

	<p style="text-align: center;">Resource Management Act 1991 Christchurch District Plan Plan Change 14 – Tree Canopy Cover and Financial Contributions Section 32 Evaluation – Part 7</p>	<h1 style="font-size: 48px; margin: 0;">14</h1>
<p style="text-align: center;">TREE CANOPY COVER / FINANCIAL CONTRIBUTIONS TO ADDRESS THE EFFECTS OF DEVELOPMENT IN RESIDENTIAL AREAS ON THE ENVIRONMENT</p> <p>Overview</p> <p>The following report has been prepared to support the Financial Contributions section of Plan Change 14 to the Christchurch District Plan, which proposes to introduce tree canopy cover / financial contributions provisions to address adverse effects of residential development and intensification on the city's environment.</p> <p>The Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021 (Amendment Act) and National Policy Statement – Urban Development 2020 (NPS-UD) require the Council to change the District Plan to enable housing intensification. Intensification will lead to:</p> <ul style="list-style-type: none"> i. Increased carbon emissions; ii. Increased stormwater run-off; iii. Increased heat island effects; iv. Loss of biodiversity and amenity. <p>As part of the package of amendments to the RMA, the Amendment Act introduced additional provisions enabling councils to make rules requiring a financial contribution for permitted and other classes of activities. The Council proposes to introduce new provisions that are intended to require that developers carrying out residential development and/or subdivision that provides for or enables new dwellings, either:</p> <ul style="list-style-type: none"> - Retain or provide an appropriate level of tree canopy cover for each residential unit or allotment, with the tree canopy cover to be secured through a consent notice; or - Pay an equivalent financial contribution in lieu of planting so that the necessary tree canopy cover can be provided elsewhere by the Council. <p>Retaining Christchurch City's existing tree canopy cover, and providing for an increased tree canopy cover, will improve the ecosystem/ regulating services that trees provide and help to mitigate adverse effects of development on the environment.</p> <p>Christchurch City's canopy cover is comparatively low and decreasing. The recently undertaken survey of the tree canopy in Christchurch, using aerial imagery of the city from 2018/2019, indicates that the city's tree canopy covers 13.5% of land in Christchurch, which represents a 2% decrease since the last 2015/2016 survey. The report also looked at canopy cover by land ownership and found that Christchurch City Council owned land had 23% tree canopy cover, Crown land had 16% canopy cover and private land had 11% canopy cover. Privately owned properties constitute 70% of all land ownership in Christchurch and that land has 57% of the city's canopy cover on it. Consequently, changes in the number of trees on private land would greatly affect the overall tree canopy cover in Christchurch.</p>		

Although some of the 2% decrease in the tree canopy cover is a result of harvesting in the Bottle Lake Forest plantation and the recent Port Hills fires, much of the tree canopy loss is attributed to residential property redevelopment and intensification. With the enabling provisions of the Medium Density Residential Standards and the likely increase in residential intensification, that canopy cover is under threat of further losses.

For full details of the proposed changes refer to the Plan Change 14 document, Chapters 2, 3, 6.10A, 8 and 14.

LIST OF ABBREVIATIONS USED IN THIS REPORT

Amendment Act	Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021
CRPS	Canterbury Regional Policy Statement
DC	Development contribution
FC	Financial contribution
IMP	Maahanui Iwi Management Plan
MDRS	Medium Density Residential Standards
NPS	National Planning Standards
NPS-UD	National Policy Statement - Urban Development 2020
PC14/ Plan Change 14	Proposed Plan Change 14 – Housing and Business Choice, including the Tree Canopy Cover / Financial Contributions provisions in Chapters 2, 3, 6.10A, 8 and 14.
RMA	Resource Management Act 1991
the Act	See 'RMA'
the Amendment Act	Resource Management (Enabling Housing Supply and Other Matters) Amendment Act 2021
the Council	Christchurch City Council
the Plan / District Plan	Christchurch District Plan
the plan change	See 'PC14/ Plan Change 14'

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1 Introduction

1.1 Purpose of this report

- 1.1.1 The overarching purpose of section 32 (s32) of the Resource Management Act 1991 (RMA / Act) is to ensure that plans are developed using sound evidence and rigorous policy analysis, leading to more robust and enduring provisions.
- 1.1.2 Section 32 requires that the Council provides an evaluation of the changes introducing tree canopy cover and financial contributions requirements, proposed in the financial contributions section (refer to Chapter 6.10A) of Plan Change 14 (PC14) to the Christchurch District Plan (the Plan). The evaluation must examine whether the proposed objectives are the most appropriate way to achieve the purpose of the RMA, and whether the proposed provisions are the most appropriate way to achieve the proposed and existing objectives of the Plan. The report must consider reasonably practicable options, and assess the efficiency and effectiveness of the provisions in achieving the objectives. This will involve identifying and assessing the benefits and costs of the environmental, economic, social and cultural effects anticipated from implementing the provisions. The report must also assess the risk of acting or not acting if there is uncertain or insufficient information about the subject matter of the provisions.
- 1.1.3 The purpose of this report is to fulfil the s32 requirements for the proposed Tree Canopy Cover / Financial Contributions section of Plan Change 14 – Housing and Business Choice. In addition, the report examines any relevant directions from the statutory context including higher order documents.

2 Resource management issues

2.1 Council's legal obligations and strategic planning documents

- 2.1.1 Sections 74 and 75 of the RMA set out Council's obligations when preparing a change to its District Plan. The Council has a responsibility under Section 31 of the RMA to establish, implement and review objectives and provisions for, among other things, achieving integrated management of the effects of the use, development, or protection of land and associated resources. One of the Council's functions is to control the actual and potential effects of land use or development on the environment, and to do so in accordance with the provisions of Part 2.
- 2.1.2 Part 2, section 5 outlines the purpose of the Act which is “to promote the sustainable management of natural and physical resources” which means:

“managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

(a) sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) avoiding, remedying, or mitigating any adverse effects of activities on the environment.”

2.1.3 Section 7 requires that particular regard shall be had to:

“(c) the maintenance and enhancement of amenity values:

(d) intrinsic values of ecosystems:

(f) maintenance and enhancement of the quality of the environment:

(i) the effects of climate change:”

2.1.4 These matters are of relevance to consideration of the proposed tree canopy cover and financial contribution provisions in relation to:

- a. the effects of intensification on the environment,
- b. the ecosystem values of trees and the role they play in addressing the effects associated with climate change,
- c. the quality of urban environment, including its biodiversity and amenity, and
- d. the effect changes in that environment may have on the health and wellbeing of residents.

2.1.5 As required by s74 and s75 of the RMA, a Plan Change must specifically give effect to, not be inconsistent with, take into account, or have regard to the following “higher order” documents / provisions which provide directions for the issues relevant to this plan change:

Document	Relevant provisions	Relevant direction given effect to/ taken account of in Strategic Directions objectives, Chapter objectives / the objectives proposed by this Plan Change
National Policy Statement on Urban Development 2020 (NPS-UD)	Objective 1:	New Zealand has well-functioning urban environments that enable all people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety, now and into the future.
	Objective 7:	Local authorities have robust and frequently updated information about their urban environments and use it to inform planning decisions.
	Objective 8:	New Zealand’s urban environments: <ol style="list-style-type: none"> a. support reductions in greenhouse gas emissions; and b. are resilient to the current and future effects of climate change.
	Policy 1:	Planning decisions contribute to well-functioning urban environments, which are urban environments that, as a minimum: (...) e. support reductions in greenhouse gas emissions; and f. are resilient to the likely current and future effects of climate change.
	Policy 6:	When making planning decisions that affect urban environments, decision-makers have particular regard to the following matters: (...)

Document	Relevant provisions	Relevant direction given effect to/ taken account of in Strategic Directions objectives, Chapter objectives / the objectives proposed by this Plan Change
		e. the likely current and future effects of climate change.
Canterbury Regional Policy Statement (CRPS)	Chapter 5 - Land-use and infrastructure Objective 5.2.1 Location, design and function of development (Entire Region)	Development is located and designed so that it functions in a way that: 1. (...) 2. enables people and communities, including future generations, to provide for their social, economic and cultural well-being and health and safety; and which: a. maintains, and where appropriate, enhances the overall quality of the natural environment of the Canterbury region, including its coastal environment, outstanding natural features and landscapes, and natural values; b. (...)
	Chapter 6 – Recovery and Rebuilding of Greater Christchurch Objective 6.2.1 Recovery framework	Recovery, rebuilding and development are enabled within Greater Christchurch through a land use and infrastructure framework that: 1. (...) 5. protects and enhances indigenous biodiversity and public space; 6. maintains or improves the quantity and quality of water in groundwater aquifers and surface waterbodies, and quality of ambient air; (...)
	Objective 6.2.3 - Sustainability	Recovery and rebuilding is undertaken in Greater Christchurch that: 1. provides for quality living environments incorporating good urban design; (...) 5. is healthy, environmentally sustainable, functionally efficient, and prosperous.
	Policy 6.3.2: Development form and urban design	Business development, residential development (...) is to give effect to the principles of good urban design below, (...): 1. Tūrangawaewae – the sense of place and belonging – recognition and incorporation of the identity of the place, the context and the core elements that comprise the place. Through context and site analysis, the following elements should be used to reflect the appropriateness of the development to its location: landmarks and features, historic heritage, the character and quality of the existing built and natural environment, historic and cultural markers and local stories. (...)

Document	Relevant provisions	Relevant direction given effect to/ taken account of in Strategic Directions objectives, Chapter objectives / the objectives proposed by this Plan Change
		6. Environmentally sustainable design – ensuring that the process of design and development minimises water and resource use, restores ecosystems, safeguards mauri and maximises passive solar gain.
	Chapter 9 Ecosystems and Indigenous Biodiversity Objective 9.2.1: Halting the decline of Canterbury’s ecosystems and indigenous biodiversity	The decline in the quality and quantity of Canterbury’s ecosystems and indigenous biodiversity is halted and their life-supporting capacity and mauri safeguarded.
	Policy 9.3.3: Integrated management approach	To adopt an integrated and co-ordinated management approach to halting the decline in Canterbury’s indigenous biodiversity through: 1. working across catchments and across the land/sea boundary where connectivity is an issue for sustaining habitats and ecosystem functioning 2. promoting collaboration between individuals and agencies with biodiversity responsibilities 3. supporting the various statutory and non-statutory approaches adopted to improve biodiversity protection (...)
	Policy 9.3.4: Promote ecological enhancement and restoration	To promote the enhancement and restoration of Canterbury’s ecosystems and indigenous biodiversity, in appropriate locations, where this will improve the functioning and long term sustainability of these ecosystems.
Mahaanui Iwi Management Plan (IMP)	5.4 PAPATŪĀNUKU Ngā Paetae Objectives	(5) Inappropriate land use practices that have a significant and unacceptable effect on water quality and quantity are discontinued. (7) Subdivision and development activities implement low impact, innovative and sustainable solutions to water, stormwater, waste and energy issues
	Subdivision and Development Guidelines	7.3 Indigenous biodiversity objectives to include provisions to use indigenous species for: (i) street trees; (ii) open space and reserves; (iii) native ground cover species for swales; (iv) stormwater management network; and (v) home gardens.

Document	Relevant provisions	Relevant direction given effect to/ taken account of in Strategic Directions objectives, Chapter objectives / the objectives proposed by this Plan Change
	Stormwater Ngā Kaupapa / Policy P6.1	To require on-site solutions to stormwater management in all new urban, commercial, industrial and rural developments (zero stormwater discharge off site) based on a multi-tiered approach to stormwater management: (...) (d) Discharge to land based methods, including swales, stormwater basins, retention basins, and constructed wetponds and wetlands (environmental infrastructure), using appropriate native plant species, recognising the ability of particular species to absorb water and filter waste.
	5.5 Tāne Mahuta This section addresses issues of significance pertaining to indigenous biodiversity and mahinga kai; the flora and fauna that make up the domain of Tāne.	Ngā Paetae Objectives (1) Regional policy, planning and decision making in the takiwā reflects the particular interest of Ngāi Tahu in indigenous biodiversity protection, and the importance of mahinga kai to Ngāi Tahu culture and traditions. (2) The customary right of Ngāi Tahu to engage in mahinga kai activity is recognised, protected and enhanced, as guaranteed by Article 2 of Te Tiriti o Waitangi, and the NTCSA 1998. (3) The presence of indigenous biodiversity on the Canterbury landscape is enhanced, both in rural and urban environments. (4) The taonga value of indigenous ecosystems as natural capital and provider of essential ecosystem services is increasingly valued in the community.
	Mahinga kai Policy TM1.4	To promote the principle of Ki Uta Ki Tai as a culturally appropriate approach to mahinga kai enhancement, restoration and management, in particular: (a) Management of whole ecosystems and landscapes, in addition to single species; and (b) The establishment, protection and enhancement of biodiversity corridors to connect species and habitats
	Indigenous biodiversity Policy TM2.1	To require that local authorities and central government actively recognise and provide for the relationship of Ngāi Tahu with indigenous biodiversity and ecosystems, and interests in biodiversity protection, management and restoration, including but not limited to: (a) Importance of indigenous biodiversity to tāngata whenua, particularly with regard to mahinga kai, taonga species, customary use and valuable ecosystem services;
	Policy TM2.8	To require the integration of robust biodiversity objectives in urban, rural land use and planning, including but not limited to: (a) Indigenous species in shelter belts on farms;

Document	Relevant provisions	Relevant direction given effect to/ taken account of in Strategic Directions objectives, Chapter objectives / the objectives proposed by this Plan Change
		<p>(b) Use of indigenous plantings as buffers around activities such as silage pits, effluent ponds, oxidation ponds, and industrial sites;</p> <p>(c) Use of indigenous species as street trees in residential developments, and in parks and reserves and other open space; and</p> <p>(d) Establishment of planted indigenous riparian margins along waterways.</p>
Tree Policy (CCC)	Policy 1.1	We will actively seek and create new tree planting opportunities in suitable locations to maximise canopy cover and deliver ongoing environmental, economic and social benefits.
	Policy 1.5	For trees planted in the road reserve, the species selected must have sufficient space to grow into mature and healthy specimens without causing significant damage to existing infrastructure (provided no reasonably practical engineering solutions are available). Trees will be planted under power lines only where the species selected is able to grow to maturity without requiring line clearance pruning that results in poor tree form or structure.
	Policy 1.8	The cost of planting and establishing street and park trees within new subdivisions will be covered by the developer for at least 24 months.
Biodiversity Strategy 2008-2035	05 Goals and Objectives	<p>Goal 1, Objective: Ecosystems, sites and habitats supporting biodiversity are protected and restored.</p> <p>Goal 3, Objective: Community and private initiatives to protect and enhance biodiversity, including on private land are supported.</p>
Ōtautahi Christchurch Climate Resilience Strategy 2021	Climate Change Goals; Action Programmes	<p>Goal 1: Net zero emissions Christchurch (by 2045)</p> <p>Goal 4: We are guardians of our natural environment and taonga - By restoring the natural environment, we will reduce the impacts of climate change, as trees, soils, and wetlands absorb large amounts of carbon dioxide that would otherwise further heat the atmosphere.</p> <p>Programmes 4 and 5 both seek to increase tree cover across Christchurch and Banks Peninsula.</p>
Ōtautahi Christchurch Urban Forest Plan 2023	Goals	<p>Goal 1: Plant – Our urban forest canopy cover is growing sustainably</p> <p>Goal 2: Nurture – Our urban forest thrives with healthy, diverse and resilient trees</p> <p>Goal 3: Protect – Our urban trees are valued and looked after as critical infrastructure</p> <p>Goal 4: Involve – Our urban forest is nurtured by partnerships and participation</p> <p>Appendix 1 – Action Plan</p>

