BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 12 to the Operative Hamilton City District Plan

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STATEMENT OF REBUTTAL EVIDENCE OF DR JULIANA REU JUNQUEIRA

(FLOOD HAZARDS AND GREEN POLICIES)

Dated 14 August 2024

LACHLAN MULDOWNEY
BARRISTER

P +64 7 834 4336 **M** +64 21 471 490
Office Panama Square, 14 Garden Place, Hamilton
Postal PO Box 9169, Waikato Mail Centre, Hamilton 3240
www.lachlanmuldowney.co.nz

INTRODUCTION

1. My full name is Juliana Reu Junqueira.

2. My qualifications and experience are as set out in my primary statement of evidence dated 26 June 2024 (**primary evidence**).

3. I reconfirm that I have read and am familiar with the Code of Conduct for Expert Witnesses (Environment Court Practice Note 2023) and I agree to comply with it.

PURPOSE AND SCOPE OF EVIDENCE

4. The purpose of this rebuttal statement of evidence, which is provided on behalf of Hamilton City Council (**HCC**) as Plan Change 12 (**PC12**) proponent, is to respond to matters raised in the evidence relating to green policies, specifically, water conservation measures, urban tree canopy and deep soils.

5. With respect to the rainwater tanks as part of the water conservation measures, I address the evidence of:

    a) Mr Philip Thomas Jaggard on behalf of Kainga Ora.

6. With respect to the requirement for a percentage of tree canopy coverage I address the evidence of:

    a) Mr Michael Robert Campbel on behalf of Kainga Ora;

    b) Mr Philip Mark Osborne on behalf of Kainga Ora.

7. With respect to the requirement for deep soils within the landscaped area I address the evidence of:

a) Mr Michael Robert Campbel on behalf of Kainga Ora.

8. In forming a view on the matters outlined above I have, in part, relied on the evidence prepared by Mr Mark Hector Roberts, Mr Michael Richard Graham and Mr Stuart James Edgar Farrant.

REBUTTAL POINTS

Rainwater Reuse

Mr Philip Thomas Jaggard - Kainga Ora

9. Mr Jaggard's evidence argues that the HCC's proposal under PC12 to mandate rainwater reuse tanks in new residential constructions is flawed. He argues that such systems frequently deplete during dry periods, failing to alleviate the pressure on the public water supply. Furthermore, he highlights the financial burden, maintenance demands, and potential health hazards as significant drawbacks, questioning the affordability and sustainability of these systems.

10. Mr Jaggard also suggests that the limited benefits offered by rainwater reuse could be more cost-effectively achieved through alternative stormwater management and water efficiency strategies.

11. Mr Farrant's evidence underscores the pivotal role of rainwater tanks in sustainable stormwater management. The importance of rainwater tanks transcends simple water collection; they embody a tangible commitment to water conservation and environmental stewardship. I agree with Mr Farrand's position regarding the importance of rainwater tanks.

Urban Tree Canopy coverage

Mr Michael Robert Campbel – Kainga Ora

12. Mr Campbell in his evidence[1], refers to issues about ensuring that permitted activities are complying with the tree requirements. He also raised concerns about the need for eventual arboricultural assessments for demonstration of compliance for permitted levels of development.

13. I concur with Mr Campbell's perspective that adopting a 'trees per unit' approach could establish a clear and quantifiable benchmark for tree planting, especially within the scope of permitted activities.

14. However, it is crucial to recognise that without proper planning during the design phase, the integration of trees can lead to unintended consequences for urban developments. For instance, trees planted without foresight can interfere with infrastructure, such as sewage systems, which can be both costly and complex to rectify.

15. Moreover, the failure to consider the mature size of trees can result in inappropriate species selection for the given location. As these trees grow, they may become unsuitable for their surroundings, leading to the unfortunate necessity of removal. This not only undermines the initial environmental intentions but also results in wasted resources and potential ecological damage.

16. To mitigate such outcomes, a planting guide could be invaluable. This guide[2] would assist individuals in selecting tree species that are compatible with their environment and that contribute to the desired tree canopy coverage.

17. The tree canopy approach provides developers with enhanced

[1] Statement of Evidence of Michael Robert Campbel on behalf of Kainga Ora, dated 24 July 2024.
[2] Statement of Evidence of Michael Richard Graham on behalf of HCC, dated 26 June 2024.

flexibility. Instead of being required to allocate a specific number of trees for each unit, developers are presented with options (see **Attachment A** on how tree canopy is considered). They can choose to preserve existing mature trees, which may cover several units, or they can opt to plant new trees that will grow to provide extensive coverage. Additionally, if it aligns more effectively with the site's layout and design, the option to plant smaller trees is available. This approach allows for a tailored strategy to vegetation that can adapt to the unique characteristics of each development site.

