhancement of mahinga kai and indigenous diversity.

Together, we will create an environment where the biodiversity, landscape and special character of our urban forest is valued, protected and cared for.

To achieve Goal 4, we need to:

- 4.1 Encourage communities to actively participate in the protection and development of our urban forest and have a deep understanding of its value;
- 4.2 Work with iwi, community groups and organisations that contribute to our thriving forest;
- 4.3 ~~Ensure m~~Mana whenua priorities outlined within the Mahaanui Iwi Management Plan are clearly incorporated into planning and actions to promote the urban forest ~~priorities are clearly incorporated into planning and actions to promote the urban forest/forest; and~~
- 4.4 Celebrate different cultures through our trees.

Implementation and funding

The detailed Action Plan (see Appendix 1) sets out ongoing, immediate and longer-term actions to maintain our urban forest and increase the amount of tree canopy cover. The actions to achieve each of our four goals are set out sequentially, taking a strategic approach to maintaining and growing our urban forest over time.

Most of the funding required to meet the targets of the Urban Forest Plan will go into planting trees. Studies have shown that, for every \$1 spent on tree planting, a return of \$2.25 per year can be achieved through benefits such as supporting stormwater management and sequestering carbon.

- **Some of the actions are already funded under existing projects and Council operations.**
- **Actions that require additional investment in new projects or operations are identified and will need to be considered as part of long term and annual budgets' planning processes.**
- **To be successful, we need to fund a large-scale tree planting programme across the city.**
- **Ongoing maintenance, such as pruning throughout the life of the tree, also incurs additional costs.**

Planting in existing suitable locations can be relatively inexpensive and complement outcomes such as increasing safety and managing stormwater. However, when it comes to planting in areas such as road corridors without sufficient grass berms, the cost can be higher but the benefits also much greater.

Cross-Council actions will lead the growth and management of our urban forest. The Urban Forest Plan's success also, crucially, requires collaboration and partnerships with mana whenua, community groups and landowners. Volunteer support will be a valuable contribution to us delivering some of the actions required.

Growing and nurturing our urban forest will also require continued support from a mix of sources, including developers, property and business owners, and through mechanisms such as the proposed collection of Financial Contributions for tree planting from landowners who do not replace felled trees as part of site developments. Trees being planted and well-maintained on private property, and in new developments, add benefits to the surrounding environment.

Monitoring and review

One of the actions in the Urban Forest Plan is to develop a monitoring programme, so that we can assess our progress towards protecting and increasing the city's tree canopy cover.

We will review the Urban Forest Plan every 10 years (the first review by 2033) to evaluate how we are tracking against our 50-year goals. The review will include an assessment of new research, the impact of, and opportunities brought by, changing technology and an environmental scan of changes and issues arising as the city grows. It will also include a comprehensive review of the Urban Forest Plan's objectives to ensure they are still fit-for-purpose.

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Appendix 1: Action Plan in detail

Goal 1, Plant- Our urban forest canopy cover is growing sustainably.

Objective 1.1 Grow our urban forest and achieve and maintain canopy cover targets.

In order for us to meet our canopy cover targets we must take an active role in locating and planting trees throughout our city.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Track our canopy cover through regular surveys and determine planting numbers required to meet the Urban Forest Plan targets.	Funding Required	✗	✓	✓	✓
Undertake a desktop analysis of our city to locate viable planting spaces across Council land <u>and work with Council ecologists to locate areas that should not be planted for ecological reasons.</u>	Funding Required	✗	✓		
Increase the growing capacity of our nursery to meet the demands of our tree planting programme.	Funding Required Currently Funded	✓	✓		
Significantly increase tree planting on Council land to meet our annual planting requirements.	Funding Required	✗	✓	✓	✓
Ensure the Urban Forest Plan's canopy cover targets are considered in all Council projects and planning documents.	Funding Required	✗	✓	✓	✓
Replace trees that are removed with a minimum of two trees, in accordance with the Tree Policy, and replace the canopy cover within a timeframe of 20 years.	Currently Funded	✓	✓	✓	✓
Investigate ways Council can incentivise and support private land owners to retain and plant more trees.	Funding Required	✗	✓	✓	✓
Establish requirements for new development sites to have a minimum of 20% projected canopy cover onsite or pay a Financial Contribution (FC) to Council for planting to occur elsewhere.	Funding Required Currently Funded	✓	✓	✓	✓
<u>When selecting species for new planting, there will be a focus on choosing the largest tree that can be supported by the space through to maturity</u>	Currently Funded	✓	✓	✓	✓
<u>Plant appropriate trees and other vegetation within the Redzone in alignment with the Otakaro-Avon River Corridor (OARC) regeneration plan.</u>	Currently Funded	✓	✓	✓	✓

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Objective 1.2 Distribute canopy cover equitably, with no ward having less than 15% total canopy cover.