- 2.1.6 The higher order documents identify the resource management issues relevant to the district and provide direction in resolving these issues. A number of objectives and policies, in the documents identified above, are broadly relevant to providing for community's social and economic wellbeing, and their health in well-functioning urban environments.
- 2.1.7 While the main focus of the NPS-UD is on provision of sufficient housing and business land to enable opportunities for future growth in a coordinated way, the objectives and related policies aim to ensure that, among other things, urban environments are of high quality, provide for people's health and their social, economic and cultural well-being, support reductions in greenhouse gas emissions, and are responsive to the current and future effects of climate change (Objective 8; Policies 1 and 6). Local authorities need to rely on "robust and frequently updated information about their urban environments and use it to inform planning decisions" (Objective 7). This applies not only to making appropriate decisions about urban growth but also to the state of the urban environment in a broader sense, including the health of its natural environment and its ability to respond well to the climate change challenges.
- 2.1.8 The Canterbury Regional Policy Statement (**CRPS**) also seeks to provide for diverse, well designed and quality living environments that function in a way which:
- a. provides for people's social, economic and cultural wellbeing, as well as their health and safety, and at the same time;
 - b. maintains and enhances the overall quality of the natural environment of the region, including natural values, and
 - c. protects and enhances indigenous biodiversity and the quality of water and ambient air.
- 2.1.9 Good quality residential and business environment is to be developed following good urban design principles, be environmentally sustainable and healthy, safeguard mauri (life force) and restore ecosystems to enhance their life-supporting capacity. The CRPS also seeks to adopt an integrated and co-ordinated approach to halting the decline in Canterbury's indigenous biodiversity to better sustain habitats and improve ecosystem functioning.
- 2.1.10 The Mahaanui Iwi Management Plan (**IMP**) seeks to implement appropriate land use practices that have low impact on the environment, including through better water and stormwater quality management. The Plan also seeks to improve indigenous biodiversity and ecosystems as providers of mahinga kai and essential ecosystem services, which includes protection and enhancement of biodiversity corridors to connect species and habitats.
- 2.1.11 The Council's Biodiversity Strategy 2008-2035 and the Ōtautahi Christchurch Climate Resilience Strategy 2021 seek to protect and restore our natural environment, both on private and public land. By restoring and enhancing our biodiversity, including increasing tree cover, wetlands and soils, the strategies aim to reduce our greenhouse gas emissions and help mitigate the impacts of climate change on our environment.
- 2.1.12 There are no other relevant national policy statements or national planning standards to give effect to (section 75(3)) in the case of this plan change. The proposed Plan Change is not inconsistent with any Water Conservation Orders or any regional matter under a regional plan.
- 2.1.13 On 2 February 2023 the Council publicly notified its Urban Forest Plan for Ōtautahi Christchurch, inviting public comments. The Plan forms a key component of the Council's "response to climate change challenges and integrates with other Council plans directing the future intensification of urban form and a well-functioning city." Urban forest is considered to be a part of the green

infrastructure that supports the city's built and natural environment and provides a number of significant benefits.

- 2.1.14 The Urban Forest Plan sets the Council's direction and priority for planting and protecting the city's trees now and into the future. Based on the recent tree canopy cover surveys and associated urban forest canopy cover research, the Plan provides the strategic framework for increasing tree planting on Council land as well as other properties, incentivise tree retention and planting on private land, and sets realistic targets by land use type for improving the tree canopy cover in the city. The target canopy for residential land use is 20% by 2070 and 15% for road corridors.
- 2.1.15 The proposed provisions in this Plan Change have regard to the Tree Policy and Christchurch Urban Forest Plan and aim to align with the tree canopy targets for the city that have been identified through research¹ as appropriate for the Christchurch environment and confirmed in the Urban Forest Plan. This Plan Change adopts the 20% canopy cover target for residential zones and 15% target for road corridors in new greenfield subdivision areas.
- 2.1.16 No other management plans or strategies prepared under other Acts are considered relevant to the resource management issues identified.
- 2.1.17 As mentioned above, the RMA prescribes certain requirements for how district plans are to align with other instruments. Whether the District Plan objectives and provisions relevant to addressing adverse effects of development on tree canopy cover do that will be discussed in section 5 of the report.

2.2 Problem definition - the issues being addressed

- 2.2.1 **ISSUE 1 – Loss of tree canopy cover through development/urban intensification and insufficient replacement tree planting, particularly in residential zones.**
- 2.2.2 Christchurch City's canopy cover is comparatively low and decreasing. The recently undertaken second survey² of the tree canopy in Christchurch for 2018/2019 indicates that the city's tree canopy covers 13.56% of land in Christchurch, which is approximately a 2% decrease since the last 2015/2016 survey. As a comparison, at 30.61%, Wellington has the greatest canopy cover, while Auckland has 18% cover. Christchurch's 2018/2019 canopy cover is illustrated on the Figure 1 map below:

¹ Morgenroth, J. (2022), *Urban Forest Canopy Cover*.

² Morgenroth, J. (2022), *Urban Forest Canopy Cover*.

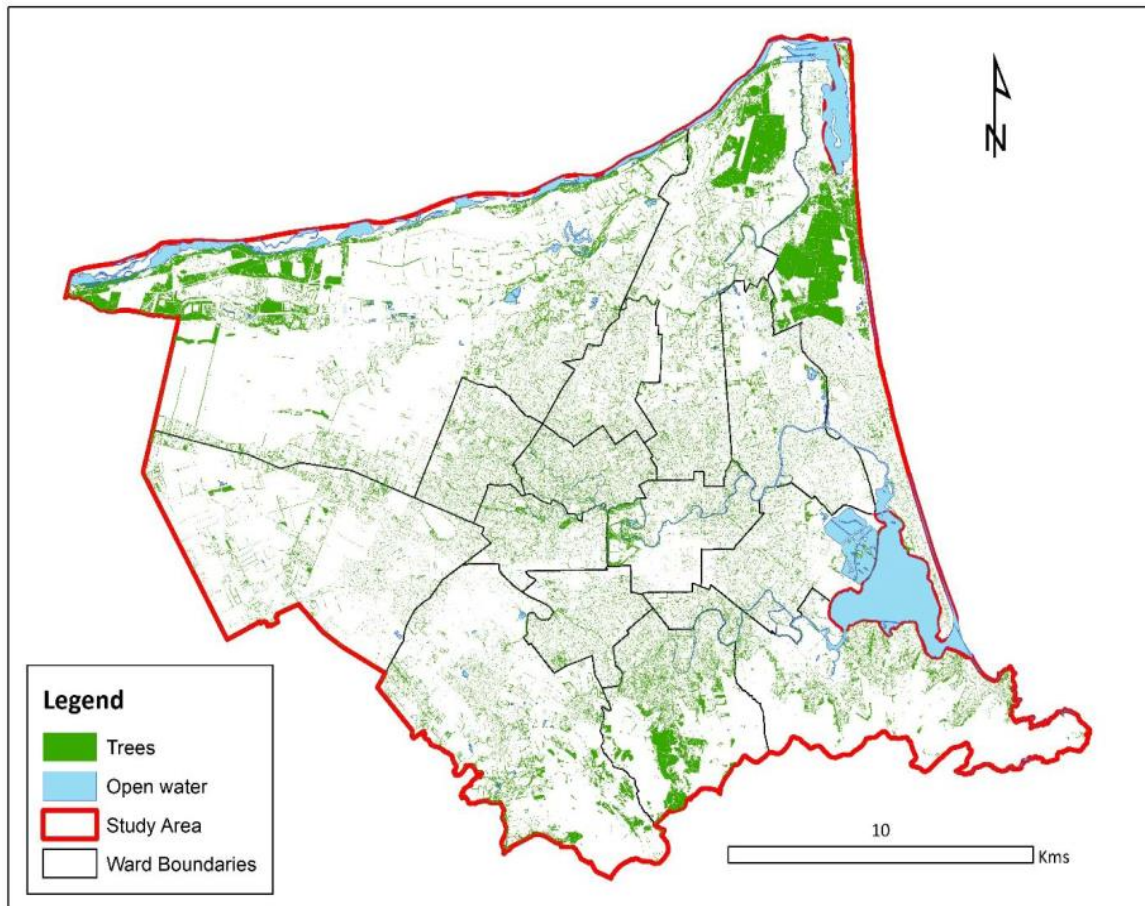


Figure 1 – Tree cover in Christchurch. Source: J Morgenroth, Tree Canopy Cover in Christchurch, New Zealand 2018/19, (2022)

2.2.3 The survey report analysed the canopy cover by land ownership and found that the Council owned land had 23% tree canopy cover, Crown land had 16% cover and private land had 11%. The tree canopy cover on all public land dropped by approximately 1% whereas on private land that drop reached 2%.

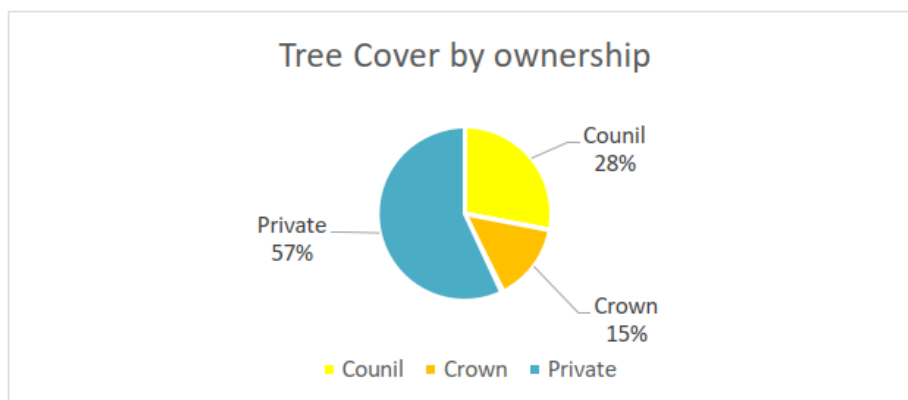


Figure 2 – Tree cover by ownership. Source: J Morgenroth, Tree Canopy Cover in Christchurch, New Zealand 2018/19, (2022), Figure 7 – Tree cover breakdown on privately- and publicly-owned land.

2.2.4 Privately owned properties contain 57% of all canopy cover in Christchurch (as shown in Figure 2 above), consequently, the loss of tree cover on private land will greatly affect the overall tree

cover in Christchurch. This is particularly important in light of the fact that 69% of all land in Christchurch is in private ownership (as shown in Figure 3 below).

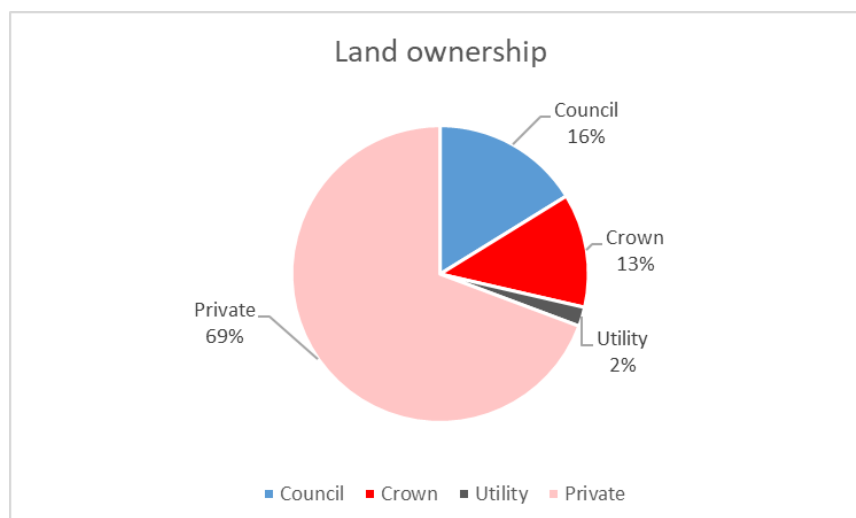


Figure 3 – Land ownership in Christchurch. Source: J Morgenroth, Tree Canopy Cover in Christchurch, New Zealand 2018/19, (2022)

- 2.2.5 In order to make a more accurate comparison of the canopy cover data, the 2018/2019 canopy cover area was overlaid with the boundaries used in the 2015/2016 survey with the following results showing the change in the percentage of land with tree canopy cover:

	2015/2016	2018/2019
Privately owned land	13%	11%
Publicly owned land	25%	24%
Total canopy cover	16%	14%

- 2.2.6 Although some of the overall 2% decrease in the tree canopy cover is a result of harvesting in the Bottle Lake Forest plantation and the recent Port Hills fires, much of the tree canopy loss is attributed to property redevelopment and intensification³. With the provisions of the Medium Density Residential Standards (**MDRS**), introduced by the Amendment Act, and the likely subsequent increase in residential intensification, that canopy cover is under threat of further losses. While the new MDRS require that 20% of the site area is set aside for landscaping, there are no requirements to retain or plant any trees on the development site, unlike in the current operative provisions of the District Plan which require that at least 50% of landscaping in multi-unit developments or medium density residential zone shall be planted with trees and shrubs.
- 2.2.7 **ISSUE 2 – Insufficient and/or inappropriate tree planting on residential development sites and in the future road reserves of new subdivisions in the greenfield or brownfield development areas.**
- 2.2.8 The current residential zones rules require tree planting within the landscaping area of multi-unit or medium density developments, but planting of trees on a single dwelling development site in the Residential Suburban zone is voluntary and is left up to the owners of the property. The

³ City-wide canopy cover decline due to residential property redevelopment in Christchurch, New Zealand, 2019, T. Guo, J. Morgenroth, T. Conway, C. Xu, Science of the Total Environment, ISSN: 0048-9697

property owners may opt for grass and/or shrubs so as to avoid tree maintenance, seasonal leaf fall or potential shading from trees.

