BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 9 to the Operative Hamilton City District Plan

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STATEMENT OF EVIDENCE OF DR HANNAH MUELLER

(Ecology - Significant Natural Areas)

14 April 2023

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INTRODUCTION

1. My full name is Dr Hannah Mueller. I am a Principal Ecologist and Director of Phoenix Ecology. For the purpose of this hearing, I am sub-contracted to 4Sight Consulting, Environmental and Planning Consultants of Hamilton.

2. I hold the qualifications of Bachelor of Arts with Honours (Liberal Arts – Humanities and Life Sciences) from the University of Maastricht, a Master of Social Science with Honours (Environmental Policy), and a PhD in Biological Sciences (Freshwater Ecology) from the University of Waikato.

3. I am a Certified Environmental Practitioner (CenvP) under the Environment Institute of Australia and New Zealand (EIANZ) certification scheme (CenvP certification number 1250).

4. I practice as Principal Ecologist and have eleven years' experience in environmental research and consulting. With a background and experience in terrestrial and freshwater ecology, I specialise in environmental impact assessments, ecological management, mitigation and restoration plans, and terrestrial fauna surveys and monitoring.

5. I have extensive experience in the assessment and management of ecological effects for land and infrastructure development projects, including impacts on forest, scrub and wetland ecosystems. Many of these projects have involved surveys and effects assessments with regards to long-tailed bats in particular. I also have experience in identifying Significant Natural Areas (**SNAs**), and have been involved in the identification and mapping of SNAs for Hamilton City Council (**HCC**) and Waikato District Council. Projects (and roles) that are of particular relevance to these hearing proceedings include:

    a) I have been involved in bat surveys using bioacoustics monitoring and hand-held observations particularly within the Waikato and Auckland

regions since 2011. I have led and designed many bat surveying programmes, including the Hamilton City-Wide annual monitoring 2016–2020.

b) I have been involved in numerous projects involving the management of bats and implementation of tree removal protocols in the Waikato and Auckland regions. In particular, I have been project manager and lead field ecologist for tree removal as part of the Puhoi to Warkworth (**P2WW**) (2016–2018) and Waikato Expressway–Longswamp Section (2016–2017) construction programmes. I have also assisted with the management of impacts on bats through tree removal at the Waikato Expressway–Ngāruawāhia Section (2012–2013) and Hamilton Section (2017–2018).

c) I have presented expert witness evidence and attended expert conferencing and mediation process with regards to bats on behalf of HCC as part of the 2020 Environment Court appeal on the Amberfield residential development, and Plan Change 5 (2021).

d) I have been lead ecologist in a number of wetland assessment and restoration management plans in the Waikato Region. These projects included comprehensive ecological assessment of the wetland including freshwater and terrestrial values, including avifauna and bat surveys, the design of a comprehensive monitoring plan and an ecological restoration plan, addressing issues such as weed management and pest control.

e) I have prepared and presented expert witness evidence on wetlands, including ecological effects and restoration options, in the Bay of Plenty (2018) and Otago (2020) and Waikato (2022) regions.

f) I have been lead ecologist for ecological management including vegetation removal and bat management for numerous rural and urban subdivisions within the Auckland and Waikato regions, which included monitoring, fauna management and compliance reporting.

g) I regularly provide peer ecological advice to district and regional councils on ecological effects assessments and ecological management plans including aspects such as bat ecology, lizard ecology, wetland ecology, and freshwater ecology.

6. I am a member of the New Zealand Freshwater Sciences Society, the New Zealand Ecological Society, and the Environment Institute of Australia and New Zealand.

7. I have been involved in the review and identification of SNAs on behalf of HCC since 2021, mainly providing high level technical inputs and project management support in the initial phase of reviewing the original SNA dataset which informed the notified version of Plan Change 9 (**PC9**) to the Operative Hamilton District Plan (**ODP**). I reviewed the original report on SNAs dated June 2022 which informed PC9 and which was Appendix 12 to the s 32 report for PC9.

8. I have also been involved with the submissions review and provided ecological advice to updates to the Plan Change provisions.

9. On behalf of HCC, I have co-authored the technical report dated 8 March 2023 on SNAs and ecology matters (**Technical Report**) to assess matters arising from submissions to PC9. That Technical Report is appended to the evidence of my co-author, Mr Hamish Dean.[1]

[1] Statement of Evidence of Hamish Dean dated 14 April 2023

10. I took part in expert conferencing on ecology and planning matters that took place on 14 March 2023 and have signed off on the Joint Witness Statement arising from this conferencing session (**Ecology JWS)**.[2]

CODE OF CONDUCT

11. I am familiar with the Code of Conduct for Expert Witnesses (Environment Court Practice Note 2023) and although I note this is a Council hearing, I agree to comply with this code. The evidence I will present is within my area of expertise, except where I state that I am relying on information provided by another party. I have not knowingly omitted facts or information that might alter or detract from opinions I express.

