Addendum to Statement of Advice

Under:	Fast-track Approvals Act 2024
In the matter of:	FTAA-2603-1178 – Alternative to the Brynderwyn Hills Project (Brynderwyn Hills section)
Addendum to Statement of advice dated 11 August 2026:	Nick Goldwater
Date:	20 October 2026

Introduction

1. My full name is Nicholas Paul Goldwater.

2. This is an Addendum to my Statement of Advice to the Director-General of Conservation on the Alternative to the Brynderwyn Hills Project (Brynderwyn Hills section) dated 11 August 2026.

3. This Addendum addresses matters in some of the material provided by the Applicant after the application was suspended on 11 August 2026. This material includes:

    a. A2BH – Ecological effects mitigation table 28 August 2026;

    b. NC – A2BH – Proposed Frog Management Package – DRAFT v3, dated 28 August 2026;

    c. Brynderwyns Hills Alternative Project – Indicative Compensation Approach dated 7 October 2026 (and subsequent email from NZTA of 8 October 2026 with frog compensation calculation); and

    d. NZTA's Proposed Amendments to Mitigation Package Since Lodgement, 9 October 2026.

4. Specifically, this Addendum concerns the Applicant's proposed offsetting and compensation approach for addressing residual effects on terrestrial vegetation, wetlands, Hochstetter's frog, lizards, kauri snail, and long-tailed bat.

Code of conduct

5. Whilst it is acknowledged this is not an Environment Court Proceeding, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in the preparation of this advice. Unless I state otherwise, this advice is within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Indigenous terrestrial vegetation

<u>Averted loss approach to compensation</u>

6. To address the residual effects on two high value forest types (mature forest kānuka, podocarp, broadleaved trees and mature forest dominated by taraire, kohekohe, podocarp, broadleaved trees), the Applicant has proposed a compensation package that will "avert forest loss which would otherwise occur elsewhere, outside of the Project area (in a defined geographic area e.g. Northland), preferentially prioritising threatened forest types for legal protection."

7. An averted loss approach can fit under the umbrella of an offset but is only appropriate if it is 'like-for-like', and if the need for this approach is robustly defended. Averted loss can therefore only be an appropriate strategy if 1) the losses the actions are preventing are quantified (i.e. what is the current rate of forest loss in this landscape based on recent changes in land use), and 2) if the averted losses address the impacts that will result from this Project (i.e. loss of mature forest on hillslopes AND losses of mature forest on alluvium and on riparian margins). No justification is given for why an averted loss approach has merit for the management of adverse effects for this Project.

8. This could be addressed with lower risk/higher certainty of benefits at earlier stages of the effects management hierarchy (e.g. fencing and planting to protect, enhance, and extend small remnants of alluvial vegetation on the Waipū plains). Where habitats have been severely reduced in extent, minimising further loss of these, and increasing their extent, needs to be given higher priority in order to be consistent with accepted offsetting and compensation principles.

9. In addition, the gain from averted loss depends entirely on what would have happened to the forest areas without protection. That gain is usually much smaller per hectare than restoration gain, and it is far more uncertain. As a result, it cannot be said whether $4.6M buys more or less ecological gain than the predicted losses, only that it roughly matches a hypothetical planting cost.

Quantum of proposed compensation

10. The compensation proposed by the Applicant is triggered by adverse effects to two of the 35 vegetation types within the Designation corridor, noting there are errors in this assessment, which are addressed in more detail in Dr Martin's statement of advice. The NZTA 9.10.26 Proposed Amendments to Mitigation Package Since Lodgement table lists other forest types that will be offset, rather than compensated for, including mature forest on alluvium. I assume that the Applicant regards the two forest types proposed for compensation are beyond the limits of offsetting due to their age and type, i.e. it would take far longer than 35 years to attain a similar type of forest. However, the reasons to support this have not been documented by the Applicant and no explanation is provided as to why offsetting was not considered in the first instance.

11. It is also not clear how the "15Ha requiring compensation" has been calculated. The Terrestrial Assessment of Effects at 4.3.1 (and Tables 17 and 23 of the EcIA) note the potential direct loss of 29 hectares of Very high, High and Moderate value vegetation, including:

    - Very High value: 18 hectares
    - High value: 7 hectares
    - Moderate value: 4 hectares

12. As such, the 15 hectares could, on an area basis, account for some but not all of the vegetation of Very High value, and none of the vegetation that is of High or Moderate value. The areas assessed by the Applicant as High and Moderate value include areas of significant indigenous vegetation, areas identified as high priority areas for protection, and areas of known habitat for locally or nationally rare, Threatened, or At Risk species.