- 2.2.9 Planting of the wrong tree species in the wrong place is not uncommon on private properties. This often leads to the tree being cut down when it gets too big for the space or when it does not do well in the limited or inappropriate space provided. The removed trees are not necessarily replaced with a more suitable species, and often give way to shrubs, other smaller plants and/or easy care gardens dominated by hard surfaces.
- 2.2.10 While developers often undertake voluntary tree planting in the future road corridors to improve the amenity of the subdivision, and its appeal to potential buyers, the number of trees planted in the road corridors varies from subdivision to subdivision and is not always sufficient to ensure meaningful benefits from tree canopy cover. The tree species choice is not always appropriate for the berm space they are planted in, which in many cases leads to stunted tree growth, sickness and/or death of the tree. Large trees planted in an inappropriate place or on the wrong side of the road may cause nuisance, infrastructure damage and shading of the adjacent properties. Such trees are often cut down and even if they are replaced with another tree, the young trees will take years to catch up to the size of the original trees.
- 2.2.11 **ISSUE 3 – Inadequate soil volume/ tree pits to allow trees to grow healthily to maturity while avoiding damage to infrastructure, and poor tree maintenance.**
- 2.2.12 Adequate growing conditions for trees are essential to ensure they grow healthily to achieve their ultimate size at maturity while avoiding any damage to infrastructure networks or buildings. Different tree species require different volumes of uncompacted soil and all trees need to be adequately maintained (watering/staking/pruning) in their early growth stages. They also require access to rain water, therefore, the tree base/roots should not be covered with impervious surfaces.
- 2.2.13 Street tree planting may require engineered tree pits to ensure the roots of the growing tree are directed to the right layer of soil, and do not cause damage to underground services and the road corridor infrastructure such as pavements. The principle of ‘the right tree for the right place’ also needs to be applied to ensure healthy and enduring tree canopy cover. There are known examples of developers choosing to plant London plane trees, capable of reaching 25 metre height and a crown about 20 metres wide, in a 1 metre wide grass berm of the future road reserve. Such trees will both outgrow their limited space provided and potentially damage the road or underground infrastructure, or their health and vitality will be affected.
- 2.2.14 **ISSUE 4 - Diminishing number of trees and canopy cover in urban environment contributes to the following adverse effects of urban intensification:**
- a. **Reduced carbon sequestrations;**
 - b. **Increased stormwater run-off;**
 - c. **Increased heat island effects;**
 - d. **Reduced biodiversity and amenity.**
- 2.2.15 Trees help build our resilience to climate change challenges and provide valuable ecosystem services, including carbon sequestration, stormwater runoff mitigation, and provision of shade to reduce the higher temperatures of the built urban environments. They also contribute to biodiversity through maintaining and/or increasing the tree species variety, including indigenous species, and supporting many species of fauna and flora. Urban amenity is greatly improved by

the presence of trees, as is people's health and wellbeing. For Christchurch, trees also help to maintain the 'garden city' image which is important to tourism. Improving the balance of indigenous planting is of great importance to the Ngāi Tahu framework for managing natural resources which is based on Kaitiakitanga (the inherited responsibility of mana whenua to manage the environment and natural resources) and which acknowledges that people are part of the world around them and not masters of it.

- 2.2.16 Overall, trees provide many essential environmental, economic, cultural and social services and benefits. Excepting scheduled significant trees, however, most of the trees on private properties are not protected in any way and often fall victim to people's neglect or preferences for easy care gardens, no leaf fall or shading.
- 2.2.17 The declining tree canopy cover in Christchurch will adversely affect the ecosystem services that trees provide as well as the city's biodiversity and amenity. This in turn will affect the city's ability to support reductions in greenhouse gas emissions and to create resilience to the current and future effects of climate change, thus creating an inconsistency with the directions of the NPS-UD, Objectives 1 and 2, and the CRPS, Objectives 5.2.1 and 6.2.3. Diminishing tree canopy cover would also be inconsistent with the environmental and cultural outcomes sought in the IMP.
- 2.2.18 Implementing the Medium Density Residential Standards (RMA, Schedule 3A) without additional provisions for tree planting would leave the Plan deficient in its ability to maintain and increase the city's declining tree canopy cover, particularly on private land, and ensure the higher order objectives outlined above are achieved. Declining tree numbers, whether due to their removal through intensification, inappropriate growing conditions or insufficient tree planting in areas of urban growth, are less able to offset the adverse effects of intensification on the environment. Insufficient tree canopy cover will adversely affect the functioning of urban environments and their effectiveness in providing for people's social, economic and cultural well-being, and for their health and safety. Not only are more trees needed in Christchurch but they also need to be protected from removal.
- 2.2.19 The proposed tree canopy cover and financial contributions provisions of Plan Change 14 seek to address the gap between the desired outcomes and the status quo.

3 Development of the plan change

3.1 Background

- 3.1.1 The resource management issues set out above have been identified through the following sources:
- a. primary research undertaken for the Christchurch and Wellington City Councils by Associate Professor Justin Morgenroth from University of Canterbury and published in a technical report entitled 'Urban Forest Canopy Cover' in 2022;
 - b. Tree Policy, Christchurch City Council;
 - c. public feedback and comments through various sources including public engagement, the media, annual residents' surveys;
 - d. matters raised in various internal Council forums by Councillors, executive leadership team, Council staff;
 - e. issues identified in other documents and plans, including those described above.

- 3.1.2 The proposed provisions for financial contributions have been enabled by legislative changes to the RMA, specifically by the Amendment Act 2021.
- 3.1.3 For the past few decades, many larger residential properties in Christchurch, as in the rest of the country, have been the subject of subdivision and infill development. With time, the development trends and housing demand have changed. Instead of adding one more dwelling to the existing property, usually through subdividing off the back yard containing a garden and/or trees, the entire properties are now often cleared to make way for higher density development of multiple residential units. With the clearing in preparation for development, all or most trees that grew on the site are removed. The new landscaping on the development sites, however, tends to be minimal, uses more hard landscaping and makes little provision for trees.
- 3.1.4 New greenfield subdivisions tend to have smaller sections with larger houses on them, leaving less room for multiple trees in the back yard. As a result, there is a noticeable decline in the city's canopy cover. This has been confirmed by the two tree canopy surveys undertaken for the Council since 2015. The 2% overall drop in the tree canopy cover in Christchurch is significant when you consider that this cover was at 16% and is now only at 14% of all land. Put another way, that reduction amounts to around 12.5% of the total existing canopy cover being lost.
- 3.1.5 The new legislation introducing medium and high density residential standards across the city, to enable intensification, is likely to exacerbate the problem of diminishing tree canopy cover. The tree clearing trends associated with infill and/or redevelopment outlined above are likely to be evident in such developments. Moreover, the minimal front, side and back yard setbacks required by the proposed medium and high density standards, combined with a lack of minimum site size for developments prior to subdivision, do not encourage setting aside sufficient space for garden and/or tree planting. This is likely to lead to a number of adverse effects on the environment and the community, as outlined in the issues above.
- 3.1.6 The Council has commissioned technical advice from external and internal experts to assist with assessing the effects of more intensive development, and the likely further tree loss, on the environment, as well as the potential options for mitigating these adverse effects. The advice includes the following:

Table 1: Technical Reports informing the Tree Canopy Cover / Financial Contributions section of Plan Change 14

	Title	Author	Description of Report
a.	Urban trees and their ecosystem services (Appendix 1)	Justin Morgenroth, University of Canterbury	A review of the current state of knowledge on urban trees and their services of carbon storage, sequestration, stormwater runoff attenuation, and urban heat island mitigation.
b.	Tree canopy cover benefits affected by urban intensification – Biodiversity and related issues (Appendix 2)	Colin D Meurk, University of Canterbury	The report explores mitigating the effects of urban intensification from a biodiversity (indigenous) perspective, specifically under Direct Use Values (Provisioning Services - Natural Habitat), Indirect Use Values (Cultural Services – spiritual, aesthetic/amenity, cultural diversity-sense of place, health & well-being, tourism, education), and Passive Values (options, existence/intrinsic, bequest).
c.	Landscape Qualities of Trees and their	Hilary Riordan,	An overview of the landscape attributes trees and their canopies can have within urban

	Canopies within an Urban Landscape (Appendix 3)	Christchurch City Council	landscapes, the benefits of urban tree canopy cover in terms of maintaining and improving landscape amenity, and how increased urban intensification may affect the amenity values of trees.
The following reports and articles were also referenced:			
d.	Urban Forest Canopy Cover, 2022	Justin Morgenroth, University of Canterbury	A technical report presenting independent research conducted by the University of Canterbury as commissioned by the Christchurch City Council and the Wellington City Council. The report undertakes a literature review on urban forest canopy cover and provides recommendations for canopy cover targets for New Zealand's cities.
e.	Tree Canopy Cover in Christchurch, New Zealand 2018/19	Justin Morgenroth, University of Canterbury	The report provides a snapshot of tree canopy cover in Christchurch between 2018 and 2019, corresponding to the dates of acquisition of both aerial imagery and LiDAR data used in the analysis.
f.	City-wide canopy cover decline due to residential property redevelopment in Christchurch, New Zealand	T. Guo, J. Morgenroth, T. Conway, C. Xu, Science of the Total Environment, 2019, ISSN: 0048-9697	Urban redevelopment influences urban forests, with consequences for ecosystem service provision. The study quantified the effect of residential property redevelopment on canopy cover change in Christchurch. Tree canopy cover losses were more likely to occur in meshblocks containing properties that underwent complete redevelopment.

- 3.1.7 The 'Urban trees and their ecosystem services' report by J Morgenroth (Appendix 1) focuses on a range of benefits, called ecosystem services, that urban forests and trees provide. A subset of the ecosystem services are regulating services, including **carbon storage and sequestration, stormwater runoff attenuation, and urban heat island mitigation**. The report quantifies the degree to which trees contribute to these regulating services and explores the factors that influence the trees' contribution. About 100 scientific articles split across the three regulating services were reviewed. These articles were used to quantify and qualify the role of trees in providing the regulating services outlined above.
- 3.1.8 The review showed that above-ground carbon storage density for trees averaged 11.5 kg of carbon per square metre of tree canopy cover (range 1.7–28.9 kg C m⁻²), while total carbon (above and below ground) storage density for trees had an average value of 7.95 kg/m² (range 0.8–36.1 kg C m⁻²). Carbon storage was greatest in species with high wood densities that had large biomass (both wood and leaf/needle biomass) and were able to live into maturity. The greatest values of carbon storage and sequestration were shown in cities or areas with more canopy cover, greater tree density, and lower forest fragmentation (more groups of trees as opposed to isolated trees). Further details are shown in section 3.2 and Table 1 of the Morgenroth report (refer **Appendix 1**).
- 3.1.9 Impervious surfaces (buildings and other hard surface) reduce the ability of rainfall to infiltrate into the soil. They also increase the speed at which rainfall runs off the surface. This increases peak discharges, the incidence and duration of flooding, and water quality. Trees reduce stormwater runoff, primarily by intercepting and storing between 9% and 61% of total rainfall in

their canopies and root systems (provided the surface is permeable). The intercepted rainfall is returned to atmosphere through evaporation and slowly infiltrated into the soil through the root systems. The soil water stores are then absorbed by the trees to support tree growth and functions, and eventually transpired back into the atmosphere during photosynthesis. As with carbon sequestration/storage, rainfall interception was influenced by leaf and plant surface area, canopy structure, and tree species. Trees with greater leaf or needle density and surface area were the most effective in rainfall interception. That effectiveness was greatest during short, low-intensity storms.

- 3.1.10 Urban areas often experience higher temperatures than rural areas, mostly referred to as heat island effect. This is due to built environments, comprising concrete, brick, asphalt or tile pavements, roof tiles and iron, absorbing sunlight and storing heat. Heat island effects are associated with higher surface and air temperatures, decreased air quality, increased energy consumption, elevated emissions of air pollutants and greenhouse gases, human discomfort, respiratory problems, heat strokes and dehydration, and accelerated deterioration of urban infrastructure, including road or pavement surfaces.
- 3.1.11 Trees, in contrast, reflect more radiation and do not store heat. Moreover, their canopies provide shade, thus preventing the surfaces underneath from absorbing sunlight, and their leaves and needles transpire, thereby cooling the surrounding atmosphere. They provide greater thermal cooling and comfort to humans than artificial sources. Ground surface temperatures were found to be 0.6–22.8°C cooler and air temperatures 0.8–7°C cooler beneath trees than in the surrounding non-treed environments.
- 3.1.12 The report shows that the variation in carbon storage and sequestration, stormwater runoff attenuation, and urban heat island mitigation is related to the quantity of trees, (expressed in tree density or canopy cover), their configuration (fragmentation, clustering), and their structural characteristics such as height, crown volume and shape, stem diameter, leaf area or density, and wood density, the latter of which is influenced by tree species and age. The regulating services, researched in the report, will improve with more trees or tree cover, particularly in clusters, and with greater total biomass and wood density. In contrast, development intensity and increased impermeable surfaces (buildings and/or hard surfaces such as pavements), which are associated with reduced tree cover, threatened the provision of the ecosystem/regulating services such as carbon storage and sequestration, stormwater runoff attenuation, and urban heat island mitigation by trees.
- 3.1.13 In his report ‘Tree canopy cover benefits affected by urban intensification – **Biodiversity and related issues**’ (refer to **Appendix 2**), C Meurk explores a complex array of values that trees represent and the role they play in the local biodiversity framework, with a particular focus on indigenous species and their benefits. The report provides support for mitigating the impacts of urban intensification on tree cover from a biodiversity perspective, specifically considering “Direct Use Values (Provisioning Services - Natural Habitat), Indirect Use Values (Cultural Services – spiritual, aesthetic/amenity, cultural diversity-sense of place, health & well-being, tourism, education), and Passive Values (options, existence/intrinsic, bequest)” (C Meurk (2022), p3).
- 3.1.14 The intrinsic/existence values of biodiversity are demonstrated by human behaviour and preferences or choices made. They also relate to well-being which is “attached to ‘sense of place’ or identity with a place, whose layered history is legible for citizens and visitors alike. This might be equated with Turangawaewae – a place to stand comfortably”. Trees, indigenous trees in particular, also provide habitat for native wildlife, and have indirect economic values, from tourism, health, and education benefits, that could be quantified. To avoid impacts on human

well-being, on wildlife, and to stop the “6th great extinction”⁴, adequate tree canopy cover that supports ecological integrity and legibility needs to be maintained and improved in our urban environment.

- 3.1.15 All of these factors contribute to our biodiversity which, the report defines as ‘indigenous contribution to global diversity’ and is distinguished from ‘species richness’, which is the total number of species regardless of origin. While species richness contributes to resilience and provision of important ecosystem services, indigenous species are specifically related to natural habitat, hosting or servicing indigenous microbes, invertebrates, birds and lizards, and providing pest and pollinator regulation. They also play an important role in providing cultural services to tangata whenua.
- 3.1.16 Indigenous trees and forest patches, particularly those rich in species, outperform exotic or un-treed residential environments in terms of indigenous wildlife and provide critical food resources, e.g. berries and nectar, at different times of the year. Good tree diversity and numbers are necessary to support native bush birds throughout the year.
- 3.1.17 Improvements in the balance of indigenous species versus exotics in the city’s tree canopy cover may be best achieved in larger areas of planting. It may not be appropriate to require a percentage of indigenous species in tree canopy cover rules for residential developments as most developments are likely to require only one or two trees per site. Species requirements in such situations could be viewed as too restrictive.
- 3.1.18 According to the report, the goal for the city’s tree canopy cover should be more aspirational than the 20% proposed. The 20% figure should be regarded as a medium-term minimum, but a higher target ought to be set for the future. Mr Meurk is of the view that the 20% goal, based on targets provided to the Council by J Morgenroth and Christchurch being contestably assessed as a grassland biome⁵, is not strictly valid due to the city’s environment containing many wetlands and indigenous forest remnants. Therefore, Christchurch has elements of a forest biome and that should be reflected in its overall canopy cover of between 25-30%, with a positive bias towards indigenous biodiversity. Refer to the **Addendum in Appendix 2** for more detailed discussion of the Christchurch biome.
- 3.1.19 The report supports the option of retaining valuable species/trees, removal of those constituting a biosecurity risks and replacing them with appropriate indigenous species. Safe havens need to be created for common, declining and endangered locally extinct wildlife that would feed, through ‘stepping stones’ and corridors of trees into the wider matrix. Trees on private properties and the streets can create such corridors linking larger areas of tree canopy on public land. Such measures would gradually lead to rebuilding the city’s ecological integrity, landscape legibility, and ultimately ecological literacy, identity, and protectiveness (or kaitiakitanga by Mana Whenua) for our natural heritage and taoka.
- 3.1.20 While it is difficult to express the biodiversity benefits of trees in monetary terms, some of them can be evaluated by proxy, e.g. tourism gains from the garden city image. International estimates,

⁴ The 6th great/mass extinction - an ongoing extinction event of a high percentage of biodiversity, or distinct species—bacteria, fungi, plants, mammals, birds, reptiles, amphibians, fish, invertebrates during the present Holocene epoch (also called Anthropocene) as a result of human activity, primarily driven by the unsustainable use of land, water and energy use, and climate change.