Many of the social benefits that come from trees are based on their location. In order to distribute these benefits across all our communities, we need to ensure that our canopy is spread across our city.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
<u>Continue to assess and focus on</u> suburbs with low canopy cover to determine why it is low and determine what can be done to increase it.	Funding Required <u>Currently Funded</u>		✓	✓	✓
Target new planting projects in areas with low canopy cover.	Currently Funded Funding Required	✓	✓	✓	✓
Identify where land may need to be acquired for the purpose of increasing tree planting, particularly in areas of low canopy cover and, where possible, in association with achieving other Community Outcomes.	Funding Required		✓	✓	✓

Objective 1.3 Increase planting requirements within our streets.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Develop a comprehensive list of engineering design standards to allow trees to be incorporated into our streets and how they can be used for other functions such as speed management.	Funding Required	✗	✓		
Map available spaces for planting trees within streets.	<u>Currently Funded</u> Funding Required	✗	✓	✓	✓

Objective 1.4 Develop targets for Banks Peninsula rurally-zoned land.

Compared to the rest of our district, Banks Peninsula has large proportions of rurally-zoned land and much smaller urban communities. More work is required to determine what targets should be set for Banks Peninsula's rurally-zoned land and what sort of structure the urban forest should take in this area.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Carry out a comprehensive survey to assess the current status of the canopy cover in Banks Peninsula.	Funding Required <u>Currently funded</u>	✓			
Develop canopy cover targets for Banks Peninsula, working with local Rūnanga and other key stakeholders.	Funding Required <u>Currently funded</u>	✓			

Goal 2, Nurture- Our urban forest thrives with healthy, diverse native and exotic and resilient trees.

Objective 2.1 Grow an urban forest that is resilient and contributes to mitigating the effects of climate change.

Understand the impacts of climate change on our current urban forest and adapt to ensure it thrives under the changed climate.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Identify tree species that will be more suited to the city's future climate and those which will be more vulnerable. Develop a monitoring programme for existing established trees.	Funding Required		✓	✓	✓
<u>Monitor existing tree species and their potential to become a pest or weed species as our climate changes.</u>	<u>Funding Required</u>		✓	✓	✓
Accurately calculate the carbon sequestered by our urban trees and report on its contribution to the city's goal of net zero greenhouse gas emissions by 2045.	Funding Required		✓		
Undertake a desktop analysis of our current urban forest to locate areas that can be included in the Emissions Trading Scheme, or other verified programme, for offsetting the Council's carbon footprint and provide additional funding sources to invest in our urban forest.	<u>Currently Funded</u> <u>Funding Required</u>	✓	✓		

Objective 2.2 Safeguard our urban forest and ensure a healthy, diverse range of tree species and ages.

A well-managed and diverse urban forest lowers the risk of significant loss of any species or individual tree.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Update and maintain the Council's tree asset register to record information on planting date, species and health.	Currently Funded	✓	✓	✓	✓
Monitor tree species diversity to ensure the city has no greater than 30% of one family, 20% of a single genus or 10% of a single species.	<u>Currently Funded</u> <u>Funding Required</u>	✓	✓	✓	✓
Develop a high level tree planting programme that extends over 50 years to reduce the quantity of trees reaching maturity at the same time.	Funding Required		✓	✓	✓

Objective 2.3 Base tree selection on species needs and attributes that benefit the immediate environment.

As trees can provide a range of functions to their immediate environment, it is important that these functions are considered when selecting tree species.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Develop a comprehensive tree species guide to provide information on the attributes and functions a tree provides to its environment, to be used by the Council and the public.	Funding Required	✓	✓		
Selection of tree species will be based on the benefits they provide to their local environment e.g. evergreen species near rivers to shade waterways.	Currently Funded	✓	✓	✓	✓
<u>When planting trees near waterways or within sites of ecological significance, we will enhance indigenous biodiversity through prioritising planting native eco-sourced species that are endemic to the region except in specific locations where other species are required.</u>	Currently Funded	✓	✓	✓	✓
<u>In alignment with Iwi Management Plan IH8.4, planting plans for Parks will include provisions to achieve an improved balance of indigenous species with exotics.</u>	Currently Funded	✓	✓	✓	✓

Objective 2.4 Increase the visibility of native tree species and create ecological corridors.