13. Dr Martin has provided further commentary on the ecological values of terrestrial vegetation in his statement of advice. He has also raised inconsistencies in the Applicant's approach to offsetting and compensation in regard to the mapping and descriptions of certain vegetation types.

Offsetting versus compensation

14. In the Indicative Compensation Approach, the Applicant appears to have conflated offsetting with compensation with its reference to a BOAM[1] ratio of 1:3. This is problematic for several reasons. Firstly, no BOAM has been provided, so I do not have the opportunity to scrutinise the inputs, attributes, outputs, and assumptions. Secondly, the ratio of 1:3 is too low to offset the residual loss of high value forest, noting that restoration over a 35-year horizon cannot rebuild mature podocarp structure, emergent trees, epiphyte loads or large-tree habitat. Properly time-discounted BOAM attributes for those components would push the required ratio well above 1:3. At any rate, a BOAM should not be used for a compensation approach.

15. This approach shows that the Applicant has not properly worked through the effects management hierarchy, and needs to justify why they have not considered offsetting instead of – and before – compensation. To the extent any of the forest can be offset, the hierarchy requires an offset designed to produce a no net loss (or a net gain), not a cash payment.

16. In the NZTA 9.10.26 Proposed Amendments to Mitigation Package Since Lodgement table, it is proposed to undertake the following:

Offset the loss of certain forest and plant species, including:

[1] The BOAM refers to the Biodiversity Offset and Accounting Model described in Maseyk et al. (2015).

i. *At a 1:1 loss to gain ratio – any secondary broad leaved, tree fern forest;*
ii. *At a 1:3 loss to gain ratio - kahikatea dominant forest, kauri dominant forest, tōtara dominant forest, mature kānuka forest with secondary tōtara and other podocarps and pūriri dominant forest;*
iii. *At a 1:50 loss to gain ratio – kauri and pūriri trees greater than 50cm in diameter at breast height;*

17. As discussed above, it appears the Indicative Compensation Approach has classed taraire–kohekohe–podocarp forest and mature kānuka–podocarp–broadleaved forest as beyond offsetting. However, at the same time, the Applicant (in the NZTA 9.10.26 Proposed Amendments to Mitigation Package Since Lodgement table) treats kauri-dominant, kahikatea-dominant and mature kānuka-with-podocarp forest as offsettable at 1:3. No justification or criteria are given for the difference. In addition, the Applicant has provided no justification for a 1:1 offset ratio for secondary broad-leaved species and tree fern forest. (I note that "secondary broad leaved, tree fern forest" is not a vegetation type identified by the Applicant as present in the Designation corridor). The Applicant should apply one offsetability test to every affected forest type, and whatever the ratio, its derivation needs to be disclosed, disaggregated by attribute, and time-discounted.

18. At any rate, the offset ratios provided by the Applicant are substantially lower than the BOAM-derived rations to calculate offset ratios. For Te Ahu a Turanga: Manawatū Tararua Highway, as examples, the following ratios were used[2]:

- 1:12 for old-growth alluvial forest
- 1:10 for old-growth hillslope forest
- 1:5 for kānuka forest and advanced broadleaved forest

For the Te Ara o Te Ata: Mt Messenger Bypass, as examples, the following offset ratios were used[3]:

[2] Table 1 of the Te Ahu a Turanga consent conditions. https://www.nzta.govt.nz/assets/projects/sh3-manawatu/nzta-nor-decision-conditions.pdf

[3] Feb 2018 supplementary report, Table 2.1. https://devtest.npdc.govt.nz/media/132dw53y/ecology-supplementary-report-ecological-mitigation-and-offset-updated-20-april-2018.pdf

- 1:14.7 for tawa rewarewa kamahi forest
- 1:15 for miro rewarewa kamahi forest
- 1:6.7 for secondary mixed broadleaved forest.

19. I note that the Applicant has included pūriri (together with kauri) in its proposed 1:50 loss to gain ratio, whereby the loss of trees of both species with diameters greater than 50 centimetres at breast height will be offset. My opinion on this approach has not changed from that outlined in my 11 August 2026 statement of advice[4]. That is, the ratio does not address the loss of kauri-podocarp forest communities and their associated understorey, invertebrate assemblages, and structural complexity. The ratio is also presented without any ecological basis for why 50:1 is sufficient at this scale and why 50 centimetres DBH is an appropriate threshold.

