

BEFORE THE HEARING PANEL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 5 to the Operative Hamilton
City District Plan

**STATEMENT OF EVIDENCE OF MATTHEW JAMES BABER
(ECOLOGY – OFFSETTING/COMPENSATION)**

Dated 2 September 2022

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INTRODUCTION

1. My full name is Matthew James Baber. I hold the position of Principal Ecologist/Director at Alliance Ecology Ltd, which I have held since May 2019.
2. I hold the qualifications of Bachelor of Science (Zoology) from Otago University, Master of Science (Hons) (Conservation Ecology) from Auckland University, and Doctor of Philosophy (Ecology) from Florida International University (Miami, Florida, USA).
3. My previous employment and associated positions include:
 - a) Tonkin + Taylor (2011 - 2019):
 - i. Technical Director/Project Director (Ecology) (2019);
 - ii. Discipline Manager (Ecology)/Principal Ecologist (2017-2018);
 - iii. Team Leader Ecology/Principal Ecologist (2016);
 - iv. Principal Ecologist (2014 - 2015);
 - v. Senior Ecologist (2011 - 2014);
 - b) Auckland Council (2010 - 2011): Team Leader Biodiversity;
 - c) Auckland Regional Council (2007 - 2010): Natural Heritage Scientist;
 - d) Ecovision (2004 - 2007): Ecologist/Director;
 - e) Postdoctoral Research Scientist, University of New Hampshire (2001 - 2004).
4. I have 21 years' experience as a professional ecologist (post PhD). My work experience includes assessments of environmental effects; input into

statutory and non-statutory policies, district and regional plans, and strategies; and the development and implementation of biodiversity offset and compensation packages, and biodiversity research and monitoring programmes (**Attachment 1**). I have worked in a variety of forest, riparian, wetland, and coastal ecosystem types and on a diversity of taxa in New Zealand and abroad. I have authored more than 20 international and national peer-reviewed scientific publications and numerous technical reports on the above subject matters. I have led or been involved in the assessment of ecological effects for numerous large infrastructure projects including appearance as an expert witness in council hearings, Environment Court hearings and a Board of Inquiry.

5. I am a certified Independent Hearing Commissioner, having completed the MfE Making Good Decisions course in September 2018. I was recertified in December 2021.
6. I am a member of the New Zealand Ecological Society, the Ornithological Society of New Zealand, the Society for Research on Amphibians and Reptiles in New Zealand, the National Wetland Trust, and the Environment Institute of Australia and New Zealand (**EIANZ**). I am also a DOC-permitted herpetologist.

CODE OF CONDUCT

7. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2014 and agree to comply with it. I confirm that the opinions expressed in this statement are within my area of expertise except where I state that I have relied on the evidence of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

INVOLVEMENT WITH THE PROPOSED PLAN CHANGE

8. I co-authored the following technical reports on ecology matters arising under the proposed Plan Change 5 to the Operative Hamilton District Plan (**PC5**):
 - (a) Plan Change 5 Technical Ecology Report dated 31 August 2022, (**Technical Ecology Report**) which is **Attachment 1** to the evidence of Mr Kessels.
 - (b) Peacocke Structure Plan Area Plan Change: Preliminary Assessment of Ecological Effects, dated July 2021 – Appendix K to PC5.
 - (c) Peacocke Structure Plan Area: Ecological Significance Assessment, dated July 2021 – Appendix L to PC5.
9. My input into these reports was primarily on the process and overall approach for the assessment of ecological effects and residual effects management, and the application of the Bat 'Biodiversity Compensation Model'.
10. I also reviewed the technical report prepared by Dr Hannah Mueller and Mr Gerry Kessels titled 'Peacocke Structure Plan Area Plan Change: Long Tail Bat Report' dated June 2020 – Appendix J to the PC5 Assessment of Environmental Effects.
11. I am familiar with the Peacocke Structure Plan Area (**PSPA**) having visited on 16 March 2020 through my involvement in the proposed Amberfield subdivision application on behalf of Hamilton City Council (**HCC**), and through the preparation of the draft PSPA Effects Management Framework. I am also familiar with the site through my involvement in the Southern Links section Council hearing where in 2014 I served as an expert witness on terrestrial ecological matters for the Department of Conservation.