⁵ <https://academic.oup.com/bioscience/article/51/11/933/227116>, *Terrestrial Ecoregions of the World: A New Map of Life on Earth: A new global map of terrestrial ecoregions provides an innovative tool for conserving biodiversity*, BioScience, Volume 51, Issue 11, 2001; and Morgenroth, J. (2022), *Urban Forest Canopy Cove*.

however, show that for every \$1 invested in trees an average of \$2.25 are returned per annum in other benefits such as carbon sequestration.

- 3.1.21 The '**Landscape Qualities of Trees and their Canopies within an Urban Landscape**' report (Appendix 3) provides a high level overview of the landscape attributes that trees and their canopies can contribute within urban landscapes. The report focuses on how urban tree canopy cover maintains and improves landscape amenity and how urban intensification may affect the amenity values of trees.
- 3.1.22 H Riordan defines "amenity", as per the Oxford Dictionary, as "a desirable or useful feature or asset of a building or place", and "the pleasantness or attractiveness of a place". She explains that what is "desirable", "pleasant", or "attractive" is evoked by human emotions, feelings, and senses which contribute to the concept of "amenity", including all sensory perception.
- 3.1.23 In physical terms, trees come in a variety of sizes, forms, shapes, textures and colours and these can change according to the environment, stage of maturity, seasons or human modification. Tree's varying form, shape and textures contribute to the amenity and landscape values of a place by providing interest, a landmark, or the experience of seasonal change. Trees can screen or enhance built environments, create green walls, naturalise built environments by softening harsh outlines of buildings, and reduce visual pollution. They can be used to create, enhance and define architectural or natural features such as doorways or riverbanks.
- 3.1.24 Recognised as 'green infrastructure', trees in public and private realms contribute to visual amenity of the streets, benefitting both the residents and other users. If trees are removed from private properties and reliance to provide amenity is placed solely on trees within public spaces, both landscapes may become undesirable ones. One devoid of natural interest and harsh, the other, in an attempt to compensate for loss of trees, becoming too dark and dense.
- 3.1.25 Mature trees, particularly those with substantial canopies, can make a noticeable physical impact on the landscape while smaller young trees will take several years to provide a meaningful canopy cover which will be enjoyed by younger generations. It is important to retain mature trees while also planting young trees. Retention of mature trees within urban landscape ensures that the existing level of amenity, biodiversity and other values are retained, whereas, regular tree planting ensures age diversity of trees and mitigates the risk of the City's tree population reaching the end of life at the same time.
- 3.1.26 The report also explores the associative and perceptual values of trees, and the way they contribute to the 'liveable city' concept. People prefer to live in urban landscapes with more trees as their presence enhances public perception of visual quality of the city. This is particularly true for residential environments where urban greening has quantifiable correlation with property values.
- 3.1.27 Trees spread through private and public land encourage physical activity and provide more visually enjoyable environment, including shade and greenery. Through a connection to nature, trees provide health benefits such as stress reduction, evoking positive emotions and a sense of well-being. Street trees with denser canopies create a calming effect as they provide a sense of enclosure and road narrowing, thus reducing traffic speed, and have beneficial effects on social interaction while reducing crime levels.
- 3.1.28 The report highlights that indigenous trees and vegetation are critical to Ngāi Tahu's sense of identity, culture, connection with the natural environment, and their ongoing ability to keep tikanga and mahinga kai practices alive. The use of indigenous trees, 89% of which are endemic,

strengthens the sense of place for Ngāi Tahu, enriches food sources for humans and local fauna, and provides wayfinding functions, either as groups or individual trees.

- 3.1.29 Overall, the supporting evidence highlights numerous ecological services, biodiversity, cultural and amenity benefits of urban tree canopy cover, and provides support for enhancing Christchurch's tree canopy. This is particularly important in light of the likely effects of residential intensification on the city's urban and natural environments.

3.2 Current Christchurch District Plan provisions

- 3.2.1 The current Plan's Strategic Directions objectives, chapter objectives and provisions relevant to this plan change include Strategic Objectives 3.3.1, 3.3.3, and 3.3.9 as they relate to the values of natural environment. Residential Objective 14.2.4, Policies 14.2.4.1, 14.2.4.2, new 14.2.4.3, Objective 14.2.5 and Policy 14.2.5.4, Objective 14.2.7 and Policy 14.2.7.1, some of which are proposed to be changed through those amendments of Plan Change 14 that implement the NPS-UD and MDRS directions as specified in Schedules 3A and 3B, are relevant to the extent that they outline the outcomes sought for residential environments.

- 3.2.2 The relevant / parts of these objectives and policies are shown below for ease of reference. It should be noted that the changes shown in bold underline and bold strikethrough below are not proposed by this section (Tree canopy cover/financial contributions) of PC14. They are proposed by that part of PC14 dealing with the NPS-UD (development capacity for housing) and MDRS implementation and are analysed in the related section 32 report.

3.3.1 Objective - Enabling recovery and facilitating the future enhancement of the district

- a. The expedited recovery and future enhancement of Christchurch as a dynamic, prosperous and internationally competitive city, in a manner that:*
- i. Meets the community's immediate and longer term needs for housing, economic development, community facilities, infrastructure, transport, and social and cultural wellbeing; and*
 - ii. Fosters investment certainty; and*
 - iii. Sustains the important qualities and values of the natural environment.*

3.3.3 Objective - Ngāi Tahu mana whenua

- a. A strong and enduring relationship between the Council and Ngāi Tahu mana whenua in the recovery and future development of Ōtautahi (Christchurch City) and the greater Christchurch district, so that:*
- i. (...)*
 - iv. Ngāi Tahu mana whenua's historic and contemporary connections, and cultural and spiritual values, associated with the land, water and other taonga of the district are recognised and provided for; and*
 - v. (...)*
 - vi. Ngāi Tahu mana whenua are able to exercise kaitiakitanga.*

3.3.9 Objective - Natural and cultural environment

- a. A natural and cultural environment where:*
- i. People have access to a high quality network of public open space and recreation opportunities, including areas of natural character and natural landscape; and*
 - ii. Important natural resources are identified and their specifically recognised values are appropriately managed, including:*
 - A. outstanding natural features and landscapes, including the Waimakariri River, Lake Ellesmere/Te Waihora, and parts of the Port Hills/Nga Kohatu*

Whakarakaraka o Tamatea Pokai Whenua and Banks Peninsula/Te Pātaka o Rakaihautu; and

- B. the natural character of the coastal environment, wetlands, lakes and rivers, springs/puna, lagoons/hapua and their margins; and
 - C. indigenous ecosystems, particularly those supporting significant indigenous vegetation and significant habitats supporting indigenous fauna, and/or supporting Ngāi Tahu mana whenua cultural and spiritual values; and
 - D. the mauri and life-supporting capacity of ecosystems and resources; and
- iii. Objects, structures, places, water/wai, landscapes and areas that are historically important, or of cultural or spiritual importance to Ngāi Tahu mana whenua, are identified and appropriately managed.

14.2.4 Objective - High quality residential environments

- a. High quality, sustainable, residential neighbourhoods which are well designed, ~~have a high level of amenity, enhance local character and reflect to reflect the planned urban character and~~ the Ngāi Tahu heritage of Ōtautahi.

14.2.4.1 Policy - Neighbourhood character, amenity and safety

- a. ~~Facilitate the contribution of~~ **Provide for** individual developments ~~to high quality residential environments~~ in all residential areas (as characterised in Table 14.2.1.1a), ~~through design which contributes to a high quality environment through a site layout and building design that:~~
 - i. ~~reflecting the context, character, and scale of building anticipated in the neighbourhood~~ **ensures buildings and planting have a greater prominence from the street than car parking and servicing areas;**
 - ii. (...)
 - vi. **provides prominent planting areas throughout communal areas and adjacent to the street;**
 - vii. incorporates ~~using~~ principles of crime prevention through environmental design.

14.2.4.2 Policy - High quality, medium density residential development

- a. Encourage innovative approaches to comprehensively designed, high quality, medium density residential development, which is attractive to residents, responsive to housing demands, and ~~provides a positive contribution to its environment (while acknowledging the need for increased densities and changes in residential character)~~ **reflects the planned urban character of an area**, through:
 - i. consultative planning approaches to identifying particular areas for residential intensification and to defining high quality, built and urban design outcomes for those areas;
 - (...)

14.2.4.3 Policy – Quality large scale developments

- a. **Residential developments of four or more residential units contribute to a high quality residential environment through site layout, building and landscape design to achieve:**
 - i. **engagement with the street and other spaces;**
 - ii. **minimisation of the visual bulk of buildings and provision of visual interest;**
 - iii. **a high level of internal and external residential amenity;**
 - iv. (...)

14.2.7-5 Objective - Residential New Neighbourhood Future Urban Zone

- a. *Co-ordinated, sustainable and efficient use and development is enabled in the ~~Residential New Neighbourhood~~ Future Urban Zone.*

14.2.7-5.4 Policy - Neighbourhood quality and design

- a. *Ensure that use and development:*
- i. *contributes to a strong sense of place, and a coherent, functional and safe neighbourhood;*
 - ii. *contributes to neighbourhoods that comprise a diversity of housing types;*
 - iii. *retains and supports the relationship to, and where possible enhances, recreational, heritage and ecological features and values; and*
 - iv. *achieves a high level of amenity.*

14.2.9-7 Objective - Redevelopment of brownfield sites

- a. *On suitable brownfield sites, provide for new mixed use commercial and residential developments that are comprehensively planned so that they are environmentally and socially sustainable over the long term.*

14.2.9-7.1 Policy - Redevelopment of brownfield sites

- a. *To support and incentivise the comprehensive redevelopment of brownfield sites for mixed use residential activities and commercial activities where:*
- i. *(...)*
- b. *Ensure the redevelopment is planned and designed to achieve:*
- i. *high quality urban design and on-site amenity; and*
 - ii. *development that is integrated and sympathetic with the amenity of the adjacent neighbourhoods and adjoining sites.*
- v.

- 3.2.3 Chapter 3 - Strategic Directions provides overall directions for matters related to providing for a city environment in a way that meets the residents' well-being needs, and sustains important values and qualities of the natural environment (Objective 3.3.1, 3.3.9), including those of particular importance to Ngāi Tahu (3.3.3). Objective 3.3.9 seeks to identify important natural resources and manage their recognised values appropriately. This includes 'the mauri and life-supporting capacity of ecosystems and resources' and indigenous ecosystems, particularly those supporting indigenous flora and fauna. While the ecosystem services, biodiversity and amenity values of trees are not specifically recognised in the list of important natural resources in Objective 3.3.9(a)(ii)(A – D), this plan change is proposing to rectify that through the addition of a new clause (a)(ii)(E).
- 3.2.4 Chapter 14 objective 14.2.4 and the relevant policies, as listed above, seek high quality residential environments that are attractive to residents, achieve high level of amenity, and create a strong sense of place. Developments should be designed to create high quality environments through, among other things, prominence of planting areas in the communal spaces and in areas adjacent to the street.
- 3.2.5 Sustainable land use and development is also sought in the Future Urban Zone (Objective 14.2.7, Policy 14.2.7.4). The policies seek that the new neighbourhoods are of high quality and amenity, are responsive to ecological features and values, and integrate well with the surrounding neighbourhoods. Redevelopment of brownfield sites (Objective 14.2.9, Policy 14.2.9.1) supports comprehensive redevelopments for mixed use residential and commercial activities which are designed to achieve high quality and are sympathetic to the amenity of the adjacent neighbourhoods.

- 3.2.6 Overall, the outcomes sought through the objectives and policies outlined above are generally consistent with the strategic directions of higher order documents, e.g. NPS-UD, which seek to create high quality well-functioning urban environments. These environments are to provide for the social and cultural well-being of the communities, and their health and safety, while supporting reductions in greenhouse gas emissions and resilience to the effects of climate change.
- 3.2.7 The District Plan promotes better sustainability through a number of measures, e.g. by directing higher density developments closer to commercial centres and transport links to reduce greenhouse gas emissions from private car travel. It also seeks to protect significant natural, historic or cultural features but it is less explicit about seeking to minimise adverse effects of development on the local ecosystems (CRPS, Objective 9.2.1) and stopping the decline of their quality and quantity. One of the measures to mitigate that decline is increasing urban tree canopy cover on residential land. Tree planting on residential sites and streets is treated more as an urban design and amenity matter, rather than as a means to improve the environment by better utilising and increasing the scope of environmental and ecological services that trees provide. That gap is proposed to be addressed through the proposed changes.
- 3.2.8 As 69% of land in Christchurch is in private ownership (total of 30,635.14 hectares), with residential land having a significant share of it at 10,796 hectares, halting the decline of tree canopy cover in the city and increasing it, particularly in residential areas, needs to be given more priority. The table in Figure 6 below, sourced from the Tree Canopy Cover in Christchurch, New Zealand 2018/19 report by J Morgenroth (2020), shows the tree canopy cover in different zones and the corresponding land area in more detail.