Mr Philip Mark Osborne – Kainga Ora

18. In response to Mr Osborne's evidence[3], it is crucial to acknowledge that while the implementation costs of trees have been raised, the analysis falls short by not considering the full spectrum of economic implications. Firstly, any new requirements will indeed incur costs; however, the submitter has overlooked the comparative expenses associated with alternatives that provide equivalent environmental benefits. The costs of such alternatives could, in fact, surpass those associated with tree planting when considering their long-term efficacy and maintenance.

19. Secondly, recognising the benefits contributed by trees is crucial to a balanced assessment. These include, but are not limited to, ecosystem services such as air purification, carbon sequestration, and water cycle regulation, which offer substantial economic value over time. These benefits create a flow on effect that positively impacts the economy at large, an aspect that should be integral to any comprehensive economic analysis of environmental interventions.

20. In his evidence, Mr Osborne also addresses concerns regarding site flexibility and efficiency (my emphasis added in underline): '*The*

[3] Statement of Evidence of Philip Mark Osborne on behalf of Kainga Ora, dated 24 July 2024.

requirement to provide contiguous space for 20% tree canopy per site has the potential to materially constrain development options for residential housing'.

21. Mr Osborne states that this could significantly limit development possibilities for residential housing. However, it is important to clarify that there is no mandate for contiguous tree canopy coverage. Developers have the flexibility to distribute trees throughout the site, which allows for more creative and efficient use of space without the necessity of a continuous canopy. This distinction is crucial for understanding the actual impact of tree canopy requirements on housing development.

22. In discussing the impact on affordability (paragraph 57, item b), it is important to note that the absence of trees to counteract the adverse effects of urbanisation could compel developers to adopt alternative stormwater management strategies. For instance, enhancing ground absorption capacity is one such method, but it often entails significant expenditures. Other alternatives include green roofs, permeable pavements, and rain gardens, which not only manage stormwater but also contribute to urban biodiversity and can improve air quality. While these solutions offer ecological and aesthetic benefits, they may also lead to increased development costs.

23. In considering the equitable distribution of costs (paragraph 57, item c), it is acknowledged that new developments will shoulder the majority of expenses under this policy. However, it's crucial to emphasise that a sustainable urban environment necessitates shared responsibility between public and private sectors. This is especially pertinent in the context of brownfields, where the anticipated tree canopy coverage cannot be achieved by public areas alone, necessitating the involvement of private land to meet these environmental goals. Such a collaborative approach ensures that the burden of creating greener spaces is distributed more fairly, aligning with broader sustainability objectives.

24. The assertion that the inclusion of land for tree planting could devalue the land and duplicate open space contributions overlooks the multifaceted benefits that trees provide to urban environments. Trees are not merely aesthetic additions but are crucial for ecological balance, enhancing air and water quality, and reducing urban heat islands, thereby complementing urban open spaces rather than duplicating them.

25. Mr Osborne's argument also fails to consider the long-term economic benefits of sustainable development practices, which include tree planting. These practices can lead to savings in healthcare costs due to improved environmental conditions, reduced infrastructure cooling costs, and increased biodiversity, among others which have their own intrinsic value. Therefore, rather than causing uncertainty or negatively impacting the salability of properties, integrating tree planting into urban planning can enhance the desirability and value of developments, contributing positively to both the economy and the environment.

26. The economic analysis overlooks the critical role of urban trees in the economic fabric of cities. Urban trees contribute significantly to the economic vitality by enhancing property values, reducing energy costs through climate moderation, and improving air quality. Their valuation, often challenging due to their non-market nature, is essential for comprehensive urban planning and policy-making. Therefore, it is imperative to integrate the ecological and economic benefits of urban trees into economic assessments to ensure a more complete and nuanced understanding of the urban economic landscape.

Recommendation

27. Upon review of the evidence presented, it is my professional opinion that the strategy proposed by HCC concerning the requirements of urban trees should remain unchanged.

Deep Soil

Mr Michael Robert Campbell – Kainga Ora

28. Mr Campbell in his evidence, recommends the deletion of deep soil requirements. According to his evidence (my emphasis added in underline) *'in my experience, the provision of specimen planting and landscape areas necessarily requires sufficient soil and ground permeability for such planting/landscaping to establish and thrive*'.

29. Mr Campbell's opinion on maintaining the current Urban Trees regulations does not alter the necessity for deep soils. Regardless of the method used to mandate urban trees—whether by number per unit or by coverage percentage—uncompacted soil is essential for their growth.