12. I participated in expert conferencing on 'Planning and Bats' and am a signatory to the Joint Witness Statement (**JWS**) dated 24 August 2022.

SCOPE OF EVIDENCE

13. In my evidence, presented on behalf of HCC as proponent of PC5, I will:
- (a) Summarise the findings in the technical reports in relation to:
 - i. The process and overall approach used to assess the ecological effects of PC5.
 - ii. The process used to assess the type and quantum of habitat restoration and enhancement measures likely required to address residual adverse effects, including use of the Biodiversity Compensation Model (**BCM**).
 - (b) Respond to matters raised in submissions on the above matters.
 - (c) Comment on the updated PC5 provisions presented at joint witness conferencing on 24 August 2022 (**updated PC5 provisions**) in relation to the above matters.
14. Where relevant I defer to the evidence of Dr Mueller and Mr Kessels who also co-authored the Technical Ecology Report. The evidence of Dr Mueller addresses effects on long-tailed bat and measures to address these effects. The evidence of Mr Kessels addresses the ecological values of the Peacocke Structure Plan Area (**PSPA**) and assesses the effects of PC5 on those ecological values.

EXECUTIVE SUMMARY

15. The environment of the PSPA and the ecological values within it are described in the PC5 Technical Ecology Report.
16. The preliminary ecological effects assessment for PC5 followed the Ecological Impact Assessment Guidelines (**EciAG**)¹. Using a standard framework and matrix approach such as this provides a consistent and transparent assessment of effects and is considered good practice.
17. The EciAG were used to identify those residual effects on biodiversity values that remain after measures to avoid, remedy or mitigate potential adverse effects. The guidelines provide a stepwise and systematic process for assessing:
 - (a) The 'Ecological value' of a habitat or species.
 - (b) The 'Magnitude of effect' of the proposed activity on each 'Ecological value'.
 - (c) The overall 'Level of residual effect' based on the 'Ecological value' against the 'Magnitude of effect'.
18. If the overall 'Level of residual effect' is assessed as being 'Moderate' or greater after measures to avoid, remedy or mitigate effects, this warrants residual effects management. For PC5, residual effects of 'Moderate' or greater were identified for a range of habitats and species as set out in the evidence of Mr Kessels. Notably, residual adverse effects on the long-tailed bat were assessed as 'Very High'.

¹ EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems, 2nd edition (2018) Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. Ecological impact assessment. Ecological Institute of Australia and New Zealand.

19. I consider that in general terms, these residual ecological effects can be appropriately addressed through habitat restoration and enhancement, with a focus on native revegetation and the control of introduced predatory mammals within suitable protected areas.
20. A Biodiversity Compensation Model (**BCM**) was used to 'sense check' the type and quantum of habitat restoration and enhancement proposed by the PC5 provisions. BCMs test the type and quantum of habitat restoration and enhancement measures that would likely be required to address these residual adverse effects to a Net Gain (**NG**) standard.
21. A single long-tailed bat BCM was used to assist with determining compensation requirements for all adversely affected biodiversity values. This is because:
 - (a) Long-tailed bats are an 'umbrella species' and efforts to address effects on bats also serve to benefit the full suite of biodiversity values that are potentially affected by the PSPA; and
 - (b) Residual adverse effects on bats were considered the most significant potential effect.
22. The application of the BCM indicates that the following measures are required in addition to those provided for in the proposed PC5 provisions (the designation of the Natural Open Space Areas, Significant Natural Areas (**SNAs**), Significant Bat Areas and other related provisions of the plan change):
 - (a) Habitat restoration within PSPA public open space areas (native revegetation, weed management and mammalian pest control within riparian pasture) of some 66 ha;
 - (b) Habitat enhancement within PSPA public open space areas (native enrichment planting, weed management and mammalian pest

control within existing forested habitats – exotic and indigenous) equating to about 62 ha; and

- (c) Habitat restoration outside of the PSPA within high value bat habitat known to support bat roosts. This comprises:
 - i. Native revegetation, weed management and mammalian pest control within riparian pasture (equating to some 190 ha of habitat restoration) and/or
 - ii. Mammalian pest control in perpetuity (equating to 700 ha of habitat enhancement), or
 - iii. A lesser combination of both.