SCOPE OF EVIDENCE

12. In my evidence, I provide a brief summary of the findings of the technical ecology report and briefly discuss SNAs in Hamilton City, with a particular focus on the importance of biodiversity, fauna habitat and the provision of corridors and buffers.

13. I respond to matters raised in submissions with a focus on bat ecology, bat habitat use, buffers and corridors, cumulative effects, and freshwater ecology and biodiversity.

14. I provide comment on the updated plan provisions, again focused on bat ecology, buffers and corridors, and freshwater ecology and biodiversity.

EXECUTIVE SUMMARY

15. I have been involved in the review and identification of SNAs on behalf of HCC since 2021, mainly providing high level technical inputs and project

[2] Joint Witness Statement for Ecology dated 14 March 2023

management support in the initial phase of reviewing the original SNA dataset which informed the notified version of PC9 to the ODP.

16. The current SNAs within the ODP cover only areas of indigenous flora and do not necessarily include areas of significant habitats for indigenous fauna.

17. PC9 addresses this gap by extending those SNAs to include other vegetation areas (predominantly in gullies and along the Waikato River) that are the habitat for several threatened and/or regionally uncommon indigenous fauna species, notably 'Nationally Critical'[3] long-tailed bats (*Chalinolobus tuberculata*).

18. I have been directly involved in the review of submissions on PC9, and have co-authored the technical report dated 8 March 2023 which responds to submitter issues. I also attended expert conferencing, and have reviewed the evidence for HCC relating to the final set of proposed SHA provisions within PC9.

19. I support the addition of further provisions to limit the effects of light intrusion of any new lighting on an SNA as recommended by Mr McKensey for HCC. In particular, I support controls on any additional lighting, screening and building setbacks to ensure additional lighting effects on SNAs are minimised.

20. I support the further changes to the provisions that address what activities with respect to public access to SNAs (e.g. walkways, cycleways) are appropriate. These infrastructure types should be controlled in a way that there is no additional light intrusion into SNAs, and that no future conflicts

[3] O'Donnell, C., Borkin, K., Christie, J., Lloyd, B., Parsons, S. and Hitchmough, R., 2018. Conservation status of New Zealand bats, 2017 (New Zealand Threat Classification Series, 21). New Zealand Department of Conservation.

are created between public access and the requirement to protect potential bat habitat or potential bat roosting trees.

21. I recognise that mudfish habitat is currently unprotected where habitat falls outside of identified SNAs, such as farm drains. While there are some rules and regional policy provisions addressing mudfish, there is uncertainty with respect to where mudfish are located which requires addressing. Once that habitat is identified with greater certainty, it is my view that further steps, including a plan change to extend the proposed SNAs, would be appropriate in order to protect mudfish habitat.

22. Within the PC9 provisions I recommend the inclusion of reference to best practice offsetting and compensation guidelines to provide clearer guidance on biodiversity offsetting and compensation as part of effects management of any new resource consent applications that have the potential to adversely affect SNAs.

KEY ECOLOGY MATTERS RAISED IN TECHNICAL REPORT

23. Previously identified SNAs in Hamilton covered only areas of indigenous flora and did not necessarily include areas of significant habitats for indigenous fauna. PC9 seeks to address this gap as Hamilton City includes other vegetation areas (predominantly in gullies and along the Waikato River) that are the habitat for several threatened and/or regionally uncommon indigenous animal species, notably 'Nationally Critical'[4] long-tailed bats.

24. While unusual compared to exercises of identifying and protecting SNAs across the country, the protection of fauna habitat is a critical component

[4] O'Donnell, C., Borkin, K., Christie, J., Lloyd, B., Parsons, S. and Hitchmough, R., 2018. Conservation status of New Zealand bats, 2017 (New Zealand Threat Classification Series, 21). New Zealand Department of Conservation.

of the SNA review in Hamilton City because the city provides habitat for threatened species such as bats.

25. The highly mobile nature of bats and the scarcity of remaining feeding, commuting and roosting habitat for bats across the city and the wider landscape mean that the protection of the areas identified as SNAs has a critical function for this species, even though it comprises areas that are dominated by exotic and even at times weedy plant species.

26. Given the historic land use change and removal of indigenous vegetation cover across the city, even degraded areas such as exotic or weed-dominated gully areas provide important habitat for indigenous fauna species and the protection of those areas that remain, and retaining linkages, corridors and buffers, is critical to ensure indigenous fauna can persist in an urban environment.