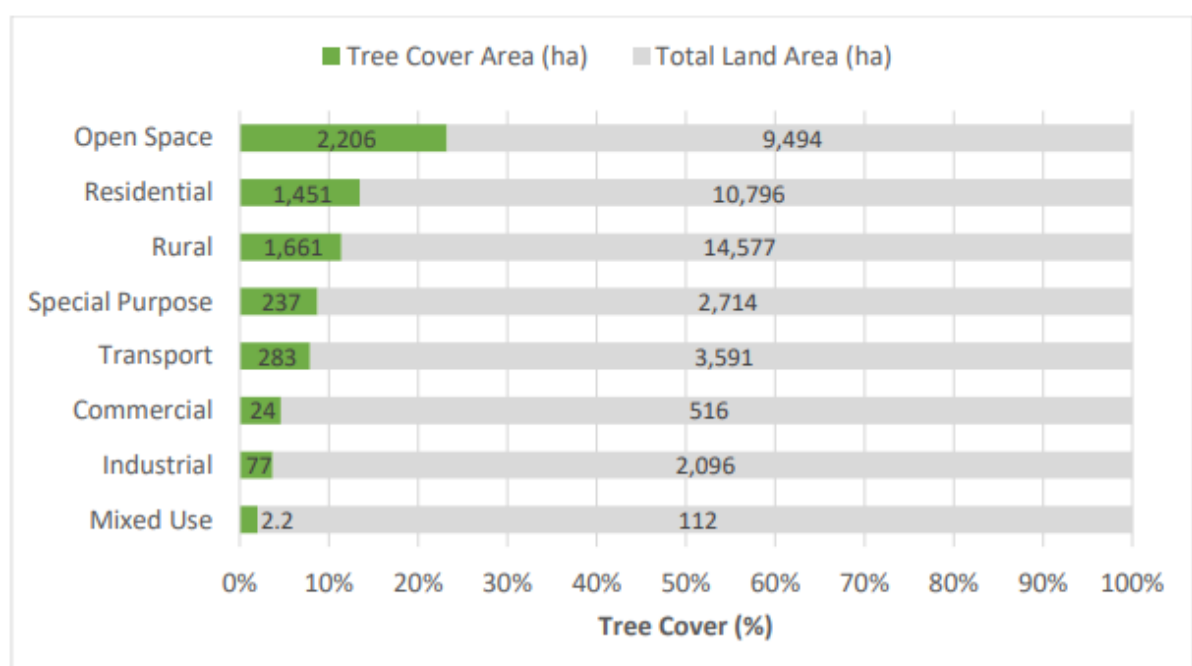


Figure 6 – Tree cover (%) within different District Plan zone types. Tree cover area and total land area within District Plan zone types are also shown as labels on the bars.

- 3.2.9 The matter of residential redevelopment and its effects on urban tree canopy were analysed in 'Tree Canopy Cover in Christchurch, New Zealand 2018/19' article by T. Guo, J. Morgenroth, T. Conway, and C. Xu published in 'Science of the Total Environment' in 2019. The paper found that urban redevelopment influences urban forests and that has consequences for ecosystem services provided by trees. The study quantified the effect of residential property redevelopment on

canopy cover change in Christchurch and found that tree canopy cover losses were more likely to occur in meshblocks containing properties that underwent complete redevelopment, i.e. replaced an existing dwelling with a number of new residential units on the same site.

3.3 Description and scope of the changes proposed

- 3.3.1 This part of Plan Change 14, focused on tree canopy cover / financial contributions, proposes an addition to Strategic Objective 3.3.9(a)(ii) to ensure the goal set out in the objective (identification and appropriate management of important natural resources) is achieved by also recognising the role that urban tree canopy cover plays in providing important ecological and environmental services, and enhancing the city's biodiversity and amenity. The changes are considered necessary and appropriate to ensure that the purpose of the Act is achieved.
- 3.3.2 The plan change also proposes to add a new objective to Chapter 8 Subdivision of the Plan, along with a suite of supporting policies. The new Objective 8.2.6 and associated policies 8.2.6.1 – 8.2.6.3 propose to provide a framework for maintaining and enhancing urban tree canopy cover in areas of residential development in Christchurch City. The adverse effects associated with development that the objectives and policies are seeking to address are:
- a. Declining tree canopy cover in urban areas;
 - b. Increase in greenhouse gas emissions;
 - c. Increased stormwater runoff;
 - d. Heat island effects;
 - e. Reduced biodiversity and amenity.
- 3.3.3 The plan change also proposes new subdivision rules to address the issue of declining urban tree canopy cover and to ensure that the relevant Plan objectives are achieved. The decision to include the tree canopy cover provisions in Chapter 8 Subdivision rather than Chapter 6 General Rules or another chapter, was made for two broad reasons. Firstly, subdivision rules enable the use of the consent notice regime to secure protection of the tree canopy cover into the future, which is essential to the overall scheme, and consent notice is a relatively straightforward and inexpensive mechanism. Secondly, subdivision will capture most of residential development that creates additional units.
- 3.3.4 New matters of control proposed to be introduced for residential subdivision, aim to increase tree planting in areas of residential subdivision and development or require that financial contributions are paid where on-site and/or on-road tree canopy cover is not achieved by the developer/site owner. The intention is that where the existing tree canopy cover is retained or the canopy cover is provided through new tree planting, it will be secured by consent notices which can be registered by the Council against the relevant titles. Financial contributions will enable the Council to carry out tree planting on public land in lieu of the required on-site tree canopy cover.
- 3.3.5 The changes described above include:
- a. An amendment to Strategic Objective 3.3.9(a)(ii);
 - b. New subdivision chapter Objective 8.2.6 - Urban tree canopy cover;
 - c. Associated Policies 8.2.6.1 – Contribution to tree canopy cover, 8.2.6.2 – The cost of providing tree canopy cover and financial contributions, 8.2.6.3 – Tree health and infrastructure;

- d. Additions to 'How to interpret and apply the rules' in 8.3.1, and to the administration (development and financial contributions) Rule 8.3.3;
- e. An addition of a new matter of control (Rule 8.7.12: Tree canopy cover and financial contributions) to controlled activities C5 - C10 listed in Rule 8.5.1.2 that are relevant to residential subdivision and development. The proposed matters of control in 8.7.12 address:
 - i. what tree canopy cover is required on the development site and in the road corridor, where applicable;
 - ii. how to calculate the canopy cover required;
 - iii. tree size and planting space requirements;
 - iv. the inclusion of a consent notice, to be registered on the land title, that requires tree maintenance and prevents tree removal;
 - v. how to calculate the financial contributions (for trees and land) that need to be paid to the Council in lieu of on-site tree planting.
- f. Additional definitions of 'heat island', 'hedge', 'maturity' (in relation to trees), and 'tree canopy cover' are also proposed.

3.4 Community/Stakeholder engagement

- 3.4.1 As required by the RMA Schedule 1, clause 3, the Council invited feedback on the draft proposal from the statutory bodies as defined in Schedule 1, the residents groups currently operating in Christchurch, the parties that specifically expressed interest in being consulted on particular matters, and general public. Pre-notification engagement occurred on proposed Plan Change 14 from 11 April 2022 to 13 May 2022. Draft amendments to the District Plan and a summary of the issues and evaluation of the draft options was provided on the Council's webpage specific to the plan change (<https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/christchurch-district-plan/changes-to-the-district-plan/planchange/plan-change-c14/>).
- 3.4.2 The draft provisions for tree canopy cover/financial contributions received 111 comments. Around three quarters of respondents either supported the financial contributions approach or considered it too lenient.
- 3.4.3 Over half of the respondents (54) supported tree canopy cover provisions. Of these, 39 provided a short supportive statement via a Generation Zero form. Others who supported the proposed approach felt that intensification development is likely to have a negative impact on the city's tree canopy cover through loss of existing trees, that protecting trees and aiming at 20% canopy cover was important, and that the proposed provisions were a way to achieve this outcome. They were also of the view that trees, indigenous species were preferred over exotic, should be planted close to the development site to offset effects such as heat island effects and to provide connectivity between vegetated areas for native birds. Many respondents thought that tree planting on residential streets and public spaces should be made a standard requirement of new developments.
- 3.4.4 Of the respondents who opposed the proposal, 25 considered that the proposed tree canopy cover/financial contribution provisions were too lenient. In their view, the approach would allow developers to pay some money instead of protecting/retaining existing trees, leading to further loss of existing tree cover. Others objected because, in their view, a young tree is not an adequate compensation for the loss of a mature tree as it will take decades to mature and play a meaningful role in combating climate change or providing habitat for native birds. Some of the respondents

also thought that the new trees should be planted close to where the development occurs so that climate injustice and inequality are not exacerbated.

- 3.4.5 Those who were of the view that the tree canopy cover/financial contribution provisions were too strict or onerous (14 comments) predominantly had first-hand development experience, and provided relatively detailed comments on a number of issues. Some argued that:
- a. the scheme would be too difficult to calculate accurately and to administer;
 - b. financial contributions would be too costly, particularly the ones for land, and the costs would be passed on to purchasers or make the development not viable;
 - c. the provisions are potentially inconsistent with what the government is trying to achieve through the MDRS;
 - d. 20% canopy cover would lead to loss of sun/natural light and cause shading and leaf drop, potentially leading to disputes between neighbours;
 - e. tree placement within development sites needs to recognise the position of new private services for new residential units which could be an additional constraint;
 - f. flexibility is needed as to where the trees are to be planted within a subdivision to account for physical or natural constraints of the land, e.g. allow for on-site trees to be planted in a common undevelopable area within the subdivisions instead;
 - g. increasing the berm width in greenfield subdivisions to accommodate trees may result in additional costs to ratepayers through the cost of leaf clean-up, damage to footpaths and infrastructure.
- 3.4.6 Another 20 responses provided a mixture of comments, including a desire for more revenue from new developments to be set aside for green streetscaping, more public space trees and green belts within the city as they are more effective in addressing carbon emissions and climate change effects than single trees. They proposed a fees structure that is proportionate to the significance of adverse effects on the neighbouring properties, such as shading and loss of privacy.
- 3.4.7 Much of the feedback emphasises the importance of retaining mature trees on development sites, with financial contributions being viewed as an 'easy way out' for developers. Some propose penalties for removal of existing mature trees. The ability of the Council to ensure that trees planted under the proposed tree canopy cover provisions are retained by subsequent owners is also questioned.
- 3.4.8 The draft proposal contained a requirement for a 10% tree canopy cover in industrial zones. That is opposed on the basis that such requirement would reduce the functional capacity of the available industrial land, particularly of the Lyttelton Port Company's port and depot areas, and that it would not be consistent with the outcomes anticipated by the zone rules with regard to landscaping.
- 3.4.9 The potential cost of the land component of financial contributions for central city developments is considered by some too high and unjustified, particularly in light of extensive open space land owned by the Council, including the former Red Zone land.
- 3.4.10 The Council considered the feedback provided. That consideration is reflected in the final provisions. It is acknowledged that in some instances, the physical or natural land constraints may make provision of on-site tree canopy cover difficult. The redrafted rules provide for some

flexibility in terms of where the required tree canopy cover is planted, e.g. in an undevelopable gully in the hill subdivisions.

- 3.4.11 The draft proposal for tree canopy cover requirements in commercial and industrial zones has been removed because this plan change is concerned with adverse effects of residential development on the environment, limiting the scope of the changes proposed. Any such provisions could potentially also be in conflict with the permitted built form standards in commercial and industrial zones as they mostly permit unlimited site coverage with buildings and impervious surfaces. Some landscaping and tree planting requirements already apply in these zones, e.g. tree planting required in car parking areas or the road boundary setbacks, and that is likely to provide similar canopy cover to the 10% proposed in the draft rules.
- 3.4.12 Some feedback provided is concerned with the potential dollar value of the land component of financial contributions which could be high or prohibitive, and which could be passed onto the purchasers. The proposed tree canopy cover/ financial contributions rules provide developers with a choice. Retaining or planting the required trees on the site, and/or in the future road corridor where applicable, is encouraged, and it is likely to be the cheaper option for developers. The examples below will help illustrate that.
- 3.4.13 The MDRS provisions require that 20% of the site be set aside for landscaping (proposed Rule Rule 14.5.2.2). Some or all of it could be used to accommodate the required trees. Trees can also be planted in other areas of the site that cannot be built on (another 30% of the site), including the site frontage, along the driveway, or service areas. Urban design advice obtained in-house confirmed that most developments can be designed around existing trees on the site, and that new trees can be accommodated on residential sites comfortably. The developers will have a choice of tree species to suit their preferences as long as the canopy cover at maturity meets the required size.
- 3.4.14 The land area required for tree roots is considerably smaller than the tree canopy size at maturity, e.g. a small tree with canopy size of 10m² requires 3.8m² of land for planting, a medium tree with canopy of 67m² needs 25.5m² of land, and a large tree with 186m² canopy, requires 70.8m² of land. Where a developer chooses not to plant trees on the site and pay financial contributions instead, an average tree size (130m² canopy) is used to calculate the number of trees for which financial contributions are required, and the corresponding land area of 50m² for tree roots is used to calculate the amount of land for which financial contributions need to be paid. All the relevant tree canopy sizes and root land areas are provided in the proposed Table 1 in Rule 8.7.12(d)(E).
- 3.4.15 To illustrate the potential cost of tree planting or the amount of financial contributions, some calculations are provided for a development on a 1000m² section as an example. For a 1,000m² site size, the required 20% on-site tree canopy cover would amount to 200m². If the developer chose to plant three medium size trees with 67m² projected canopy cover (as per Table 1 in Rule 8.7.12(d)(i)), the developer would need to plant 2.98 trees. A fraction over 0.5 is rounded up, therefore, 3 trees of medium size would need to be planted on the site. They would require 3 x 25.5m² land area to be planted in (8.7.12(d)(i) Table 1). The overall cost would likely be limited to the cost of three trees. If the price of \$200.00 per tree was used as an example, the total cost would be \$600.00. Tree prices can vary depending on the species and the young tree size and range from \$20.00 for a small sapling, around \$100.00 for a tree about 2 metres high and up to several hundred for an established rare specimen.
- 3.4.16 If the developer chose to plant a mix of trees with different canopy sizes, including 2 medium size trees (at 67m² canopy cover each), the two trees would achieve the projected canopy cover of

134m². The remaining 66m² of the overall canopy cover required would be planted with small trees (at 10m² canopy cover each). 66m² divided by 10m² canopy size equals 6.6 small trees. A fraction over 0.5 is rounded up, therefore, 7 small trees would need to be planted on the site. Overall, the developer would need to plant 2 x medium trees and 7 x small trees. The cost could vary depending on the tree species chosen and their size at the time of purchase.

- 3.4.17 If the developer chose not to plant trees on the site but pay financial contributions instead, the 200m² canopy cover required for a 1000m² site would need to be divided by the 'average' tree canopy size of 130m² (Rule 8.7.12, Table 1) to calculate how many trees would need to be paid for through financial contributions: 200m² divided by 130m² = 1.53 trees. This needs to be rounded up to 2 trees and then multiplied by the \$2037.00 financial contribution required per tree (refer to Rule 8.7.12(e)(i)). 2 trees x \$2037.00 = \$4074.00.
- 3.4.18 An 'average' tree with a 130m² canopy needs 50.00m² of land area to be planted in (Rule 8.7.12(d)(i), Table 1), therefore, 100m² of land is needed for 2 trees. The 100m² land area required will need to be multiplied by the value of the site per square metre (valuation will be required at the time of the subdivision application – Rule 8.7.12(e)(iv)(B)). As an example, the average residential land value per m² in Christchurch is estimated to be around \$400 - \$500/m². Based on the lower estimate, the financial contribution for 100m² of land required would be \$40,000.00. After adding the \$4,074.00 contribution for two trees, the total financial contributions for that site would be \$44,074.00.
- 3.4.19 The land value is based on the market value of the site at the time of development/the valuer undertaking the valuation. That is the most common approach to valuing land and is considered to be justified as the Council would need to pay market value for any land it needs to purchase for tree planting in/near the area of development. While the Council owns some open space land, it may not necessarily be in the area of a particular development and most of it needs to be retained as open space for public recreation or sports. The Council is planning to undertake tree planting, e.g. in the former Red Zone land or open space surplus to sports or recreation requirements, to help create an urban forest and boost our canopy cover. That, however, needs to be complemented by trees on private properties to ensure we achieve the recommended 20% tree canopy cover⁶ in the city.
- 3.4.20 The Christchurch tree canopy cover surveys undertaken and analysed by J Morgenroth, provide some estimates of the tree canopy cover increases if we planted various areas/zones of the city at the target canopy cover rates. If the Council increased the canopy cover on all of its open space land (9493.73 hectares) to 40%, it would only increase the city's current 13.5% canopy cover by 2%, reaching 16%. The Red Zone area (600 hectares in total, including the river and wetlands) planted to the target 80% canopy cover (i.e. covering 480 hectares), would increase the city's overall canopy cover by only 1.09%.