23. Since PC5 was notified, various amendments have been made to the proposed plan provisions to further support ecological protection and restoration. The amendments in the updated PC5 provisions relating to ecological matters are described in Section 7.1 of the Technical Ecology Report and in the evidence of Mr Kessels and Dr Mueller. I consider these provisions a significant step forward from the notified provisions, and generally support them.

24. I recommend refinements to further strengthen the provisions and to achieve the objective of 'No Net Loss of biodiversity values and preferably Net Gain' (**NNL/NG**) as stated in the Technical Ecology Report, as follows:

- (a) The landscape-scale approach to management adopted by some PC5 objectives should follow through into the PC5 rules. The rules around subdivisions and other matters take an individualised (property-based) approach which in my view may not adequately address cumulative effects on ecological values. A landscape-scale approach is important in the PSPA because of the 'very high' level of adverse effect on the local population of the nationally threatened (nationally critical) long-tailed bat.

- (b) Additional mechanisms (possibly financial contributions or similar) are required to address the adverse residual effects of urbanisation within the growth cells of the PSPA on the low- and medium-value long-tailed bat habitats of the PSPA. Where vegetation clearance of significant indigenous vegetation or significant habitats of indigenous fauna cannot be avoided, biodiversity offsetting and compensation principles should be applied to determine the quantum of habitat restoration or enhancement required to address this residual adverse effect.
- (c) Compensation sites are required to enable pest control and/or restoration planting to address residual effects, as specified in paragraph 22 above. These sites are likely to be located at least partially outside the PSPA, and possibly outside HCC's territorial boundaries. Further work is required to determine the location and nature of compensation actions to provide additional assurance that NNL/NG goals are realised. Some of these measures may sit outside the district plan.

TECHNICAL REPORTS

Assessment of Ecological Effects

25. The preliminary ecological effects assessment for PC5 followed the EclAG². Using a standard framework and matrix approach such as this provides a consistent and transparent assessment of effects and is considered good practice.

² EIANZ guidelines for use in New Zealand: terrestrial and freshwater ecosystems, 2nd edition (2018) Roper-Lindsay, J., Fuller S.A., Hooson, S., Sanders, M.D., Ussher, G.T. Ecological impact assessment. Ecological Institute of Australia and New Zealand.

26. The EclAG were used to identify those residual effects on biodiversity values that remain after measures to avoid, remedy or mitigate potential adverse effects. The guidelines provide a stepwise and systematic process for assessing:
 - (a) The 'Ecological value' of a habitat or species.
 - (b) The 'Magnitude of effect' of the proposed activity on each 'Ecological value'.
 - (c) The overall 'Level of residual effect' based on the 'Ecological value' against the 'Magnitude of effect'.
27. The magnitude of effect was conservatively assessed in the context of the local landscape for habitats, and in the context of the local population for species.
28. If the overall 'Level of residual effect' is assessed as being 'Moderate' or greater after measures to avoid, remedy or mitigate effects, this warrants measures to undertake residual effects management.
29. For PC5, residual effects of 'Moderate' or greater were identified for a range of species and habitats as set out in the Technical Ecology Report. In summary, these included:
 - (a) A 'Very High' level of residual effect on the local population of the long-tailed bat.
 - (b) A 'Very High' level of residual effect on ecological corridor habitat at a local landscape scale.
 - (c) A 'High' level of residual effect on riparian margins.
 - (d) A 'potentially High' level of residual effect on wetlands at the landscape scale.

- (e) A 'High' level of residual effect on the local population of pipit.
- (f) A 'Moderate' level of residual effect on the local populations of several other species and on habitats at the landscape scale.