27. In the case of Hamilton's gully systems, preserving these fauna habitats and protecting them from further urbanisation effects also requires maintaining corridors (including streams and other linkages) and buffers (including exotic vegetation) from further encroachment.

28. Small, incremental reductions in size of an SNA, increased fragmentation, and reduction in width of corridors all can have substantial effects on the habitat function and resilience of these systems. Due to these cumulative effects, further encroachment into gully systems by urbanisation needs to be avoided to preserve the function of SNAs as habitat for indigenous flora and fauna across the city, and requested changes to SNA extent were considered in this context.

RESPONSE TO SUBMISSIONS

29. Submissions with respect to ecology centred around three key themes, which were the extent or significance of SNAs on private land; SNA provisions, requesting changes to rules and consenting requirements; and

submissions requiring more effective and/or extensive protection of biodiversity values.

30. Below, I comment on provisions and biodiversity values. Aspects of SNA identification and determination of extent are addressed in the evidence prepared by Mr Hamish Dean.[5]

Infrastructure

31. Several submissions raised concern about the appropriateness of installing infrastructure such as small structures, fences, and pathways within SNAs. The Department of Conservations (**DoC**) submission[6] raised concern about the appropriateness of constructing public walkways and cycleways within floristic SNAs (**fSNAs**), and seeks protection of these areas from their potential effects.

32. While enabling public access into gully systems and SNAs is beneficial to allow for restoration and enjoyment by the public, installation of infrastructure also has a risk of disturbing and fragmenting the ecosystem. It is my view that the installation of small structures and small unlit pathways for the purpose of restoration are not at risk of compromising ecosystem function.

33. However, larger infrastructure such as public walkways, park benches and cycleways have more potential to create adverse effects through lighting requirements.

34. There is also a potential conflict between safe use of these features, and the presence of mature trees and vegetation that may need to be removed now or in future for safety purposes if there is public access. This could compromise ecosystem function and habitat through the removal of

[5] Statement of evidence of Hamish Dean dated 14 April 2023
[6] Sub 425, 20.2.1.g

potential bat roost trees that are already of limited availability in the city, and that often are mature, damaged or dead trees that have the highest risk in terms of public safety.

35. To avoid this risk, in my opinion these infrastructure features enabling public access may not be appropriate in many situations in fSNAs and should be carefully managed in corridor/indigenous fauna habitat SNAs (**cSNAs**) to avoid further habitat loss and fragmentation.

Lighting

36. DOC's submission requests further rules and provisions to protect potential bat habitat from the effects of lighting and glare. Forest and Bird[7] also submit that the impact of this needs to be considered.

37. I support lighting controls limiting additional lighting intrusion into SNAs while working within the constraints of existing lighting in urban areas. In broad alignment with recent hearing decisions for Plan Change 5[8] and Weston Lea[9], acknowledging existing lighting in already developed areas, a 0.3 added lux limit as received at the boundary of an SNA would be an appropriate control, from the perspective of minimising additional effects of any new lighting on bat habitat.

38. Alternatively, setbacks for new buildings and screen planting should be considered to attenuate light intrusion into SNA areas.

39. I also recommend referring to key measures[10] to minimise lighting effects on wildlife in the plan, the guiding principles of which are summarised in the Technical Report (Section 5.4.3).

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[7] Submission # 333
[8] Plan Change 5 decisions version
[9] Weston Lea subdivision consent
[10] Kyheröinen, E.M., S. Aulagnier, J. Dekker, M.-J. Dubourg-Savage, B. Ferrer, S. Gazar- yan, P. Georgiakakis, D. Hamidović, C. Harbusch, K. Haysom, H. Jahelková, T. Kervyn, M. Koch, M.

Freshwater Systems

40. DOC submits[11] that mudfish habitat is currently unprotected where habitat falls outside of identified SNAs, such as farm drains. DOC considers that the lack of protection of habitat for this threatened species needs to be addressed through PC9.

41. I agree that mudfish habitat meets SNA criteria (criterion 3) and should be appropriately protected. Protections for waterways through the proposed PC9 SNA provisions are currently limited to restrictions on vegetation clearance and earthworks which provide some control of direct and indirect impacts on waterways from development.

42. Provisions have not sought to control other impacts on waterways through development such as habitat loss and fragmentation, or the discharge of stormwater or runoff into SNA waterways; some of which may be controlled through regional policy and rules.

43. This means that while some potential effects are controlled, no formal protection of mudfish habitat is provided for in areas outside the identified SNAs, which could lead to better ecological outcome for this threatened freshwater species.