20. No explanation is given for how trading up will occur for tōtara, kānuka and other secondary forest types in the Proposed Amendments to Mitigation Package Since Lodgement table. Trading up may be appropriate for vegetation types that occur on hillslopes (i.e. not including alluvial forest); however, there needs to be a stated recipient type, a currency showing the gain is of higher value, and an explanation of why like-for-like is not feasible. I note that trading up is not provided for in the offsetting principles in Appendix 3 of the NPS-IB, which require a like-for-like loss/gain calculation. If trading up is proposed, it is effectively compensation and must meet principle 9 in Appendix 4.

21. The incorporation of nationally or regionally Threatened or At Risk plant species within planting designs is commendable; however, population gains need to be proven by using survival targets and long-term maintenance.

<u>Principles of biodiversity compensation</u>

22. The Applicant appears to have concluded that the loss of mature taraire–kohekohe–podocarp forest and mature kānuka–podocarp–broadleaved forest cannot be offset[5]. I agree that mature forest of this kind cannot be recreated by

[4] N Goldwater statement of advice, paras 30 and 31.

[5] Indicative Compensation Approach, pp. 1 and 4.

planting within any reasonable timeframe. However, in my opinion the Applicant has not demonstrated that its approach complies with the first principle of biodiversity compensation in Appendix 4 of the NPS-IB (adherence to the effects management hierarchy), for three reasons:

a. No analysis or documentation is provided of whether the loss of these forest types could be,or has been, further avoided or minimised. Because they include some of the highest value vegetation types affected and the Applicant's information acknowledges they cannot be offset, the Applicant should show that it has done everything practicable to avoid and minimise their loss.

b. The conclusion that these forest types cannot be offset is asserted, not demonstrated. No offsetability assessment has been provided, and the conclusion is inconsistent with the Applicant treating comparable mature forest types as offsettable at 1:3.

c. Some attributes of these forests could be offset like-for-like by restoring and enhancing degraded or grazed remnants of the same forest types, including within the Designation corridor. This would shorten time lags compared with planting on pasture. Compensation would then be needed only for the attributes that genuinely cannot be offset. The Applicant does not appear to have considered this.

23. The Applicant's proposed compensation approach also does not meet the "financial contributions" principle. This principle states that financial contribution is only considered if there is no effective option for delivering biodiversity gains on the ground and it directly funds an intended biodiversity gain or benefit that complies with the rest of principles. As previously mentioned, there are ample options to deliver biodiversity gains on the ground, through offsetting or compensation at identified sites, including within the Designation corridor, noting that all offsetting or compensation sites need legal protection that outlasts the term of the Designation corridor.

24. In my opinion, there is a high risk of issues with additionality with a financial compensation approach for vegetation. Given that the recipients are proposed

to be DOC, Ngā Whenua Rāhui, QEII and district councils, all of which already fund legal protection, there is a risk that the compensation could be used to replace baseline agency spending rather than adding to it.

25. A key principle is also that ecological actions should benefit the environments, habitats and species adversely affected by a project, preferably close to the impact site or within the same ecological district (the Landscape context principle). The proposal is that the funds are for work in the "North Island" with a focus on eastern Northland Ecological Districts and the Kaipara Harbour Catchment. The broad wording of this would not prevent funds being allocated to the protection of common forest types anywhere between Cape Reinga and Wellington. Furthermore, if all funds were allocated to the Kaipara Harbour catchment, no funding would be allocated to projects protecting indigenous forest on the Waipū plains.

Financial compensation

26. It is not clear how the cost of $146,000 per hectare /$440,000 per hectare (at a 1:3 ratio) has been calculated. If the Applicant intends to restore forests on alluvial land (which are commonly high production dairy farms), the land costs are likely to be significantly greater than the land prices for beef and sheep farms. This would underestimate restoration costs, and compensation amounts, for actions needed to address the loss of rare alluvial forest types.

27. The reasoning for reducing the $6,600,000 total by $2,000,000 to $4,600,000 on the basis that this reflects the “QEII approach” is not provided by the Applicant. The basis for the $2,000,000 figure is not shown. The only potentially relevant reference to a QEII approach that I have been able to locate is the statement on the 3rd page of the Indicative Compensation Approach that QEII’s surveys have found that only 25% of landowners actively manage the biodiversity within the covenanted area. It is not clear how this is relevant or could prompt a ~30% reduction to the Applicant’s compensation calculation.

28. Any compensation amount would need to also factor in the third party administration, legal, and operational costs involved. The costs of staff time

for design, decision-making processes, and facilitation of the work would need to be factored in as an overhead to the compensation Project costs. The total costs would also need to be CPI adjusted to account for inflation.

29. Paying the funds out over 35 years means the protection gains would arrive decades after the losses. There also needs to be consideration of indexation or treatment of interest, reporting, and what happens to unspent funds.