Recommended Measures to Address Residual Adverse Effects that Cannot be Avoided or Minimised

- 30. Management of residual effects that cannot be avoided or minimised falls to offsetting (where feasible) or compensation if offsets cannot demonstrably be achieved. The essential difference between the two is that offsetting requires NG outcomes, whereas compensation requires the indigenous biodiversity values lost through the activity to be addressed by positive effects to indigenous biodiversity that are proportionate to the adverse effects.
- 31. While offsetting for the residual adverse effects of PC5 was considered in the first instance, it was ultimately ruled out, in part because of difficulties in demonstrating an offset using current national policy definitions, as detailed in the PC5 Technical Ecology Report (Chapter 5). The proposed habitat restoration and enhancement measures for PC5 are therefore termed 'compensation' and not 'offsetting'.
- 32. A BCM was used to 'sense check' the likelihood that NG outcomes will be achieved through the measures proposed in PC5 to address residual adverse effects. BCMs are based on measurements of biodiversity loss at the impact site(s) and gains at the proposed compensation site. That is, an assessment of:
 - (a) The quantum and value/quality of habitat within the impact footprint before and after landuse change (biodiversity loss).
 - (b) The quantum and value/quality of habitat before and after proposed compensation measures (biodiversity gain).

33. I consider BCMs to be appropriate and conservative because they:
- (a) Allow for use of both quantitative and qualitative information, with the latter being based on the values in the ecological effects assessment.
 - (b) Account for time lag between adverse effects at impact sites and gains at compensation sites.
 - (c) Use multiple contingencies to minimise the risk of false positives, i.e. predicting likely NGs when the converse is true. Separate contingencies account for:
 - i. Biodiversity risk, which is based on ecological value/threat status per se.
 - ii. Impact uncertainties.
 - iii. Degree of confidence that stated NG outcomes will be achieved through restoration or habitat enhancement measures, within the stated time frame.
 - iv. Predicted NG (a NG target of 20% provides a buffer).
34. A single long-tailed bat BCM was used to assist with determining compensation requirements for all adversely affected biodiversity values, because:
- (a) Long-tailed bats are an 'umbrella species' and efforts to address effects on bats also serve to benefit the full suite of biodiversity values that are potentially affected by the PSPA (e.g. indigenous vegetation, fish, lizards and indigenous birds); and

- (b) Residual adverse effects on bats were considered the most significant potential effect.

Proposed Residual Effects Management Package

- 35. I consider that in general terms, residual ecological effects can be appropriately addressed through habitat restoration and enhancement, with a focus on native revegetation and the control of introduced predatory mammals within suitable protected areas. The specific measures proposed in PC5 provisions to address residual effects on bats are summarised in the evidence of Dr Mueller.
- 36. The Bat BCM indicated that in addition to the measures proposed in the updated PC5 provisions, in order to achieve a NG target of 20% after 25 years, the following habitat restoration and enhancement activities would likely be required:
 - (a) Habitat restoration within PSPA public open space areas (native revegetation, weed management and mammalian pest control within riparian pasture) of some 66 ha;
 - (b) Habitat enhancement within PSPA public open space areas (native enrichment planting, weed management and mammalian pest control within existing forested habitats – exotic and indigenous) equating to about 62 ha; and
 - (c) Habitat restoration outside of the PSPA within high value bat habitat known to support bat roosts. This comprises:
 - i. native revegetation, weed management and mammalian pest control within riparian pasture (equating to some 190 ha of habitat restoration) and/or

- ii. mammalian pest control in perpetuity (equating to 700 ha of habitat enhancement), or
 - iii. a lesser combination of both.
37. I consider that these measures are required to achieve the NNL/NG outcome for PC5 recommended in the Technical Ecology Report and consider NG to be likely if the proposed effects management measures are undertaken.

MATTERS ADDRESSED IN THE 'PLANNING AND BATS' JWS

38. Several submitters raised concerns in conferencing regarding the need to adopt a wider landscape approach for bat habitat management.
39. This matter is predominantly addressed in the evidence of Mr Kessels and Dr Mueller. I also agree that a wider landscape approach should be taken. As described in 24 above, the rules around subdivisions and other matters take an individualised (property-based) approach which may not adequately address cumulative effects on ecological values. A landscape-scale approach is important in the PSPA because of the 'very high' level of adverse effect on a threatened (nationally critical) highly mobile species, the long-tailed bat, and the high potential for cumulative impacts associated with landuse to generate Net Loss outcomes.