44. An essential component of this protection would be the clear identification of current mudfish habitat in areas such as farm drains. Without understanding where these habitats exist it is not possible to map and protect farm drain areas with confidence. So, while I support the intent of

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Lundy, F. Marnell, A. Mitchell-Jones, J. Pir, D. Russo, H. Schofield, P.O. Syvertsen, A. Tsoar (2019): Guidance on the conservation and management of critical feeding areas and commuting routes for bats. EUROBATS Publication Series No. 9. UNEP/EUROBATS Secretariat, Bonn, Germany, 109 pp.; Commonwealth of Australia 2020. National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds. January 2020 version 1.0.

[11] Sub 425, page 5

the DOC submission on this issue, in the context of PC9 I consider there is currently insufficient evidence available to accurately determine the extent of habitat to be included in the SNAs. To extend the SNA mapping to address the concern, further work would need to be undertaken to ensure that the habitat is accurately identified. This would also ensure that no areas are missed that have not previously been subject to mudfish surveys.

Offsetting and Compensation

45. DOC submits that there is need for clearer guidance on the use of offsetting and compensation as part of any ecological effects assessments and management for resource consent applications that have the potential to adversely affect SNAs.

46. I agree that there should be clear guidance on these issues, and recommend that rules around compensation and offsetting are in line with the effects management hierarchy and compensation and offsetting guidance of the National Policy Statement – Indigenous Biodiversity (**NPS-IB**)[12].

47. I recommend that reference should be made within the plan in the information requirements section, to current best practice guidelines on offsetting and compensation[13].

UPDATED PC9 PROVISIONS

48. Since PC9 was notified, amendments have been made to the proposed plan provisions to further support ecological outcomes and enable protection

[12] Appendix 3, Draft National Policy Statement for Indigenous Biodiversity — Exposure draft. Ministry for the Environment, dated June 2022.
https://environment.govt.nz/assets/publications/NPSIB-exposure-draft.pdf
[13] Maseyk, F., Ussher, G., Kessels, G., Christensen, M. and Brown, M., 2018. Biodiversity Offsetting under the resource management Act: A guidance document. Prepared for the Biodiversity Working Group on behalf of the BioManagers Group.
Department of Conservation 2014 Guidance on Good Practice Biodiversity Offsetting in New Zealand, published August 2014.

and restoration of SNAs. These amendments include changes to limit the effects of light intrusion of any new lighting on an SNA, clarifications around activities with respect to public access to SNAs, consideration of mudfish habitat, and clarifications on offsetting and compensation.

49. I support the addition of further provisions to limit the effects of light intrusion of any new lighting on an SNA as recommended by Mr McKensey for HCC. In particular, I support controls on any additional lighting, screening and building setbacks to ensure additional lighting effects on SNAs are minimised.

50. PC9 provisions have been amended to ensure that while small structures such as unlit pathways are enabled to grant access to SNAs for restoration purposes, larger infrastructure such as cycleways and walkways are not to be placed within fSNAs without careful management. I support these amendments.

51. I understand that due to scope constraints, no further amendments are recommended to be made to the PC9 provision with regards to the protection of mudfish habitat. While I acknowledge the uncertainty around where mudfish are present, additional protection of mudfish habitat that is currently not protected through the proposed SNA overlay should be pursued, including accurate habitat mapping and then reflection via a further plan change process.

52. PC9 provisions currently include wording that align with the draft NPS-IB with respect to offsetting and compensation. However, reference to best practice guidelines as I discuss above could be included in the information requirements for ecological effects assessments.

CONCLUSION

53. I support the addition of further provisions to limit the effects of light intrusion of any new lighting on an SNA as recommended by Mr McKensey for HCC. I support controls on additional lighting, screening and setbacks to achieve minimisation of lighting effects on SNAs.

54. I support the further changes to the provisions that address what activities with respect to public access to SNAs (e.g. walkways, cycleways) are appropriate. These infrastructure types should be controlled in a way that there is no additional light intrusion into SNAs, and that no future conflicts are created between public access and the requirement to protect potential bat habitat or potential bat roosting trees.

55. While there are some rules and regional policy provisions addressing mudfish, there is uncertainty with respect to where mudfish are located which requires addressing before accurate mapping can be produced. After that exercise, it is my view that further consideration should be given in regards to the protection of mudfish habitat.

56. I recommend the inclusion of reference to best practice offsetting and compensation guidelines to provide clearer guidance on biodiversity offsetting and compensation as part of the effects management of any new resource consent applications that have the potential to adversely affect SNAs.

Hannah Mueller

14 April 2023