Table showing the effects of Red Zone land on city canopy cover

	Area (ha)	Current canopy	Canopy target	Projected canopy cover (Ha)
Red Zone	600	10%	80%	480
	Canopy contribution to city			1.09%

- 3.4.21 The most significant impact on the city's tree canopy cover comes from an increase of that cover in residential zones. The residential zones cover 10,795.75 hectares of land. An increase of the

⁶ Urban Forest Canopy Cover, J Morgenroth, 2020

tree canopy cover in all residential zones to the target 20% would increase the city's overall canopy cover substantially and achieve 22%.

Table showing effects of Residential land on city canopy cover				
Land zone	Area (ha)	2018/2019 canopy cover	Draft canopy cover targets	Projected canopy (ha)
commercial	515.53	4.60%	10%	52
industrial	2095.77	3.68%	10%	210
mixed use	111.71	2.01%	5%	6
open space	9493.73	23.24%	40%	3797
residential	10795.75	13.44%	20%	2159
rural	14577.16	11.39%	15%	2187
specific purpose	2714.04	8.73%	20%	543
transport	3591.1	7.87%	15%	539

Projected canopy cover with residential land included	22%
Projected canopy cover with residential land excluded	17%

3.4.22 Some consultation respondents expressed concerns about the potential difficulties with calculating the required canopy cover or the value of financial contributions. The proposed rules have been expanded to include step by step instructions on how to do that. The Council is also developing an on-line calculator that will allow developers to easily check what their required canopy cover or financial contributions are going to be.

3.4.23 A blanket protection of all existing mature trees in the city, as suggested in some of the feedback, is not permitted by the RMA. Some went as far as suggesting penalties for removing mature trees to allow for new development. The Council does not have a database of existing mature trees, other than the scheduled significant trees, therefore it would be hard to enforce any such rule.

3.5 Consultation with iwi authorities

3.5.1 Consultation on the draft proposal was also undertaken with the local Iwi authorities Te Rūnanga O Ngāi Tahu through Mahaanui Kurataiao Limited. No feedback specific to the tree canopy cover / financial contributions section of Plan Change 14 was received at the pre-notification consultation stage.

4 Scale and significance evaluation

4.1 The degree of shift in the provisions

4.1.1 The level of detail in the evaluation of the proposal has been determined by the degree of shift of the proposed provisions from the status quo and the scale of effects anticipated from the proposal. The details of the proposed changes are described above in 3.3.

4.1.2 The degree of shift in the objectives and provisions from the status quo is not considered to be significant. However, when the operative plan provisions are considered in conjunction with the implementation of the new MDRS and high density residential zone frameworks, the new requirements for provision of tree canopy cover in all residential zones and/or payment of

financial contributions may have a moderate impact on how new residential developments are designed and executed.

- 4.1.3 While the current strategic objective 3.3.9 seeks to protect and appropriately manage significant natural resources, including natural features and landscapes and the life-supporting capacity of ecosystems, this is not applied specifically to the tree canopy cover in the city. This plan change is proposing to rectify that in recognition of the important ecosystem services and other benefits that trees provide. This is particularly important in light of the recent tree canopy survey results that show that our canopy cover in the city is declining and that most of that decline is occurring in the residential redevelopment areas. The link between redevelopment of the entire site and tree loss has been researched in the paper referred to in paragraph 3.1.6, Table 1(f) above.
- 4.1.4 Currently the rules for low density residential and density transition zones do not require any tree planting in the landscaping areas for a single dwelling development. Multi-unit developments in these zones, however, and developments in the central city and medium density zone are required to provide 20% of the site for landscaping, half of which needs to be planted in trees and shrubs.
- 4.1.5 The new residential standards introduced by the MDRS in clause 18 of Schedule 3A of the RMA, and proposed to be implemented through PC14, require that 20% of the site is dedicated to landscaping but there are no requirements to plant trees within or outside of the landscape areas. The changes proposed in this plan change will require that trees be planted in all residential developments (where subdivision is proposed) to achieve a tree canopy cover of 20% of the net site area at maturity. The trees could be planted anywhere on the site where no buildings or impervious surfaces are proposed, including in the landscape areas. Overall, the shift from the current tree planting requirements to the proposed rules is considered not to be significant if the required trees are retained or planted on the development site.

4.2 Scale and significance of effects

- 4.2.1 The scale and significance of the likely effects anticipated from the implementation of the proposal have also been evaluated. The initial assessment of the environmental, economic, social and cultural effects anticipated has been verified and expanded on by the technical and specialist advice obtained. In making this evaluation regard has been had to whether the proposal:
- a. will result in effects that have been considered, implicitly or explicitly, by higher order documents, and will:
 - i. give effect to the relevant higher level RMA document; and/or
 - ii. help implement non-statutory initiatives, strategies and plans, e.g. Tree Policy, Biodiversity Strategy 2008-2035 , Christchurch Climate Resilience Strategy 2021, and the draft Urban Forest Plan (under development);
 - b. will have positive/negative impact on Part 2 matters, including positive or negative effects on people’s amenity, health and their economic, social and cultural wellbeing;
 - c. will be a significant shift from the current provisions;
 - d. will give better effect to the Plan objectives;
 - e. is of localised or city wide significance;
 - f. will address known concerns about tree loss in the city;
 - g. will affect options for people who were contemplating residential development;

- h. will impose significant costs on individuals or communities.
- i. is likely to positively affect those with particular interests, including Maori, and on resources of significance to iwi (matter of national importance in terms of Section 6 of the Act);
- j. will have certain benefits and costs.

4.2.2 The strengthened Strategic Objective 3.3.9 and the proposed new Urban tree canopy cover Objective 8.2.6 will better reflect and give effect to the higher order directions, as outlined in 2.1.5 above, and to the purpose of the Act. Urban canopy cover will help mitigate adverse effects of development on the environment and help safeguard the life-supporting capacity of air, water and ecosystems. The proposal will also ensure the Plan provisions are better aligned with other Council strategies and plans seeking to enhance the city's natural environment and its resilience. The proposal will also address the concerns of the public, Councillors and Council staff about the declining tree canopy cover in Christchurch and the effect of the decline on our environment, biodiversity and amenity.

4.2.3 While the proposal will have some monetary and design impacts on those developing residential land, through having to retain or plant trees on the development site, the effects are not dissimilar to those currently applicable to medium density zones through the existing landscape and tree planting provisions. These costs will apply only to new residential subdivisions/developments across the Christchurch City part of the Christchurch District, i.e. they will not affect Banks Peninsula where the level of canopy cover is much better.

4.2.4 If the developer chooses not to retain or plant trees on the site, financial contributions are required to be paid in lieu, to enable the Council to plant the equivalent tree cover off-site, on Council owned land. The impact of paying financial contributions may be more significant than that of on-site tree planting as financial contributions include the cost of the Council purchasing sufficient land for tree planting. It is noted that the amount of land is measured by the size of the tree pit required to accommodate the roots of the tree, rather than the canopy size.

4.2.5 The benefits of maintaining and enhancing the urban tree canopy cover are likely to be more noticeable in a few years' time when the trees grow and reach a more substantial canopy size. They will provide additional ecological services though carbon sequestration, stormwater runoff mitigation, shading and cooling that will mitigate heat island effects, and create better links and environment for the local fauna. With the likelihood of some more indigenous planting (the Infrastructure Design Standards tree list will contain a fair selection of native species), the indigenous biodiversity will also benefit through additional food sources and better links between more substantial urban forest patches on public or rural land. The amenity of residential neighbourhoods will improve, with added benefits to the community's well-being and health.

5 Evaluation of the proposal

5.1 Statutory evaluation

5.1.1 A change to a district plan should be designed to accord with sections 74 and 75 of the Act to assist the territorial authority to carry out its functions, as described in s31, so as to achieve the purpose of the Act. The aim of the analysis in this section of the report is to evaluate whether and/or to what extent the proposed Tree canopy cover / Financial contributions section of Plan Change 14 (PC14-FC) meets the applicable statutory requirements, including the District Plan objectives. The relevant higher order documents and their directions are outlined in section 2.1

of this report. Section 3.2 above sets out the directions provided by the District Plan strategic objectives in Chapter 3 and in the Chapter 14 residential objectives, as proposed to be amended by PC14, that are specifically concerned with the quality, character, and amenity of residential areas.

5.2 Evaluation of objectives

- 5.2.1 Section 32 requires an evaluation of the extent to which the objectives⁷ of the proposal are the most appropriate way to achieve the purpose of the Act (s32(1)(a)). This plan change proposes to amend and add new objectives to the Plan. This section of the report, therefore, examines whether the proposed objectives are the most appropriate way to achieve the purpose of the Act.
- 5.2.2 For the purposes of changing the District Plan, Rule 3.3.a (Interpretation) of the District Plan imposes an internal hierarchy for the District Plan objectives. Strategic Directions objectives 3.3.1 and 3.3.2 have relative primacy whereby all other Strategic Directions objectives are to be expressed and achieved in a manner consistent with those objectives. Furthermore, objectives and policies in all other chapters of the District Plan are to be expressed and achieved in a manner consistent with the Strategic Directions objectives. In this case, an addition is proposed to Strategic Objective 3.3.9 to ensure that the tree canopy cover in Christchurch maintains and enhances the city's biodiversity and amenity, and provides important ecosystem/regulating services such as carbon sequestration, stormwater runoff and heat island effects mitigation.
- 5.2.3 The proposed new Objective 8.2.6 is consistent with the amended Strategic Objective 3.3.9 by seeking outcomes that will achieve Objective 3.3.9.
- 5.2.4 The amendments are consistent with the overarching Strategic Objective 3.3.1 which seeks that future enhancements to the city are done in a manner that meets the community's social and wellbeing needs, and sustains the important qualities and values of natural environment. Maintaining and enhancing the city's urban tree canopy cover is consistent with these goals and will have positive effects to offset adverse effects of residential intensification.
- 5.2.5 The evaluation summarised in the table below shows that the proposed amendments are also consistent with the direction provided in the CRPS Objectives 5.2.1, 6.2.1, 6.2.3 and 9.2.1, and the supporting policies, which seek to maintain and enhance the overall quality of the region's natural environment, provide quality, healthy and sustainable living environments, and to protect and enhance our biodiversity, ecosystems and the quality of water and air. The proposed Objective 8.2.6 and the addition to Strategic Objective 3.3.9 will also give better effect to NPS-UD Objectives 1, 7 and 8 through supporting reductions in the city's greenhouse gas emissions, improving resilience to the effects of climate change, and creating urban environments that are healthier and better able to ensure people's social and cultural well-being.

Objective	Summary of Evaluation
Objective 3.3.9 – Option 1 – Amend the objective to recognise the values of urban tree canopy cover	<i>a. The intent of Objective 3.3.9 is to ensure that the important qualities and values of the city's natural and cultural environment, and the important resources are recognised</i>

⁷ Section 32(6) defines "objectives" and "proposal" in terms specific to sections 32 – 32A. "Objectives" are defined as meaning:

- (a) for a proposal that contains or states objectives, those objectives;
 (b) for all other proposals, the purpose of the proposal.

<p>3.3.9 Objective - Natural and cultural environment</p> <p>a. A natural and cultural environment where:</p> <p>i. People have access to a high quality network of public open space and recreation opportunities, including areas of natural character and natural landscape; and</p> <p>ii. Important natural resources are identified and their specifically recognised values are appropriately managed, including:</p> <p>A. outstanding natural features and landscapes, including the Waimakariri River, Lake Ellesmere/Te Waihora, and parts of the Port Hills/Nga Kohatu Whakarakaraka o Tamatea Pokai Whenua and Banks Peninsula/Te Pātaka o Rakaihautu; and</p> <p>B. the natural character of the coastal environment, wetlands, lakes and rivers, springs/puna, lagoons/hapua and their margins; and</p> <p>C. indigenous ecosystems, particularly those supporting significant indigenous vegetation and significant habitats supporting indigenous fauna, and/or supporting Ngāi Tahu mana whenua cultural and spiritual values; and</p> <p>D. the mauri and life-supporting capacity of</p>	<p>and appropriately managed, consistent with the CRPS Objective 5.2.1 and 9.2.1.</p> <p>b. This option additionally provides for the maintenance and enhancement of urban tree canopy cover which provides important ecosystem services, improves the city's biodiversity and people's health and wellbeing. This approach is consistent with CRPS Objective 5.2.1, 6.2.1, and 9.2.1, and gives effect to the NPS-UD Objectives 8 through supporting mitigation of greenhouse gas emissions and improving resilience to climate change effects. It is also consistent with the IMP Objectives 5.4(5) and (7), and 5.5.</p> <p>c. The proposed amendment will help implement quality and well-functioning living environment which is healthy, environmentally sustainable and functionally efficient, consistent with CRPS Objective 6.2.3 and 9.2.1, and the NPS-UD Objective 8.</p> <p>d. Proposed amended Objective 3.3.9 will promote restoration and enhancement of the city's ecosystems and biodiversity consistent with CRPS Objective 9.2.1 and supporting policies 9.3.3 and 9.3.4, IMP Objectives 5.4 and 5.5.</p> <p>e. Using updated information about the city's declining tree canopy cover (refer two Christchurch tree canopy cover surveys) to inform planning interventions is consistent with the NPS-UD Objective 7.</p> <p>f. Amended Objective 3.3.9 seeks to address the following resource management issues identified earlier, namely:</p> <p>i. Loss of tree canopy cover through development/urban intensification and insufficient replacement planting (Issue 1)</p> <p>ii. Insufficient tree planting in greenfield and brownfield residential subdivisions (Issue 2)</p> <p>iii. Diminishing canopy cover in intensifying urban environment contributes to these adverse effects: increased carbon emissions, stormwater runoff and heat island effects, and deteriorating biodiversity and amenity (Issue 4)</p> <p>Option 1 (Proposed amended Objective 3.3.9) would (in the context of Part 2 matters) have the following benefits:</p> <p>g. Ensure the tree canopy cover in Christchurch maintains and enhances the city's biodiversity and amenity, and provides important ecosystem/regulating services, including carbon sequestration, and stormwater runoff and heat island effects mitigation. It is consistent with the CRPS Chapter 6 and 9 objectives identified above, and the NPS-UD Objective 1 and 8.</p> <p>h. Maintain and enhance the overall quality of the region's natural environment, provide quality, healthy and more</p>
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<p>ecosystems and resources; and</p> <p><u>E. Tree canopy cover in urban areas that maintains and enhances the city's biodiversity and amenity, sequesters carbon, reduces stormwater runoff, and mitigates heat island effects; and</u></p> <p>iii. Objects, structures, places, water/wai, landscapes and areas that are historically important, or of cultural or spiritual importance to Ngāi Tahu mana whenua, are identified and appropriately managed.</p>	<p>sustainable living environments, protect and enhance our biodiversity, ecosystems and the quality of water and air. (consistent with CRPS Objectives 5.2.1, 6.2.1, 6.2.3 and 9.2.1)</p> <p>i. Support reductions in the city's greenhouse gas emissions, improve resilience to the effects of climate change. (NPS-UD Objective 8)</p> <p>j. Help create urban environments that are healthier and better able to ensure people's social and cultural well-being. (NPS-UD Objectives 1)</p> <p>k. Mitigate adverse effects of (new residential) activities on the environment (Section 5)</p> <p>l. Better safeguard the life-supporting capacity of air, water, and ecosystems (Section 5)</p> <p>m. Provide for the relationship of Maori and their culture and traditions with their ancestral lands, water, and other taonga (Section 6)</p> <p>n. Maintain and enhance amenity values and the quality of the environment (Sections 7(c) and (f)).</p> <p>Option 1 (Proposed amended Objective 3.3.9) could potentially have the following disadvantages:</p> <p>o. May require some alterations to the design of development to provide sufficient space for tree roots/canopy cover;</p> <p>p. Potential additional costs to developer, particularly if they opt to pay financial contributions in lieu of on-site tree retention/planting;</p> <p>q. The Council may not always be able to plant trees funded by financial contributions close to the development site;</p> <p>r. Large trees may be viewed by some residents as a nuisance, in terms of shading and leaf fall;</p> <p>s. Does not address the deficiency of trees in existing areas that are not being redeveloped;</p> <p>t. May not address the balance between exotic and indigenous species (support for indigenous biodiversity vs better efficiency of exotics in regulating services).</p>
<p>Objective 3.3.9 - Option 2 Status quo (No specific reference to / support for enhancing tree canopy cover)</p> <p>Retention of unchanged Objective 3.3.9</p>	<p>a. The current Objective 3.3.9 is largely consistent with the CRPS Objectives 5.2.1, 6.2.1, and 9.2.1 in that it seeks to:</p> <p>i. Identify important natural features and landscapes and appropriately manage their specifically recognised values, including:</p> <p>A. outstanding natural features and landscapes;</p> <p>B. natural character of the coastal environment, wetlands, lakes and rivers, springs, lagoons;</p> <p>C. indigenous ecosystems;</p> <p>D. the mauri and life-supporting capacity of ecosystems and resources; and</p>