RESPONSE TO SUBMISSIONS

Response to Waikato Regional Council

40. In regard to biodiversity offsetting and compensation, Waikato Regional Council³ requests a new policy that provides for financial contributions to deliver maintenance and enhancement (restoration) of the defined natural

³ Sub 36

environment and open space network within the PSPA, to provide for appropriate effects management.

41. I agree with the intent of this submission. There needs to be certainty that compensation for residual effects can be achieved and that financial contributions are adequately managed. I note also that habitat restoration and enhancement measures will also be necessary to avoid Net Loss outcomes for adverse effects on biodiversity within the PSPA.
42. As noted in the PC5 Technical Ecology Report, an automated and integrated approach is required for offsetting/compensation of adverse effects given the potential for 'death by a thousand cuts', with lots of small developments having unquantified cumulative effects on ecosystems. This can be achieved through an updated version of the BCM that also calculates financial contribution requirements, or some similar economic tool, (based on expected revegetation and/or pest management costings). These contributions would be used to fund habitat restoration and enhancement measures.

Response to Director-General of Conservation

43. The submission by the Director-General of Conservation raised concerns about a range of ecology matters, a detailed response to which was provided in the Technical Ecology Report and is also covered in the evidence of Mr Kessels and Dr Mueller.
44. I consider that the concern raised by the Director-General regarding the need to provide clear guidance in the Structure Plan on biodiversity offsetting is addressed by my recommendations in response to the Waikato Regional Council submission above.

Other submitters

45. The remaining submissions on ecological matters are addressed in the evidence of Dr Mueller (long-tailed bat) and Mr Kessels (other matters).

UPDATED PC5 PROVISIONS

46. Since PC5 was notified, various amendments have been made to the proposed plan provisions to further support ecological protection and restoration. The amendments in the updated PC5 provisions relating to ecological matters are described in Section 7.1 of the Technical Ecology Report. Many of these amendments relate more specifically to long-tailed bat (e.g. vegetation clearance protocols, information requirements for Bat Management Plans and lighting requirements) and are addressed in the evidence of Dr Mueller, Mr Kessels, and Mr McKensey (lighting).
47. Overall I consider these updated provisions a significant step forward from the notified provisions, and generally support them.
48. While I agree with these amendments, I consider the loss of low- and medium-value bat habitat across the PSPA is currently not fully addressed by the overall ecological effects assessment and is not contained in the information requirements of the updated PC5 provisions. I recommend that mechanisms are required to address the adverse residual effects of urbanisation on these low- and medium-value long-tailed bat habitats of the PSPA. Where vegetation clearance of significant indigenous vegetation or significant habitats of indigenous fauna cannot be avoided, uniformly applied and transparent offset or compensation approaches should be used to determine the quantum of habitat restoration or enhancement required to address this residual adverse effect. Specifically:

- (a) Compensation sites are required to enable pest control and/or restoration planting to address residual effects, as specified in paragraph 22 above. These sites will need to also be located at least partially outside the PSPA, and possibly outside HCC's territorial boundaries. The specific nature and quantum of habitat restoration and enhancement measures indicated by the BCM is detailed in paragraph 22 of my evidence above.
- (b) A mechanism (such as a revised version of the BCM) would be required to calculate financial contribution requirements, or similar, (based on expected revegetation and/or pest management costings). These contributions would be used to fund habitat restoration and enhancement measures.
- (c) Further work will be needed to provide assurance that potential residual effects management sites can be secured and that financial mechanisms are in place to fund the required conservation actions.

CONCLUSION

49. I consider that the updated PC5 provisions are a significant step forward from the notified provisions, and generally support them. In order to achieve NNL/NG outcomes, compensation sites will be required to enable pest control and/or restoration planting to address residual effects. These will need to be located at least partially outside the PSPA, and possibly outside Council's territorial boundaries. I recognise that while the district plan provisions can assist in delivering this outcome, a compensation regime of this nature may require inputs from a range of parties and may need to use additional measures that sit outside the bounds of the district plan.