30. It is also not clear why the list of what the compensation fund could be used for only includes "initial" pest control[6], when ongoing pest control is likely to be needed across protected areas. The Applicant acknowledges this by stating the kohekohe, taraire, podocarp broadleaved forest "would require on going possum control as many of the species within this forest are possum palatable."[7]

Wetland vegetation

31. Management of residual effects on wetlands is not addressed in the Applicant's Indicative Compensation Approach. However, NZTA's Proposed Amendments to Mitigation Package Since Lodgement table lists the following amendments:

    - *Requirement for a pre-construction survey to be undertaken to confirm the extent and value of wetlands that will be impacted by the Project when developing the Wetland Management Plan (WMP).*
    - *Mitigation for both moderate and high value wetlands, either through restoration of existing or creation of new offset wetlands.*
    - *Amendments to the specifications in the WMP requirements to reflect the distinction between requirements for wetland restoration and offsetting.*

32. It is not best practice to defer wetland mapping to a pre-construction survey, and it is not unreasonable to expect (i) all wetlands within the Designation

[6] Page 3 of the Indicative Compensation Approach.

[7] Page 4 of the Indicative Compensation Approach.

corridor to have been mapped (at least using a desktop survey) prior to lodgement and (ii) all wetlands within the existing project footprint to have been mapped and assessed in the field. If the survey happens after consents are granted, the Panel may end up approving effects it cannot quantify. Similarly, it would be appropriate to provide at least a draft Wetland Management Plan (WMP) prior to lodgement. In addition, as Dr Martin mentions in his statement of advice, it is unlikely that high value wetland habitats will be avoided if they are not identified until the pre-construction project phase.

33. The Applicant continues to adopt a values-based approach to offsetting wetlands by proposing to only address residual effects on moderate and high value wetlands. This approach ignores the potentially substantial loss of "low value" wetlands within the Designation corridor and it does not account for the cumulative effects of wetland loss in a region that has lost most of its original wetland extent.

34. Rather than assessing the magnitude of loss at a catchment scale, the magnitude should be assessed for each wetland, once all affected wetlands have been identified and assessed. In my opinion, in order to comply with Policy 6 of the National Policy for Freshwater Management (NPS-FM), any loss of natural inland wetland extent should be offset at least like-for-like regardless of the value or level of effect. This refines paragraph 71 of my statement of advice (dated 11 August 2026) in that wetland value remains an input, but the level of effect should determine the ratio.

35. The Applicant states that the Wetland Management Plan (WMP) will distinguish "between requirements for wetland restoration and offsetting". I assume the Applicant means wetland restoration (as in restoring the condition of an existing degraded wetland) and wetland creation (as in creating new wetland extent through excavation and/or hydrological manipulation). I note that both approaches are acceptable for offsetting; however, in my opinion, wetland creation carries a greater risk of failure and time lags. As such, restoring existing degraded exotic-dominant wetlands within the Designation where positive outcomes are more certain and likely to be achieved relatively

quickly, should be preferred. As discussed in paragraph 47 of my statement of advice, there are ample areas of degraded wetlands throughout the Designation corridor that are far more suitable for offsetting purposes. I note that restoration of existing wetlands should count towards extent only where the restored area is not currently a natural inland wetland (for example, pasture-dominated wetland). All offset wetlands will need legal protection that outlasts the term of the Designation corridor.

36. It is important that all potential wetland offset sites are identified and confirmed as soon as practicable. For reasons discussed in my statement of advice[8], and that of Dr Martin[9], the proposed wetland offset site (Q08/066) identified in the Wetland Assessment is not appropriate.

37. I now consider that all offset sites should be protected in perpetuity in adherence to the offsetting principle of long-term outcomes.

Hochstetter's frogs

38. The compensation package is described in NZTA's Proposed Amendments to Mitigation Package Since Lodgement as addressing uncertainty, but it proposes payment only upon demonstrated failure of the frog translocations. It does not address the habitat loss and population effects that remain even if translocation succeeds for those frogs that are caught and moved to release sites. That is to say, the approach does not account for frogs that are not captured and will be killed outright, which given the terrain and the unprecedented numbers of Hochstetter's frogs involved, is likely to be in significant numbers, as Dr Burns' statement of advice explains. The compensation should be separated out to account for the number of Hochstetter's frogs left in situ (killed), being the estimated population at the time salvage occurs minus the number of frogs captured, plus the number of frogs translocated unsuccessfully. The success test also says nothing about

[8] N Goldwater statement of advice – paras 46 and 47.

[9] T Martin statement of advice – para 225.

displacement, competition or reduction in resident frogs where salvaged frogs are released into occupied habitat.