30. Furthermore, Mr Campbell's evidence in Table 6 acknowledges *'the risks of not acting on the relief sought by Kāinga Ora are the negative consequences outlined above*'. However, it fails to address the risk associated with planting trees and other vegetation in the absence of suitable uncompacted soil, which can hinder their survival and proper maturation (without discussing other benefits of deep soils).

31. Mr Campbell's evidence in Table 6 recognises the risks of inaction regarding Kāinga Ora's relief, citing the negative outcomes previously detailed. However, it overlooks the risks of planting trees and other vegetation without appropriate uncompacted soil—a factor critical to their survival and growth. While acknowledging the various other benefits of deep soils, these are not the focus of this particular evidence.

Recommendation

32. After an examination of the provided evidence, I recommend that the

HCC requirements for deep soil zones should be maintained as they are.

CONCLUSION

33. I have reviewed the evidence provided for Flood Hazards and Green Policies of PC12 specific to the evidence statements of:

    a) Mr Michael Robert Campbel on behalf of Kainga Ora;

    b) Mr Philip Thomas Jaggard on behalf of Kainga Ora.

    c) Mr Philip Mark Osborne on behalf of Kainga Ora.

34. After considering these statements, I have no specific changes to recommend in response to the matters I have considered.

Dr Juliana Reu Junqueira

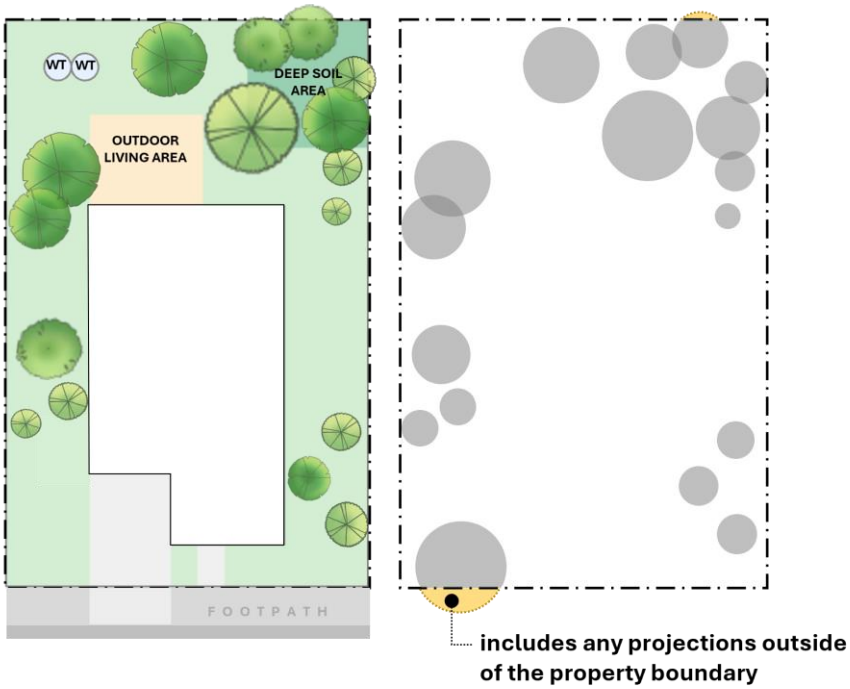
14 August 2024

ATTACHMENT A

URBAN TREE CANOPY COVERAGE PROJECTION

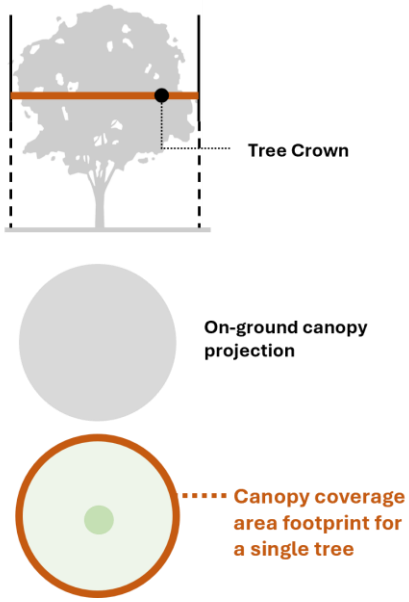
20% for General and Medium density Residential Zone, 10% for High density Residential Zone

The tree canopy coverage requirement is determined by what zone a site is located and is calculated by taking the total area of tree crowns planted within a site.