Planting more native trees in public spaces to enhance Ōtautahi Christchurch's indigenous biodiversity and sustain mahinga kai.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
In alignment with TM2.8 of the Mahaanui Iwi Management Plan, a greater use of indigenous species will be used in areas such as: <ul style="list-style-type: none"> Shelterbelt planting within rural zones Buffers for effluent/silage/oxidation ponds and industrial sites Within streets and open spaces Riparian waterway margins. 	Currently Funded	✓	✓	✓	✓
Establish a programme for the creation of an optimal bush patch configuration across the city to support viable populations of native birds.	Funding Required Currently Funded	✓	✓	✓	✓
Identify the number and location of naturally occurring native tree and forest-associated species within the Low (Canterbury) Plains Ecological District to inform seed collection and propagation for forest restoration plantings.	Funding Required Currently Funded	✓			

<u>Planting within open spaces will recognise and enhance the potential for areas to improve habitat values for taonga species and enhance habitat connectivity as outlined in section IH8.4 of the IMP.</u>	Currently Funded	✓	✓	✓	✓
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Objective 2.5 Planting sites are selected and designed to enable a tree to reach maturity and minimise conflicts with the surrounding area.

Design and construction standards prioritise a tree's ability to grow in the urban environment.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Develop a comprehensive tree planting guide which will include a list of design and engineering solutions to incorporate trees into the built environment.	Funding Required	✓	✓		
Update the Council's Infrastructure Design Standards to include guidance on soil volume and planting practice to ensure trees have the soil volume they require to reach maturity; and include planting practices that reduce the risk of damage to infrastructure from tree roots.	Currently Funded	✓	✓		

Goal 3, Protect- Our urban trees are valued and looked after as critical infrastructure

Objective 3.1 Retain our existing canopy cover

In order to efficiently grow our urban forest, we must protect and retain what we have and what we continue to plant.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Use regulatory tools available to Council to protect existing trees on private land.	Currently Funded	✓	✓	✓	✓
Prioritise the retention of mature trees through all aspects of Council projects, in accordance with the Tree Policy.	Currently Funded	✓	✓	✓	✓
<u>Add additional trees to the Council's Significant Tree Register within the District Plan.</u>	Funding Required	✓	✓		

*Increased funding may be required to increase the number of trees protected on private land

Objective 3.2 Consider trees as critical infrastructure

By acknowledging trees as critical infrastructure we ensure they are included in design and are considered important for retention.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Update the Council's Infrastructure Design Standard documentation to make trees a requirement.	Currently Funded	✓	✓		

Objective 3.3 Care for and maintain trees to extend their life

Through correct maintenance of trees in their early years we are able to prevent structural problems forming in the tree and also avoid expensive pruning interventions as the tree matures.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Extend the establishment period for juvenile tree care from 2 years to 7 years and increase the focus on improved tree planting standards.	Currently Funded Funding Required		✓	✓	✓

Provide for a regular tree maintenance programme, including reviews focused on efficiency gains.

**Currently
Funded**

✓

✓

✓

✓

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Goal 4, Involve - Our urban forest is nurtured by partnerships and participation.

4.1 Our communities actively participate in the development of our urban forest and have a deep understanding of its value

By providing ongoing education and awareness of the importance of our trees, our communities will have the tools to care for our urban forest.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Plant exemplar plots of different species in a range of environments, to foster public understanding of 'right tree, right location'.	Currently Funded Funding Required		✓	✓	✓
Create an online hub for learning about urban trees and the benefits as well as providing a space for people to collaborate on the management of our urban forest.	Funding Required		✓	✓	✓
Promote community planting days and other urban forest management activities.	Currently Funded	✓	✓	✓	✓
<u>Investigate and implement programmes to support and incentivise tree management and planting on private land.</u>	Funding Required	✓	✓	✓	✓

4.2 We have effective partnerships with iwi, community groups and organisations that contribute to our thriving forest

Working collaboratively we will further the work towards meeting the goals of this Urban Forest Plan.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
Engage with iwi Papatipu Rūnanga, developers and community groups for assistance with the planning, management and advocacy for urban trees.	Currently Funded	✓	✓	✓	✓
Develop partnerships with educational institutions such as the University of Canterbury to improve the management and understanding of our urban forest.	Funding Required		✓	✓	✓
Partner with other local authorities, both nationally and internationally, to share resources towards improving the management of our urban forest.	Currently Funded		✓	✓	✓
Create partnerships with neighbouring councils to promote a wider network for our urban forest.	Currently Funded		✓	✓	✓
<u>Work with developers to deliver greater tree retention and planting during development.</u>	Currently Funded	✓	✓	✓	✓

4.3 Mana whenua priorities outlined within the Mahaanui Iwi Management Plan are clearly incorporated into planning and actions to promote the urban forest/ forest.