39. The measures in the Indicative Compensation Approach include legal protection, pest control, and fencing of existing frog habitat. At most, they may go some way towards compensating for habitat effects, and only if they are triggered. They are not designed to replace the frogs lost during construction and relocation, and the payment mechanism does not account for them.

40. The residual effects of fragmentation on an equal number of Hochstetter's frogs (~22,000) should also be factored into the compensation calculation, together with the residual loss of frog habitat and potential harm to resident frogs at the receiving sites, as well as the frogs that die during capture or holding.

41. Overall, I consider the compensation measures provided by the Applicant to be speculative and theoretical. There is no certainty that any of the measures could be successfully implemented. There may also be issues with additionality given that large parts of the Brynderwyns and wider forested areas are already likely to be subjected to some kind of conservation management, e.g. Maranui Conservation Area and Waipū Gorge Scenic Reserve.

42. The fact that the document says that compensation "could" be put towards a range of measures does not provide certainty in outcomes sought. There are also vague statements made such as: *"The intent is to release any compensation amount once it has been determined to be needed to the appropriate parties to undertake the compensation works identified"*. Such statements lack certainty and substance.

43. In addition, the Applicant has still not demonstrated why it is not possible to do more to minimise effects on Hochstetter's frogs and their habitat, for example by selecting options within the Designation corridor that have the least environmentally damaging outcomes. This could include bridging streams and gullies instead of depositing large amounts of fill in them, and hauling excess fill and spoil out of the construction zone (in particular

Earthworks Zone 2) instead of depositing it in the streams and gullies, which are important freshwater and Hochstetter's frog habitat.

44. Compensation is the final step in the effects management hierarchy, and financial contributions are the least preferred form of it. The Applicant has moved directly to compensation to address the adverse effects without first seeking to apply any possible offsetting approach, which is inconsistent with the effects management hierarchy as described in the NPS-IB. In my opinion, and as Dr Burns also concludes, the residual effects on Hochsetter's frog cannot be offset to achieve a net gain, and compensation is not appropriate for the reasons I have explained.

45. As such, from an ecological perspective, avoidance is the only acceptable option for addressing adverse effects on Hochstetter's frogs that would be consistent with the effects management hierarchy as described in the NPS-IB. That is, where biodiversity offsetting of more than minor residual adverse effects is not possible, and biodiversity compensation is not appropriate, the activity itself is avoided.[10]

46. For completeness, I have provided a detailed assessment of NZTA's Indicative Compensation Approach against each principle in Appendix 4 of the NPS-IB[11]:

Principle 1: Adherence to effects management hierarchy. Compensation is "a commitment to redress more than minor residual adverse effects". It should be contemplated only after the earlier steps "are demonstrated to have been sequentially exhausted". NZTA's approach fails on two counts in that (i) it has not demonstrated that offsetting the effects on frogs is impossible and (ii) a payment that applies only if translocation fails, and pays nothing if it is judged "100% successful", does not commit to redressing the residual effects.

Principle 2: When compensation is not appropriate. As previously discussed, compensation is not appropriate "where indigenous biodiversity

[10] Effects management hierarchy as defined in clause1.6 of the NPS-IB.

[11] In acknowledging that Hochstetter's frog is semi-aquatic, my assessment also follows the principles for aquatic biodiversity offsetting in Appendix 7 of the NPS-FM. My conclusions are the same.

values are not able to be compensated for". All three of the listed examples apply to the Applicant's proposed approach:

a. irreplaceable or vulnerable. The Northland clade of Hochstetter's frog is a distinct, range restricted lineage, and the species is At Risk – Declining.

b. effects are uncertain but potentially significantly adverse or irreversible. NZTA accepts translocation is "untested at this scale" and that "other parties do not share this confidence" (p. 5 of the Indicative Compensation Approach). The number of frogs that will not be salvaged is unknown, and the loss of habitat is permanent.

c. no technically feasible option to secure a net gain within acceptable timeframes. No proposed measure has been shown to produce a net gain for this species. Gains would not begin until 5–10 years after translocation.

Under clause (f) of the NPS-IB definition of the effects management hierarchy, "if biodiversity compensation is not appropriate, the activity itself is avoided". The onus is on the Applicant to show why compensation is still appropriate. For completeness, I suggest the Applicant uses the analysis in Pilgrim et al. (2013)[12] to test their Indicative Compensation Approach against the limits to offsetting.

