

**In the Environment Court
I Mua I Te Kōti Taiao O Aotearoa**

Under the Resource Management Act 1991

and in the matter of the direct referral of an application for resource consents by Meridian Energy Limited in respect of the proposed Mt Munro wind farm under section 87G of the Resource Management Act 1991 (**RMA**).

Meridian Energy Limited
Applicant

and

Tararua District Council, Masterton District Council, Manawatū-Whanganui Regional Council and Greater Wellington Regional Council (Councils)
Consent Authorities

and

s 274 Parties

Statement of Rebuttal Evidence of Vaughan Francis Keesing on behalf of Meridian Energy Limited

6 September 2024

ANDREW BEATSON
BARRISTER
RICHMOND CHAMBERS
TEL 021 223 9170 EMAIL ANDREW@BEATSON.CO.NZ



SOLICITORS ACTING: E TAFFS AND H TAPPER, MERIDIAN ENERGY LIMITED
287-293 DURHAM STREET NORTH, CHRISTCHURCH, 8013, NEW ZEALAND
TEL 021 676797 EMAIL ELLIE.TAFFS@MERIDIANENERGY.CO.NZ

CONTENTS

Introduction	3
Actions agreed at expert conferencing	4
EC Conditions	4
Further Sampling and updated SEV-ECR	5
eDNA sampling results	6
Fish, mussels and ecological value	8
Stream classification	11
Receiving environment monitoring	11
Conclusions	12

INTRODUCTION

1. My full name is Vaughan Francis Keesing. My statement of evidence in chief dated 24 May 2024 addresses matters relevant to freshwater ecology and wetlands in relation to the proposed Mt Munro Wind Farm. My qualifications and experience are set out in that statement of evidence, and I reaffirm my commitment to comply with the code of conduct for expert witnesses.
2. The primary purpose of this rebuttal evidence is to reply to the evidence of Mr Lambie and Dr Forbes on behalf of the Councils, and to provide an update on the actions agreed through expert conferencing, including the second conferencing session held on 5 September 2024.
3. Mr Lambie, Dr Forbes and I participated in court-assisted expert conferencing on 6 August 2024, and reached agreement on a number of matters, as is reflected in the Joint Statement of Freshwater Ecology and Wetlands Experts (the **JWS**). The outstanding actions and matters are as outlined in the evidence of Dr Forbes.
4. Dr Forbes and I met again to discuss freshwater ecology matters, resulting in a Second Joint Statement of Freshwater Ecology Experts (the **second JWS**).
5. Meridian has advised me that notwithstanding some minor points of remaining disagreement between Dr Forbes and I, Meridian is content to apply the SEV calculation approach recommended by Dr Forbes, and outlined in the second JWS, noting that there is capacity on the site to accommodate a longer stream offset. Meridian has also advised me that it accepts a proposed condition to require the stream classification to be undertaken again prior to works.
6. The second JWS therefore does not represent agreement in principle from me to the underlying SEV methodology preferred by Dr Forbes, but instead records the agreed outcomes for offsets using the method and inputs proposed by Dr Forbes.

7. I therefore use this rebuttal to provide a reply to the position set out in Dr Forbes's evidence where I feel it necessary following our further discussions, and the second JWS outcomes.

ACTIONS AGREED AT EXPERT CONFERENCING

8. The actions agreed in the JWS were for Meridian to confirm:
- a) that collection of eDNA at each sampling point would be undertaken prior to the hearing;
 - b) that stream simulation culverts will be used in the Mangaroa tributary, the Northern Makakahi; and
 - c) that the above would be fed into an updated recalculation of SEV and ECRs
9. It was also agreed that:
- a) the stream classification point could either be addressed by overlaying the stream classification layer with the wetland layer to determine if ephemeral/intermittent streams are identified as wetlands and therefore potentially covered by the sediment discharge compliance into wetlands; and
 - b) Dr Forbes and I would collaboratively investigate and rewrite the conditions EC15 – EC17 (effects management conditions) to achieve desired ecological outcomes.

EC CONDITIONS

10. As noted in Dr Forbes's evidence, we participated in further discussions following conferencing to agree on the wording of the ecological monitoring conditions (the 'EC' conditions). This meeting was also attended by planners Mr Anderson (for Meridian), Ms Edwards (for

Horizons) and Ms Vivian (for Greater Wellington), who provided drafting assistance for conditions.

11. We reached broad agreement on these, with only one outstanding matter in relation to the need for regular monitoring, which is addressed in my evidence below. With this exception, I agree that the **August Proposed Conditions** attached to the evidence of Mr McGahan are appropriate, and reflect the agreement reached in these discussions.

FURTHER SAMPLING AND UPDATED SEV-ECR

12. On 16 August 2024, I went back on to the site and collected eDNA from the Mangaroa tributary and the 5 Makakahi tributaries and a sample from the Kopuaranga hill tributary which represents KOP1 and 2 of the report where they meet the Hastwell Road. I did not collect samples from the Bruce Stream.
13. At that same time, I collected the data relevant to application of the SEV model in the Mangaroa Stream. This data collection occurred prior to the heavy rain of the week of 18 August and the streams were flowing as I have seen them before and what I would call normal bank to bank levels, depths and velocities.
14. The eDNA was collected following the Wilderlabs instruction. The samples were then sent to Wilderlabs, the data was analysed and created by them.
15. I then ran the SEV model using the field data collected to produce a set of SEV outcomes for the current Mangaroa stream condition, a predicted restoration condition and a stream simulation culvert condition. These modelled outcomes were then used to calculate an ECR (Environmental Compensation Ratio) for the offset (having removed the fish and macroinvertebrate components of the model as required by Dr Forbes).
16. I provided an updated SEV and ECR set to Dr Forbes on Monday 19 August 2024. Dr Forbes advised that he required more time to analyse

the updated results, and the updated SEV and ECR set are therefore not reflected in Dr Forbes's evidence filed on 23 August 2024.