The Mahaanui Iwi Management Plan (IMP) is an expression of kaitiakitanga and rangatiratanga. It is a manawhenua planning document reflecting the collective efforts of six Papatipu Runanga that represent the hapu who hold manawhenua rights over lands and waters within the takiwa from the Hurunui River to the Hakatere River and inland Ka Tiritiri o Te Moana. Council will use the IMP as a guiding document for how to grow and manage our Urban Forest to progress the objectives set out in the plan. We understand the significance of our forest/urban forest to mana whenua, and the protection and enhancement of mahinga kai and indigenous diversity.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032
<u>In alignment with section TM 1.2 of the IMP, Council will work with local iwi to advocate that the protection and restoration of traditional and contemporary mahinga kai sites and species is recognised and provided for as a matter of national importance under the RMA</u>	Currently Funded	-✓	✓	-✓	✓
<u>Council work alongside local iwi to progressively enhance and restore mahinga kai resources and sites and the customary use traditions associated with such resources in alignment with section TM 1.3 of the IMP.</u>	Funding Required		✓	✓	✓
<u>Council will map existing mahinga kai, listed natural habitat and sites of significance (as defined within the IMP) using GIS mapping software to avoid the unintentional loss or disturbance of these sites through development projects.</u>	Funding Required	✓	✓		
<u>Council will work with local Runanga to provision the sustainable harvest of mahinga kai species (including native timbers) and culturally aligned recreational activities as outlined in section IH8.3(e) of the IMP. Council will investigate with Rūnanga the ability to create a sustainable source of native timbers for traditional or cultural purposes.</u>	Funding Required		✓		
<u>Council will work alongside local iwi to ensure specific rules and policies are developed to protect, enhance and extend existing remnant and restored habitat areas within the city in alignment with IH7.4 of the IMP.</u>	Funding Required Currently funded	✓	✓	✓	✓

4.4 Celebrate different cultures through our trees

There is a strong cultural and community connection between our urban forest and the people who live and visit Ōtautahi Christchurch.

Action	Funding	Implementation timeframe			
		2023-2024	2024-2026	2027-2029	2030-2032

Work with the city's diverse international communities to develop unique tree planting designs to fulfil specific cultural requirements.	Funding Required			✓	✓
Develop cultural narrative and interpretation on mana whenua associations with trees and forests.	Currently Funded Funding Required		✓		

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Appendix 2: How we developed the Plan

We commissioned a canopy cover survey in 2015 to determine the extent of our urban forest. This was followed by another survey four years later, which found there had been a gradual loss of canopy cover and highlighted the need for a comprehensive plan.

The Council set up a working group comprising Council staff and external experts and sought the views of a range of industry experts regarding the state of our urban forest and options for creating a plan to create a vibrant and sustainable city with a thriving urban forest. Workshops were held with Council staff, elected members and external stakeholders, including academics, utility operators and community group representatives, which refined the areas of focus for the plan.

The goals and actions of the Urban Forest Plan reflect mana whenua values, as set out in the Mahaanui Iwi Management Plan. Mahaanui Kurataiao reviewed the draft Urban Forest Plan, on behalf of the six Papatipu Rūnanga whose takiwā fall in part within the Christchurch district. Their feedback was positive:

- they encouraged planting of indigenous trees and noted this is captured appropriately in the Plan
- they endorsed the Plan's intention that the distribution of the tree canopy should be equally distributed across the city, and
- the intention of the Plan is in keeping with Ngāi Tahu values.

We asked the wider community about what they value about trees through Have Your Say in 2017 and also received feedback related to the urban forest during the public consultation on the Tree Policy in 2020. The feedback reflected the public's understanding of the importance of trees and the aesthetic, environmental, economic, cultural and social benefits they provide. A number of comments also noted the leadership role of the Council in managing trees to ensure their benefits are maintained for future generations and to contribute to achieving the Council's climate goals. Some of the main themes that related specifically to the urban forest were a preference for a particular type of tree and concerns about the loss of trees through the increase in medium and high density development, damage to infrastructure and property and nuisance issues.

We looked to local and international examples of urban forest plans and strategies, including Auckland, Melbourne, Sydney and Geelong; and academic papers, including a literature review of canopy cover targets by the University of Canterbury.

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