Principle 3: Scale. This principle requires the positive effects of compensation to outweigh the adverse effects. NZTA does not quantify either side, and three features of the design work against this principle:

- payment is calculated as a share of the frogs released, while the $5M quantum is costed on the roughly 22,000 frogs affected (pp. 5–6 of the Indicative Compensation Approach);
- nothing is paid if every release site passes the success test; and

[12] Pilgrim J.D., Brownlie S., Ekstrom J.M.M., Gardner T.A., von Hase A., ten Kate K, Savy C.E., Stephens R.T.T., Temple H.J., Treweek J., Ussher G.T. & Ward G. (2013) A process for assessing the offsetability of biodiversity impacts. *Conservation Letters* 6(5): 376–384.

- displacement, fragmentation, and adverse effects on resident frogs are not considered at all.

Principle 4: Additionality. Gains must be "above and beyond" those that would occur anyway, including gains "additional to any minimisation and remediation or offsetting". As previously discussed, parts of the Brynderwyns are already under conservation management, for example Maranui Conservation Area and Waipū Gorge Scenic Reserve. The recipient agencies are not specified, so there is no safeguard against the money replacing their existing baseline spending.

Principle 5: Leakage. Compensation must avoid "displacing harm to other indigenous biodiversity in the same or any other location". Part of NZTA's Indicative Compensation Approach involves releasing translocated frogs into occupied habitat, which transfer harm onto resident frogs through crowding, competition, and risk of disease. NZTA's success test does not measure effects on residents, and nothing in the package appears to address them.

Principle 6: Long-term outcomes. Outcomes must last "at least as long as the impacts, and preferably in perpetuity", with consideration of "funding, location, management, and monitoring". The effects on Hochstetter's frog will be permanent. Against that, based on NZTA's package:

- pest management at receiving sites only lasts five years;
- monitoring of frog populations lasts 5–10 years;
- funding is not yet secured and locations are not yet identified;
- recipients are only "the appropriate parties" (p. 5); and
- the measures are things the money "could" be put towards, which lacks certainty.

Principle 7: Landscape context. Compensation should preferably be "close to the impact site or within the same ecological district". Measure (c) on page 6 of the Indicative Compensation Approach is consistent with this principle. However, measure (e) ("at an appropriate ecological-district or regional scale") and the absence of any defined locations are not.

Principle 8: Time lags. Delay must be minimised, with gains achieved within the consent period or "not more than 35 years". The compensation funds are not released until 5–10 years after translocation of the frogs, and compensation works only begin after that. Hochstetter's frog is long-lived and slow to reach maturity. Because the Applicant has not calculated any gain, it cannot demonstrate the gain would be achieved within 35 years.

Principle 9: Trading up. The Applicant does not explicitly claim that trading up will be used to compensate for the residual effects on frogs; however, measures (d) and (e) of the Indicative Compensation Approach would allow compensation funds to be spent on outcomes other than for Hochstetter's frog. If such spending were framed as trading up, principle 9 does not allow trading up where the values lost are to an At Risk – Declining species. In my opinion, measures (d) and (e) should be amended or removed, and expenditure confined to the Northland clade of Hochstetter's frog.

Principle 10: Financial contributions. Money is acceptable only if "(a) there is no effective option available for delivering biodiversity gains on the ground; and (b) it directly funds an intended biodiversity gain". The package fails both clauses:

- measures (a)–(c) of the Indicative Compensation Approach could be delivered on the ground under conditions, as NZTA's own works rather than payments to third parties.
- the money is not tied to a specified gain. It is released to "the appropriate parties" for measures it "could" fund.

Principle 11: Science and mātauranga Māori. Design must be "a documented process informed by science, and mātauranga Māori". On the science side, there is no documented design:

- the 140-hectare site area, the implied density of about 157 frogs per hectare, and the costing at about $35k/ha are unexplained (p. 6);
- the success parameters are deferred to a Frog Management Plan that has not been prepared (p. 5).

I am unable to provide commentary regarding mātauranga Māori.

Principle 12: Tangata whenua and stakeholder participation. Effective and early participation must be "demonstrated". The Indicative Compensation Approach says its purpose is "to inform a discussion between NZTA and DOC" (p. 1). It records no tangata whenua participation in designing the compensation; however, it is possible that NZTA may have consulted with iwi in this regard.

Principle 13: Transparency. The costing assumptions provided by the Applicant are not explained and there is no commitment to report results publicly.

47. I consider the Northland clade of Hochstetter's frog is potentially irreplaceable at the scale of the Northland clade and vulnerable to threats as such predators, extreme weather, and forestry operations. The potential effects of the Project on the Northland clade are significant and irreversible, and no technically feasible options are proposed by which to secure a proposed net gain for the affected frog populations within acceptable timeframes. Accordingly, the Project's residual effects on Hochstetter's frog are considered beyond the limit of what can be compensated. No set of conditions could credibly achieve a net gain for this species.