	<ul style="list-style-type: none"> ii. <i>Identify objects, places, water, landscapes and areas that are historically important, or of cultural or spiritual importance to Ngāi Tahu mana whenua;</i> iii. <i>Ensure people's access to natural landscapes and area of natural character.</i> b. <i>While the objective seeks to recognise important features and landscapes, and important natural resources, it does not extend to recognising the values of tree canopy cover or its role in mitigating many adverse effects of urban development which leaves a potential gap in terms of achieving the CRPS Objective 9.2.1 or IMP Objectives 5.4.</i> c. <i>The current objective supports recognition of significant indigenous ecosystems (consistent with CRPS Objective 6.2.1, and IMPs Objective 5.4 and 5.5) but does not recognise the value of the overall tree canopy cover (which may not meet the 'significant feature' criteria) and its ecosystem/regulating services with respect to low environmental impact development, managing stormwater runoff and improving water quality.</i> d. <i>The objective does not specifically address the issue of declining tree canopy cover in the city as it does not specifically seek to enhance or appropriately manage it;</i> e. <i>The objective does not address the issue of adverse effects of residential intensification on the city's stormwater quantity and quality, or an increase in carbon emissions;</i> f. <i>The issue of increased building and impervious surfaces mass raising the urban temperatures, and the declining number of trees being less effective in cooling that environment will not be addressed;</i> g. <i>The role of private property and street tree canopy cover in providing links and enriching the overall biodiversity will remain unrecognised.</i>
<p>Option 1 – New Objective 8.2.6 - Urban tree canopy cover</p> <p>a. <u>Tree canopy cover in areas of residential activities is enhanced through maintaining existing trees and/or planting new trees as part of new residential development to sequester carbon from emissions, reduce stormwater runoff, mitigate heat island effects, and improve the</u></p>	<ul style="list-style-type: none"> a. <i>This option provides for enhancement of urban tree canopy cover to provide important ecosystem services and improve the city's biodiversity and amenity. This approach is consistent with CRPS Objective 5.2.1, 6.2.1, and 9.2.1, and gives effect to the NPS-UD Objectives 8 through supporting mitigation of greenhouse gas emissions and improving resilience to climate change effects. It is also consistent with the IMP Objectives 5.4(5) and (7), and 5.5.</i> b. <i>The new objective is consistent with the amended Strategic Objective 3.3.9 as well the overarching Strategic Objective 3.3.1 in that it will help to sustain the important values, qualities and functions of natural environment;</i> c. <i>The proposed objective will help achieve a well-functioning living environment which is healthy, environmentally sustainable and functionally efficient, consistent with CRPS Objective 6.2.3 and 9.2.1, and the NPS-UD Objective 8.</i>

<p><u>city's biodiversity and amenity.</u></p>	<p>d. <i>Proposed Objective 8.2.6 will promote restoration and enhancement of the city's ecosystems and biodiversity consistent with CRPS Objective 9.2.1 and supporting policies 9.3.3 and 9.3.4, and IMP Objectives 5.4 and 5.5.</i></p> <p>e. <i>New Objective 8.2.6 seeks to address the following resource management issues identified earlier:</i></p> <ul style="list-style-type: none"> i. <i>Loss of tree canopy cover through development/urban intensification and insufficient tree replacement (Issue 1)</i> ii. <i>Insufficient tree planting in greenfield and brownfield residential subdivisions (Issue 2)</i> iii. <i>Inadequate soil volumes and placement to allow trees to grow healthily while avoiding damage to the surrounding environment (Issue 3)</i> iv. <i>Diminishing canopy cover in urban environment which contributes to these adverse effects: increased carbon emissions, increased stormwater runoff and heat island effects, and deteriorating biodiversity and amenity (Issue 4)</i> <p><i>Option 1 (Proposed Objective 8.2.6) would (in the context of Part 2 matters) have the following benefits:</i></p> <ul style="list-style-type: none"> f. <i>Ensure the tree canopy cover in Christchurch maintains and enhances the city's biodiversity and amenity, and provides important ecosystem/regulating services, i.e. carbon sequestration, stormwater runoff attenuation and heat island effects mitigation. It is consistent with the amended Strategic Objective 3.3.9, the relevant CRPS Chapter 6 and 9 objectives identified above, and NPS-UD Objectives 1 and 8.</i> g. <i>Maintain and enhance the overall quality of the city's natural environment, provide quality, healthy and sustainable living environments, and ecosystems. (consistent with CRPS Objectives 5.2.1, 6.2.1, 6.2.3 and 9.2.1)</i> h. <i>Support reductions in the city's greenhouse gas emissions, improve resilience to the effects of climate change. (NPS-UD Objective 8)</i> i. <i>Help create urban environments that are healthier and better able to ensure people's social and cultural well-being. (NPS-UD Objectives 1)</i> j. <i>Mitigate adverse effects of (residential development) activities on the environment (Section 5)</i> k. <i>Better safeguard the life-supporting capacity of air, water, and ecosystems (Section 5)</i> l. <i>Provide for relationship of Maori and their culture and traditions with their ancestral lands, water, and other taonga (Section 6)</i> m. <i>Maintain and enhance amenity values and the quality of the environment (Sections 7(c) and (f)).</i>
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	<p><i>Option 1 (Proposed Objective 8.2.6) could potentially have the following disadvantages:</i></p> <ul style="list-style-type: none"> <i>n. May require alterations to the design of development to provide sufficient space for tree roots/canopy cover;</i> <i>o. Potential additional costs to developer, particularly if they opt to pay financial contributions in lieu of tree retention/planting;</i> <i>p. The Council may not always be able to plant trees funded by financial contributions close to the development site;</i> <i>q. Large trees may be viewed by some residents as a nuisance, in terms of shading and leaf fall;</i> <i>r. Does not address the deficiency of trees in existing areas that are not being redeveloped;</i> <i>s. May not address the balance between exotic and indigenous species (support for indigenous biodiversity vs better efficiency of exotics in regulating services).</i>
<p>Option 2 - No new Chapter 8 objectives on tree canopy cover</p>	<p><i>Option 2 would have the following disadvantages:</i></p> <ul style="list-style-type: none"> <i>a. No support for the amended Objective 3.3.9, therefore, the outcomes of subdivision/development resulting from intensification may not be consistent with the CRPS Objectives 5.2.1, 6.2.1, and 9.2.1 in that the current subdivision objective, policies and rules may not sufficiently recognise the mauri and life-supporting capacity of ecosystems supported by trees;</i> <i>b. This option does not recognise the values of tree canopy cover or its role in mitigating adverse effects of urban development or its ecosystem/regulating services, therefore, the outcomes may not achieve the CRPS Objectives 6.2.1 and 9.2.1 and/or IMP Objectives 5.4 and 5.5;</i> <i>c. The status quo option will not address the issue of declining tree canopy cover in the city;</i> <i>d. Option 2 will not address the issue of adverse effects of residential intensification on the city's stormwater quantity and quality, or an increase in carbon emissions as a result of intensification;</i> <i>e. The issue of increased building and impervious surfaces mass raising the urban temperatures and the declining number of trees being ineffective in cooling that environment will not be addressed;</i> <i>f. The role of private property and street tree canopy cover in providing links and enriching the overall biodiversity would remain unrecognised;</i> <p><i>Option 2 (status quo) could have the following benefits:</i></p> <ul style="list-style-type: none"> <i>g. No additional requirements in terms of development design;</i>

	<p><i>h. No additional costs to developers or encumbrances on property owners;</i></p> <p><i>i. Complaints about shading or leaf fall less likely.</i></p>
<p>Recommendation:</p> <p>The evaluation shows that urban tree canopy cover plays an important role across several areas of the city's natural environment and indicates that the amended Strategic Objective 3.3.9 and proposed new Objective 8.2.6 give better effect to the relevant higher order directions seeking to provide high quality and amenity urban environment that protects and enhances the city's biodiversity and ensures the community's wellbeing. The objectives recognise the important role that tree canopy cover plays in addressing adverse effects of development through its ecosystem/regulating services. The proposed Objectives 3.3.9 and 8.2.6 are, therefore, recommended as the most appropriate way to achieve the purpose of the Act.</p>	

5.3 Reasonably practicable options for provisions

5.3.1 In considering reasonably practicable options for achieving the objectives of the Plan, the following options for supporting policies and rules have been identified. Taking into account the environmental, economic, social and cultural effects, the options identified were assessed in terms of their benefits, and costs. Based on that, the overall efficiency and effectiveness of the alternative options were assessed.

5.3.2 **Option 1** – Status quo - no provisions for tree planting to:

- a. compensate for the loss of tree canopy cover through development; and
- b. address adverse effects of subdivision/development on the environment.

5.3.3 **Option 2** – Charge development contributions (**DC**), under the Local Government Act, for tree canopy cover treated as infrastructure.

5.3.4 **Option 3** – Introduce a financial contribution (**FC**), under s77E of the Resource Management Act (RMA), to cover the costs of mitigating adverse effects of new subdivision/development through provision of tree canopy cover.

5.4 Evaluation of options for provisions

5.4.1 The policies of the proposal must implement the objectives of the District Plan (s75(1)(b)), and the rules are to implement the policies of the District Plan (s75(1)(c)). The evaluation of the identified options will examine the effectiveness of the provisions in achieving the relevant objectives of the Plan.

5.4.2 The relevant objectives and policies are outlined in more detail in section 3.2 and the changes to objectives proposed in this plan change are summarised and evaluated in section 5.2 above. The proposed changes to the rules are summarised in 3.3 above.

5.4.3 A number of Chapter 14 (Residential) objectives and policies (refer to 3.2) are relevant to this proposal in that they seek residential environments to be well designed, sustainable and of high quality. Neighbourhoods are sought to have a strong sense of place and attractiveness to residents, engage with the street and other places through design and landscaping, be functional and support and enhance ecological features and values. These objectives and policies broadly align with the outcome sought in Strategic Objective 3.3.9 to provide people with access to

natural character and natural landscape, and the outcome of maintaining and enhancing the city's tree canopy cover proposed through the amendment sought in this plan change.

- 5.4.4 The relevant residential chapter objectives and policies also broadly align with the proposed new Objective 8.2.6 and supporting Policies 8.2.6.1 – 8.2.6.3 in Chapter 8 Subdivision that seek enhancement of the tree canopy cover in residential subdivisions/developments. There is currently a gap in the subdivision rules as none require provision of urban canopy cover in residential subdivision and development, therefore, the outcomes proposed in the amended and new objectives would not be likely to be achieved. Consequently, this Plan Change proposes tree canopy cover rules in support of the outcomes sought.
- 5.4.5 A detailed evaluation of the policies and rules proposed in the Plan Change, and the alternative options identified, has been carried out in terms of their potential costs and benefits, based on the anticipated environmental, economic, social, and cultural effects. The evaluation includes consideration of the overall appropriateness, based on efficiency and effectiveness, to achieving the objectives of the Plan and the purpose of the Act, as well as the risks of acting or not acting.

5.4.6 **Evaluation of methods - Options 1 to 3** (Note: The costs and benefits considered include environmental, economic, social and cultural costs.)