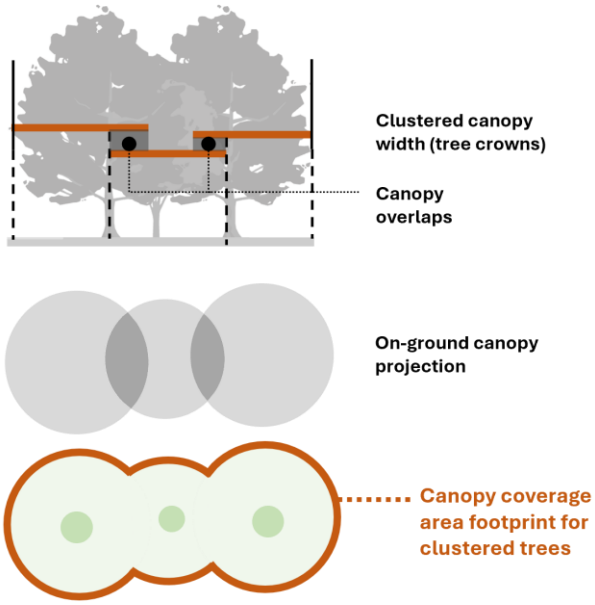
Single tree canopy coverage

Measured along the widest section of the Tree Crown circumference, projected unto the ground



Clustered tree canopy coverage

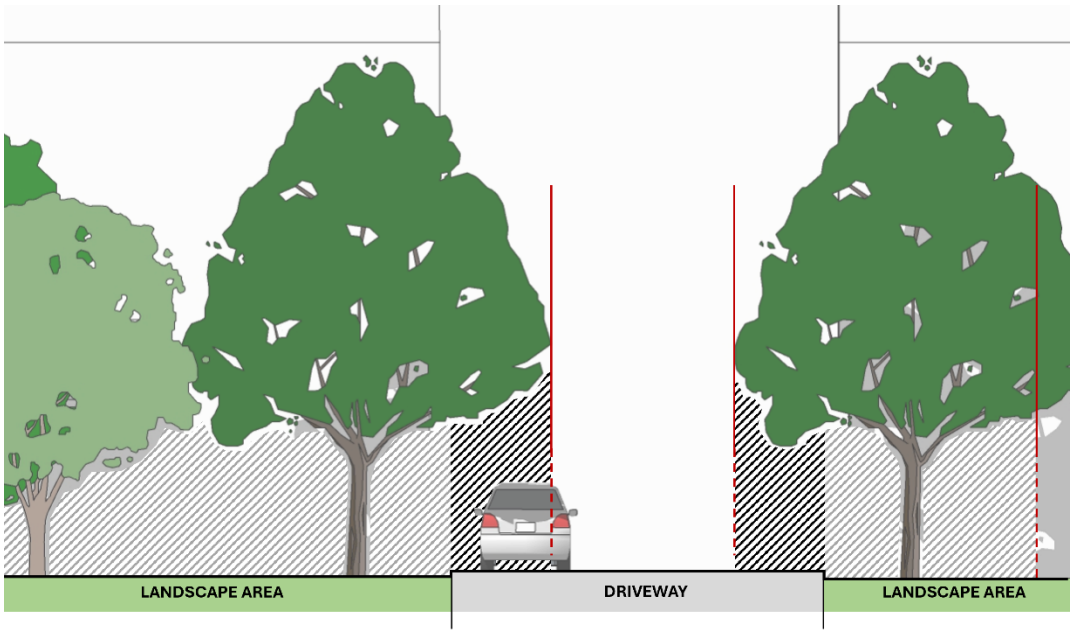
Measured along the widest section of each individual Tree Crown circumference, including intersections of the projection unto the ground.



Tree Canopy Coverage

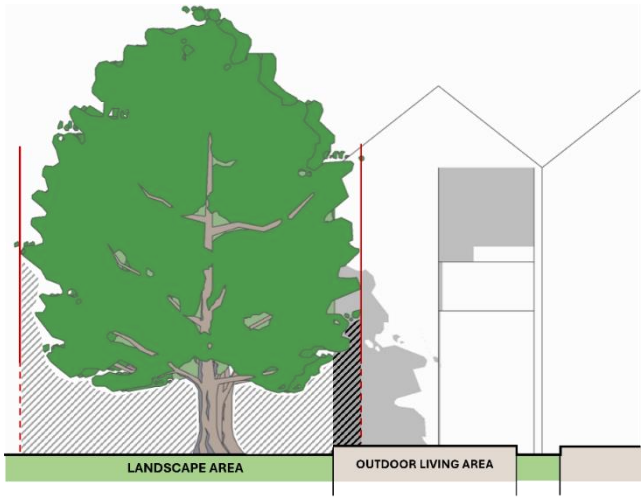
Tree Canopies can project over driveways and outdoor living areas, while still having habitable space depending on the use-case. These projections should cumulatively come up to a minimum 20% for GRZ and MDRZ, and 10% for HDRZ of the total site area.

Tree canopy projecting over Driveway



Tree Canopy cover

Tree canopy projecting over Outdoor Living Area



Tree Canopy cover