48. Overall, I consider that the Applicant has not demonstrated that the residual effects on Hochstetter's frogs will be adequately addressed. It is highly likely that there will be a significant net loss for the Northland clade of Hochstetter's frogs as a result of the Project, even with the proposed mitigation and compensation measures. The Applicant has not demonstrated otherwise.

Lizards and kauri snail

49. I have read the statements of advice of Drs Burns and Stavert on lizards and kauri snail respectively. I rely on their statements regarding lizards and kauri snail ecology and agree with their conclusions.

50. The Applicant has assessed the level of residual effect on lizards and kauri snail as Low (Tables 26 and 28 of Appendix D06). They are relying on salvage and relocation and mitigation planting and enhancement of existing native vegetation to mitigate the effects on lizards and kauri snails. Although

revegetation planting can provide suitable habitat for some lizard species in 5-10 years, this does not apply to kauri snails. As Dr Stavert has mentioned in his statement of advice, new planting cannot recreate the structure, microclimate, litter depth, and invertebrate communities of a mature forest within a timeframe relevant to the Project's effects. As such, the Applicant has not demonstrated a Low mitigated overall level of effect.

51. Dr Burns accepts the Applicant's assessment for copper skink; however, for the other lizard species he considers the effect should be Moderate, not Low or Very Low–Low. The lower ratings depend mostly on species not being found, acknowledging that survey effort in forest habitats was limited, and there was no targeted survey for arboreal geckos despite a gecko being recorded incidentally inside the Designation corridor. Dr Burns expects that most lizards in felled forest will be killed without being detected.

52. For kauri snail, the Applicant reduces the High unmitigated effects to Low after mitigation, but Dr Stavert considers that this reduction has not been appropriately demonstrated. This is because affected habitat is unquantified, salvage cannot address habitat loss or fragmentation, and release-site capacity and suitability are unproven.

53. For both lizards and kauri snail, the Applicant has treated measures that reduce mortality as if they also reduce permanent habitat effects. Salvage may save some individuals, but it does not replace habitat, reconnect populations or remove edge effects. For lizards, the new highway will be a barrier that revegetation does nothing to address. Where the Applicant relies on 39.5 hectares of new planting to deal with habitat loss, that planting is in function an offset. It should therefore be tested against offsetting principles, including the substantial time lag. The mitigation is also inadequate, given that pest animal control lasts three to five years with no outcome targets.

54. Dr Burns has suggested the construction of a pest-proof enclosure as a means of addressing residual effects on lizards. I support this recommendation and it is an approach that is frequently proposed for large-scale infrastructure projects where lizards and notable invertebrates are affected. This could also provide a form of compensation for kauri snails, too, and could also act as a

receiving site for relocated animals, depending on the quality and age of the habitat that would be fenced. However, baseline information would be needed to quantify additional gains and compare them with residual effects. The pest-proof enclosure that receives displaced lizard and snails would also require an assessment of current carrying capacity and potential effects on resident snails.

55. In summary, I consider the residual effects on lizards other than copper skink are at least Moderate. I agree with Dr Stavert that the Applicant has not shown that the residual effect on kauri snail is Low. For both groups, the permanent effects of habitat loss and fragmentation remain after mitigation, so the Applicant's reason for offering no offset or compensation is not justified.

Long-tailed bats

56. I have read the statement of advice of Ms Tertia Thurley on long-tailed bats (pekapeka-tou-roa). I rely on her statement regarding bat ecology and agree with her conclusions. In particular, I agree that the measures the Applicant proposes will not adequately address the residual effects of the Project on long-tailed bats. In my opinion, the level of residual effect will be at least Moderate for habitat loss, including the loss of roost trees. I note that Ms Thurley assesses the residual effects of fragmentation and vehicle collision as High.

57. Long-tailed bats are classified as Threatened – Nationally Critical, which is the highest threat ranking short of extinction. They are also listed as "specified highly mobile fauna" in Appendix 2 of the NPS-IB. Effects of this magnitude on a species with this threat status are, in my opinion, at least more than minor. Under the effects management hierarchy, residual effects of that level must be offset or, where offsetting is not possible, compensated for.

58. As Ms Thurley notes, none of the documents the Applicant provided during the suspension period proposes any additional measures for bats. The Indicative Compensation Approach covers only indigenous vegetation and Hochstetter's frog. No offset or compensation of any kind is proposed for the residual effects on long-tailed bats.