Matthew James Baber

2 September 2022

ATTACHMENT 1
SELECTED PROJECT EXPERIENCE

Examples of experience relevant to the scope of my evidence include:

- (a) Appeared as an expert witness on ecological matters for Hamilton City Council in the Amberfield subdivision hearing and Environment Court proceedings, which included an assessment of the applicant's residual effects management package using a BCM as a decision support tool.
- (b) Appeared as the expert witness for DOC on terrestrial, wetland and freshwater ecology (excluding long-tailed bats) for the joint hearing for the Hamilton Section of the Waikato Expressway Resource Consent Application and the east-west Tamahere Link Notice of Requirement ("NOR") and for the Southern Links Section of the Waikato Expressway Resource Consent application (2014).
- (c) Led the wetland and terrestrial ecology inputs for the Beachlands South Proposed Plan Change, including the development of preliminary biodiversity compensation models (2020 – ongoing).
- (d) Led the assessment of effects for terrestrial ecology and contributed to the development and implementation of ecological management and monitoring plans and biodiversity offset and compensation models for the Manawatū— Tararua Highway Project during the resource consenting stage.
- (e) Reviewed terrestrial ecology matters for the Waihi North Mine Application by Oceana Gold NZ Ltd, on behalf of Hauraki District Council (ongoing).
- (f) Led the wetland and coastal bird ecology inputs for the Glenbrook Steel Mill resource consent renewal application for New Zealand Steel Ltd, including the development of biodiversity compensation models.

- (g) Led the wetland and terrestrial ecology inputs for the assessment of effects for the Auckland Regional Landfill Project for Waste Management New Zealand, including the development of associated biodiversity outcome monitoring programmes and biodiversity offset and compensation models (2018 - ongoing).
- (h) Led the ecology inputs during the Multi-Criteria Assessment ("MCA") phase for the Mt Messenger State Highway 3 Project (2017) on behalf of Waka Kotahi.
- (i) Reviewed (on behalf of the Tree Council) terrestrial ecology matters for the replacement of the Huia Water Treatment Plan. Included the applicant's approach to the assessment of effects, biodiversity offsets and compensation, and monitoring (2021-current).
- (j) Led the development and implementation of ecological management plans for Puhoi to Warkworth Road of National Significance for Northern Express Group ("NX2") on behalf of NZTA (2015 – 2016).
- (k) Appeared as an expert witness on behalf of the West Coast Regional Council and Buller District Council on terrestrial ecology matters for the Mt William North mine (Solid Energy) hearing (2014).
- (l) Appeared as the expert witness on behalf of Auckland Council for the Onehunga Foreshore Rehabilitation Hearings on terrestrial ecology and coastal bird matters (2011).
- (m) Appeared as the expert witness for DOC on terrestrial ecology and coastal bird matters for the Transmission Gully Motorway BOI (2011).
- (n) Appeared as an expert witness before Council Hearings and Environment Court in relation to consent applications for quarrying and residential developments in terrestrial and coastal environments (various).

- (o) Led the assessment of ecological effects on the terrestrial and wetland ecology components of the Huntly Section of the Waikato Expressway on behalf of the NZTA (2014). 3445-7872-9238
- (p) Led and managed ecological input into the resource consent process, policy review, and the development and implementation of biodiversity management initiatives for Auckland Council (2010 — 2011).
- (q) Reviewed the applicant's biodiversity offsets and compensation package for Te Kuha mine, which included use of the BCM as a decision-support tool.
- (r) I have peer-reviewed publications on biodiversity offsetting and compensation⁴ and was lead author of the recently developed BCM user tool⁵.

⁴ Baber and Ussher The Role of Monitoring and Compliance in Securing Better Biodiversity Outcomes through Offsetting Arrangements (T+T, February 2012); Baber, M, Christensen, M, Quinn, J, Markham, J, Ussher, G and Signal-Ross, R. "The use of modelling for terrestrial biodiversity offsets and compensation: a suggested way forward" (2021) Resource Management Journal April 2021; Quinn. J; Baber M, J Markham, G Ussher, M Lowe and N Goldwater "Defining mitigation: an ecology perspective" (2021) Resource Management Journal August 2021; Baber, M, Dickson, J, Quinn, J, Markham, J, Ussher, G, Heggie-Gracie, S, and Jackson, S. A Biodiversity Compensation Model for New Zealand – A User Guide (Version 1) (T+T, October 2021).

⁵ Tonkin and Taylor, 2021 as at 4 above.