Evaluation of Options		
Option 1 - Status Quo	Option 2 – Development contributions for tree canopy cover (DC)	Option 3 – Proposed Plan Change – Tree canopy cover requirements/ Financial Contributions (FC)
<p>Status quo – no provisions for tree canopy cover planting to maintain and/or enhance the canopy cover and its benefits in areas of residential subdivision/development or to compensate for any loss of tree canopy cover through development.</p> <p>Benefits: No changes to the District Plan or the Development Contributions Policy required and no associated costs to the Council or developer. (economic) No instruments registered on the property title affecting current and future owners. (social, economic) Developers of greenfield subdivisions may continue to plant some street trees in future road corridors for amenity. (social, environmental)</p> <p>Costs: No specific incentive to retain existing trees during development or to plant new trees. (environmental, social/amenity) Adverse effects of urban development, including those contributing to climate change, such as: - increased carbon emissions;</p>	<p>Charge a development contribution (DC) under the Local Government Act (LGA) to fund the necessary infrastructure provision to service urban growth to the required level of service. The infrastructure, in this case, being trees planted on- and off-site to achieve the required tree canopy cover levels of:</p> <ul style="list-style-type: none"> - 20% of net site area (residential re/development), and - An additional 15% of the future road corridor area (in residential greenfield development or brownfield where new roads are created). <p>Charging DCs to enable the Council to provide tree canopy cover would be a novel use of the DC power.</p> <p>Benefits: Increase in on-site and street tree canopy cover with the associated environmental, social and cultural benefits as in Option 3. As in Option 3, adverse effects of residential subdivision/ development on the environment are addressed on-site or off-site through DCs. (environmental) Place-making benefits, urban landscape legibility. (social, cultural)</p>	<p>Introduce requirements for tree canopy cover provision on development sites and in future road reserves to achieve the required tree canopy cover of:</p> <ul style="list-style-type: none"> - 20% of net site area (residential re/development), and - An additional 15% of the future road corridor area (residential greenfield development or brownfield where new roads are created). <p>Consent notice would be required to be registered on the title to ensure trees are retained and appropriately maintained by all future owners. Where sufficient tree canopy cover is not retained or planted on the site or the future road corridor, payment of financial contributions (FC) in lieu of planting (RMA, s77E) would be payable to cover the costs of planting the equivalent tree cover by the Council on public land, as close as practicable to the development site. FCs would be based on:</p> <ul style="list-style-type: none"> - an average cost of a tree(s), - cost of planting (may require construction of an engineered road tree pit), - juvenile tree maintenance; and - a fair and proportional cost of purchasing land for planting of the required tree(s) off-site. <p>Benefits:</p>

Evaluation of Options		
Option 1 - Status Quo	Option 2 – Development contributions for tree canopy cover (DC)	Option 3 – Proposed Plan Change – Tree canopy cover requirements/ Financial Contributions (FC)
<p>- increased stormwater runoff; - increase in heat island effects; - decreased biodiversity and amenity will remain not addressed. (environmental, social, economic, cultural)</p> <p>Potential for further loss of tree canopy cover through intensive development enabled by the MDRS introduced by the Amendment Act and NPS-UD. (environmental, social, cultural)</p> <p>No provisions for tree planting (indigenous or exotic) in the landscape or other areas of the site in the MDRS, therefore, no incentive for developers to retain or plant any trees. (environmental, social, cultural)</p> <p>Reliance on the Council to create more urban forest patches on Council land at the ratepayers' expense. (economic)</p> <p>Planting of trees on available public land away from the site will not deal with the adverse effects of development on the site and the immediate surrounds as effectively. (environmental)</p> <p>Planting of maximum canopy cover on public land only will not achieve the 20% canopy cover target for Christchurch. (environmental, social, economic)</p> <p>Provision of some street trees by developers of greenfield subdivisions may continue to</p>	<p>Incentive to retain existing mature on-site trees or plant replacement trees on-site to avoid DC costs. (environmental, economic, social)</p> <p>DC charges would be included in the Development Contributions Policy which can be changed/updated as needed relatively easily. (administrative, economic)</p> <p>The associated Level of Service for tree canopy cover for new development would need to be set and the associated capex programme established in the Long Term Plan (LTP) providing the ability to review regularly. (administrative)</p> <p>The revenue collected is spent on the purpose for which it has been taken, as in Option 3. (economic, environmental, social)</p> <p>Costs: Additional costs to the developer/land owner (economic).</p> <p>DCs are used to service growth development (new or upgraded infrastructure) and are not linked to mitigating adverse effects of new development on the environment. Potential difficulty in establishing the level of service. (administrative)</p> <p>Tree provision may not be viewed as provision of the necessary infrastructure to service growth. (social, economic)</p> <p>To ensure the same level of service provision (tree canopy cover) everywhere, some rates funding is likely to be required to fund tree planting in the</p>	<p>Adverse effects of residential subdivision/development on the environment are addressed on-site (as the first option) or off-site (as a second option) through tree planting or FCs. (environmental)</p> <p>Increase of on-site and street tree canopy cover which would have beneficial effects on:</p> <ul style="list-style-type: none"> - The overall target tree canopy cover for the city; - Carbon sequestration and storage; - Stormwater runoff attenuation; - Heat island effects (shade and infrastructure longevity); - Biodiversity; - Amenity. (environmental, social, cultural) <p>Place-making benefits, urban landscape legibility. (social, cultural)</p> <p>Incentive to retain existing mature on-site trees or plant replacement trees on site to avoid FC costs. (environmental, economic, social)</p> <p>Trees would be appropriately maintained and retained in perpetuity or replaced, if diseased, through consent notice. (environmental, social, cultural)</p> <p>Some rules flexibility allowing consideration of taking land in lieu of FCs in subdivisions with, for example, land constraints. (economic, environmental)</p> <p>The revenue collected is spent on the purpose for which it has been taken (the relevant processes would be set up once the changes proposed are approved and operative) and, unlike DCs, is not driven by the Long</p>

Evaluation of Options		
Option 1 - Status Quo	Option 2 – Development contributions for tree canopy cover (DC)	Option 3 – Proposed Plan Change – Tree canopy cover requirements/ Financial Contributions (FC)
<p>be inappropriate (species/root space) and insufficient to offset the environmental effects of new development. (environmental)</p> <p>Efficiency and effectiveness:</p> <p>This option would be inefficient and ineffective in addressing the loss of tree canopy cover in the city through intensification and/or insufficient new tree planting to meet the recommended canopy cover target for Christchurch.</p> <p>Inefficient and ineffective in addressing adverse effects of development such as increased carbon emissions, heat island effects, excessive stormwater runoff, loss of biodiversity and diminishing amenity.</p> <p>Ineffective in achieving the relevant Plan objectives.</p>	<p>existing areas where no tree DCs have been collected through new development - additional burden on rate payers. (economic, social)</p> <p>The additional charges through rates would not be linked to mitigating the effects of new development. (social, economic)</p> <p>Inability to plant trees in the street adjacent or nearby to the development site and the need to plant the trees elsewhere may create a conflict with the level of service that the DCs collected are meant to achieve in the affected area. (social, economic, environmental)</p> <p>Inability to use consent notice as a legal instrument to protect trees in perpetuity, therefore, it would be difficult to ensure that the tree canopy cover is maintained over time. (economic, administrative)</p> <p>A risk that DCs for trees, being a relatively small portion of development costs, may not incentivise on-site tree retention or planting in the first instance. (environmental)</p> <p>As with Option 3, additional costs to the Council associated with monitoring and enforcement. (economic)</p> <p>Efficiency and effectiveness:</p> <p>If, due to increased expectations, the level of service was extended to existing properties, the DC fees collected would be insufficient to cover the cost of service provision across all areas, therefore</p>	<p>Term Plan spending schedules. (economic, environmental)</p> <p>Unlike Option 2, FCs do not create the risk of additional levies through rates as they are based on addressing adverse effects of a particular development rather than providing levels of service that may be expected to be the same across the city, regardless of the level of development in the area and related contributions. (economic, social)</p> <p>Costs:</p> <p>Additional costs to the developer/land owner. (economic)</p> <p>Potential effects on development design to ensure sufficient soil volume and permeability is provided for trees. (economic)</p> <p>As would be the case with DCs (Option 2), a potentially high cost of purchasing land for planting trees adds to the overall level of FCs. (economic)</p> <p>FCs, being a relatively small portion of development costs, may not be a sufficient incentive to retain on-site trees or to plant the required trees on the development site as a first option. (environmental, social, cultural)</p> <p>Additional costs to the Council associated with consenting, monitoring and enforcement. (administrative, economic)</p> <p>Efficiency and effectiveness:</p> <p>This option would be more effective than Option 1 in addressing environmental effects of development and addressing the issues identified.</p>

Evaluation of Options		
Option 1 - Status Quo	Option 2 – Development contributions for tree canopy cover (DC)	Option 3 – Proposed Plan Change – Tree canopy cover requirements/ Financial Contributions (FC)
	<p>ineffective in addressing the adverse effects of new development and potentially inequitable.</p> <p>Would not be as effective as Option 3 in achieving the Plan objectives, particularly because of inability to secure the tree canopy cover over time or to effectively encourage developers to plant trees on the site in the first instance.</p> <p>In terms of fees collected, this option could be as effective as Option 3 in areas of new development but ineffective in providing equitable level of service across the city.</p> <p>Likely less effective in the long-term protection of trees, as the bespoke consent notice scheme for subdivision consents would not be utilised.</p> <p>This option may not be as efficient as Option 3 in terms of the use of funds collected for the stated purpose due to potential LTP process inefficiencies.</p>	<p>Effective in achieving the relevant Plan objectives.</p> <p>This option would be efficient in providing funding directly for the purpose that the charges were collected for.</p> <p>In terms of fees collected to address adverse effects of development on the environment, this option would be as effective as Option 2 without the potential inefficiencies of the LTP process and the risk of additional rates charges to provide improved tree cover in areas with no or little development.</p> <p>This option is relatively simple therefore it is more efficient and effective than Option 2.</p>
Recommendations:		
<p>Option 1 is not recommended as it is considered inefficient in terms of the balance of costs and benefits. It is ineffective in addressing the issues identified or achieving the relevant Plan objectives.</p>	<p>Option 2 is not recommended as it is not considered to be as effective in addressing the issues identified in the areas most affected. More efficient and effective alternative provisions are outlined in Option 3.</p>	<p>Option 3 is the preferred option and is recommended as the most efficient and effective option of the alternatives considered. The recommended proposal addresses the issues identified, and the benefits of the proposed amendments outweigh the costs. It provides alternative mechanisms for developers to contribute appropriately to tree canopy cover across the city. The proposed solutions to the issues are considered more effective than the other options in achieving the relevant Plan objectives and the desired outcomes.</p>

Evaluation of Options		
Option 1 - Status Quo	Option 2 – Development contributions for tree canopy cover (DC)	Option 3 – Proposed Plan Change – Tree canopy cover requirements/ Financial Contributions (FC)
Risk⁸ of acting or not acting		
<p>With the imminent increase in development intensification enabled by the NPS-UD and RMA Schedule 3A, the risk of not acting is far greater than the risk of acting. The recent 2018/2019 survey of the tree canopy cover in Christchurch indicates that the overall canopy cover is now at 13.5% which represents a 2% loss since 2016. CCC owned land had 23% canopy cover, crown land had 16% canopy cover and private land had 11% canopy cover. While the public land lost 1% of the cover (mainly due to plantation forest felling and Port Hills fires), the biggest loss (2%) occurred on privately owned land, predominantly where redevelopment occurred. With nearly 70% of land in Christchurch being in private ownership and 57% of tree canopy cover being on private land, the risk of further canopy loss across the city is very real. To reverse that trend and address the associated adverse effects, the tree canopy cover in the city needs to be maintained and increased. Even with the maximum planting targets on all vacant Council land (e.g. former Red Zone), the 20% canopy cover target cannot be achieved without additional tree planting on private land.</p>		

⁸ Risk is the likelihood or probability of an effect and the cost of the consequence occurring = 'likelihood times consequence'.

5.5 The most appropriate option

- 5.5.1 **Option 3** is considered to be the most appropriate option for achieving the purpose of the Act as it is the most efficient and effective of all options considered in addressing the issues identified. The benefits of the proposed amendments outweigh the costs. The proposed solutions are considered more effective in achieving the relevant Plan objectives and the desired outcomes than the alternatives considered.
- 5.5.2 Through providing the opportunity to plant trees on the development site instead of paying financial contributions, this option is more economic for developers, while ensuring the trees mitigate the effects of development at source. Trees are very effective and efficient in absorbing and storing greenhouse gases, thus helping the community to minimise our contribution to climate change. Christchurch is prone to flooding and an increase in impermeable surfaces, both from buildings and hard surfaces, and consequently an increased stormwater runoff, is likely to exacerbate the problem. Trees are capable of absorbing substantial amounts of rain water, particularly in less severe weather events, and releasing it slowly into the air through evaporation. They also redirect some of the rainfall into the ground and limit the amount of polluted water being washed away through the drains into our rivers.
- 5.5.3 Their shade helps to keep us and our houses cool in hot summer months, while street trees prolong the life of infrastructure and have a traffic calming effect. Mature trees contribute to the amenity and pleasantness of our environment while also providing health benefits to people living, playing and walking around them. They provide wayfinding and reference points in our urban environment, and add character to our civic spaces.
- 5.5.4 While the proposed provisions do not require trees of particular species to be planted for canopy cover, it is likely that some of the trees planted will be indigenous species. Improving the balance of indigenous species in the city's environment is of particular importance to mana whenua, not only because of cultural and historic references but also because indigenous vegetation is important to our indigenous biodiversity and natural environment.
- 5.5.5 The proposal will more effectively address the issues identified and help ensure the outcomes set out in the Plan objectives, as well as those in the higher order documents are achieved. Ultimately, the Option 3 proposal is considered to be the most appropriate way to achieve the purpose of the Act.

6 Conclusions

- 6.1.1 This part of proposed Plan Change 14 has been prepared to introduce tree canopy cover and financial contributions provisions to address adverse effects of residential intensification development on the city's environment and its tree canopy cover.
- 6.1.2 Christchurch City's canopy cover is comparatively low and decreasing. The recently undertaken survey of the tree canopy in Christchurch, using aerial imagery of the city from 2018/2019, indicates that the city's tree canopy covers 13.5% of land in Christchurch which is a 2% decrease since the last 2015/2016 survey. The survey also looked at canopy cover by land ownership and found that Christchurch City Council owned land had 23% tree canopy cover, Crown land had 16% canopy cover and private land had 11% canopy cover. Privately owned properties constitute 70% of all land ownership in Christchurch and that land has 57% of the city's canopy cover on it.

Consequently, the loss of trees on private land would greatly affect the overall cover in Christchurch and the ecosystem / regulating services that trees provide.

- 6.1.3 Much of the tree canopy loss is attributed to property redevelopment and intensification. With the enabling provisions of the Medium Density Residential Standards and the likely increase in residential intensification, that canopy cover is under threat of further losses. Appropriate mitigation measures need to be put in place to prevent that. The recommended 20% target canopy cover is consistent with the highly modified environment of urban Christchurch and would require a 6.5% increase from the current cover. While Christchurch may be classified as a woodland/shrubland or a temperate forest biome, the residential 25% tree canopy cover target, reflective of such a biome, would not be consistent with the MDRS provision for 20% landscaping area per site. Modelling undertaken by in-house urban designers shows that 25% cover would be very hard to fit with an average multi-unit development without the tree canopies shading the outdoor living areas of the residential units or encroaching on neighbouring properties.
- 6.1.4 Tree canopy cover loss is not such an issue in rural or open space zones, however, the Council will be increasing tree planting in open space zones and streets to boost the canopy cover in Christchurch, consistent with the targets set in the Urban Forest Plan. Many non-residential zones, e.g. industrial, have sufficient landscaping and tree planting requirements in place to ensure that canopy cover in such zones is achieved to the levels commensurate with the anticipated level and type of development in them. Based on the targets set in the Urban Forest Plan (p.17) shown below, the overall tree canopy cover in the city should be at 29% by 2070.

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%

- 6.1.5 The new Medium Density Residential Standards, introduced through RMA, Schedule 3A, however, do not contain tree planting requirements that would be applicable to most of the residential areas in Christchurch. Additional objectives, policies and rules addressing this issue are, therefore, considered necessary. The PC14 proposed rules introduce additional matters of control for residential subdivision and development that will require provision of 20% tree canopy cover on residential sites, with an additional 15% cover requirement for future road corridors in greenfield subdivisions.
- 6.1.6 As the evaluation in this section 32 analysis indicates, the proposed policies and rules would ensure consistency with the Plan objectives and the higher order directions outlined above. Therefore, the proposal is considered to be the most appropriate way to achieve the purpose of the Act

7 Appendices

Appendix 1 – Technical report – Urban trees and their ecosystems

Appendix 2 – Technical report – Tree canopy cover benefits affected by urban intensification – Biodiversity and related issues

Appendix 3 – Technical report – Landscape qualities of trees and their canopies within an urban landscape