59. In my opinion, the vegetation offset and compensation measures cannot be relied on to address effects on bats, for three reasons:

- Roost trees take decades to replace, and may never be replaced. Trees suitable for roosting take many decades to develop cavities with suitable thermal properties, if they ever do. That time lag is likely to exceed the 35-year limit in principle 8 of the NPS-IB (Appendix 4).
- Gains away from the affected colonies will not benefit them. Long-tailed bat colonies appear to use fixed roosting ranges. Forest protected elsewhere in the North Island under the proposed vegetation compensation, or planting outside the affected colonies' ranges, is unlikely to benefit the bats that lose their roosts.
- Not all bat habitat is accounted for. Ms Thurley identifies about 49 hectares of pine forest as bat habitat that will be lost. Neither the indigenous vegetation offset nor the compensation addresses it. She also observes that the mitigation sites appear to have been designed for other values, with bats "tagged on".

60. Any gains for bats should be identified and measured separately. Examples are roost availability, connectivity along confirmed commuting routes (not affected by artificial light), and the survival and breeding success of the affected colonies. Gains for bats should not be inferred from hectares of vegetation planted or protected in the mitigation planting areas.

61. The survey effort to date is not enough to identify roost trees, colony roosting ranges, or commuting routes, all of which is important for every step of the effects management hierarchy. Comprehensive surveys are needed to target avoidance, to place crossing structures, to locate mitigation in the right places, and to quantify the residual effect that any offset or compensation must address.

62. I agree with Ms Thurley that the loss of roost trees is difficult to offset or compensate due to the long lag time between planting trees and when the trees are mature enough to develop roost features. As such, the Project

should avoid the felling of potential roost trees in order to reduce residual effects of habitat loss on bats.

Conclusions and Recommendations for conditions

63. The conclusions and recommendations set out in my earlier statement of advice remain as stated there. I have, however, provided additional recommendations regarding offsetting and compensation in the event the Panel decides to grant the approvals. With regard to offsetting the residual effects on terrestrial vegetation, a defensible package would include the following:

    - a stated outcome: hectares of each affected forest type (i.e. a disaggregated approach) legally protected and managed to a defined condition, in perpetuity;
    - a quantum derived from transparent BOAM accounting per attribute with time discounting;
    - ecological equivalency (i.e. like-for-like);
    - performance standards (survival, canopy cover, composition, and a timeframe for each);
    - defined areas for offsetting to take place (preferably close to the impact sites);
    - funding for ongoing management, not just establishment; and
    - additionality safeguards.

64. Once the Applicant has finalised the highway design, the level of effects on wetlands should consider magnitude of effect at the scale of **individual** wetland loss, rather than at the **wider** catchment scale. This should then be fed into an updated Ecological Impact Assessment. This should also identify and assess all previously unmapped wetlands and provide an appropriate site (or sites) for offsetting purposes.

65. With regard to Hochstetter's frog, should the Panel grant the consent on the basis that compensation should be imposed to address the residual effects,

the following must be provided at a minimum, after all possible avoidance, minimisation, remediation and offsetting measures have been exhausted:

- a compensation package, secured before construction, for the:
    a. permanent loss of habitat, including spoil sites;
    b. permanent impact on habitat by dewatering and ground water flow reduction;
    c. permanent fragmentation of populations in upper catchments;
- calculation of any contingent component against the forecast affected population (i.e. the payment should reflect the proportion of all affected frogs that are not successfully re-established, including those not found during salvage, died before release, or were released to a site that failed);
- replacement of the frogs lost (frogs not salvaged, frogs that die during capture or holding, frogs translocated unsuccessfully, and declines in resident frogs at release sites) through measures that demonstrably increase the survival or recruitment of Northland clade populations;
- application of quantitative success criteria with stated statistical power, assessed over a period long enough to show that the population is replacing itself;
- funding independent monitoring and verification;
- maintaining pest management at receiving sites for as long as they are legally protected; and
- confining expenditure to outcomes for the Northland clade of Hochstetter's frogs.

66. With regard to lizards and kauri snail, as a minimum, the conditions should require:

- a predator-proof enclosure to address residual effects on lizards, kauri snails, and other notable invertebrate species;
- long-term pest control on both sides of the alignment and at release sites, tied to measurable outcomes; and
- stage-specific quantification of kauri snail habitat and release-site capacity.

67. With regard to bats, Ms Thurley recommends that a residual effects management package be developed within a Bat Management Plan. I agree that such a package is needed, although its core outcomes and components should be set in the conditions themselves rather than left to a management plan that has not yet been prepared. Without this, the Panel cannot assess whether the residual effects on bats will be adequately addressed.

68. The Applicant has not yet provided any updated conditions, so the final wording of amended proposed conditions and plans remains to be reviewed.