17. Confirmation that a stream simulation culvert would be used was provided by Meridian verbally, and is reflected in Dr Forbes's evidence, and in the proposed condition sets attached to the evidence of Mr McGahan (the **August Proposed Conditions**) and Mr Anderson (the **6 September Proposed Conditions**). In the second JWS we further emphasise that the SEV-ECR is based around that culverting method.
18. The second JWS records our agreed ECR effects ratios for the offset for the installation of the culverts in the Mangaroa and Mākākahi north tributaries. I understand that this agreement and the use of the simulation culverts now resolve Dr Forbes earlier concerns about whether the proposed offsets would be consistent with the applicable effects management hierarchy. As agreed in the second JWS, Dr Forbes and I agree that the offset principles in the National Policy Statement for Freshwater Management 2020 (NPSFM) are met.¹

EDNA SAMPLING RESULTS

19. With respect to the eDNA results no freshwater mussel were recorded. The numbers in the table below reflect the strength of the eDNA signal. The raw data is included in Annexure A of the second JWS.
20. Tables 1 and 2 below show the compiled fish and freshwater mussel results from the eDNA analysis, and then the data from the conventional sampling as set out in the Ecology Report which formed part of the Assessment of Effects on the Environment (AEE).

¹ Second JWS, at Issue 8

Table 1: Compiled fish and freshwater mussel results from eDNA analysis

Common Name	Manga	MAK 1	MAK 2	MAK 3	MAK 4	MAK 5	Kop 1&2
Kaharore bully (upland bully)	14109	0	0	0	10478	0	13202
Common bully	3868	0	0	0	5110	0	5139
Longfin eel	316	547	0	193	0	182	462
Shortfin eel	188	57	0	0	119	134	1483
Brown trout	0	0	0	0	1331	0	0

Table 2: Combined results as shown in Table 1 and 19 of the Ecology Report (EFM (2011) and spotlight (2021)).

SPECIES	KOP1*	KOP2	MAG2*	MAK1	MAK2*	MAK3	MAK4	MAK5*
Longfin eel	3	10		14			11	
Shortfin eel		1					3	
Unidentified eel sp.	1	4		2				
Elver	1			2			1	
Common bully	5						15	
Upland bully	2		7					

21. The eDNA data show a similar set of species to the conventional sampling for MAK1, Kopuarunga tributaries, MAK2 (no species), adds brown trout to MAK4, and adds long fin eel to MAK 3 and long and short fin eel to MAK 5.
22. With regard to the Mangaroa tributary the eDNA added common bully, and long and short fin eel. While the eDNA data generally adds eel to the tributaries I consider no new indigenous taxa not already recorded as present on site have been recorded as present through this method.
23. Dr Forbes, however, does not agree with this and states in the second JWS that: "A new native fish species, Kaharore bully which is a species described (new to science) in 2021 and is distinguishable from upland bully by fin ray counts. This species is per taxonomic references

described in AF's evidence. This additional native species was found in three eDNA sample locations representing at least four tributaries (inc. Mangaroa). This is a new native species for the project".

24. However, given this is a new species determination over the existing labelled species post 2021, historical surveys (pre-2021) would have appropriately recorded it as upland bully. I am firmly of the opinion that the 2011 and 2021 spotlight data recorded this "new" species as "upland bully", not that there is both "upland bully (*Gobiomorphus breviceps*) and kaharore (*G. mataraerore*)", otherwise the eDNA data would have shown both.
25. Irrespective, we remain disagreed as to the impact the fish species presence data has on the values of the streams.

FISH, MUSSELS AND ECOLOGICAL VALUE

26. Dr Forbes and I agreed to disagree in the first JWS on the determination of ecological value of the streams, with Dr Forbes determining a moderate value and I a low.
27. It appears to me that the main area of difference is in Dr Forbes's consideration of the macroinvertebrate data outcomes and the fish species outcomes.
28. The Values assessment considers five elements: representativeness, rarity and distinctiveness, diversity and pattern, ecological context and ecological integrity. These considerations take into account the physical habitat as much as the biota.
29. Due to the better-than-expected macroinvertebrate data, the representativeness element in the assessment was considered moderate rather than low, and I consider that this reflects Dr Forbes's opinion that the macroinvertebrate assemblages are typical of rural farm streams (and so moderate); however, in my assessment the integrity, diversity and pattern of all features, weighted by the physical habitat parameters rather than just the aquatic fauna, is **low**.

30. Despite the features being small headwaters of a wider catchment, the ecological context was considered very low, in the main because of the condition of the land (cleared and grazed) and water – sediment and nutrient loading. Therefore, in my opinion the overarching value is **low**.
31. The second JWS continues to record our disagreement around this evaluation.
32. A substantive component of this disagreement is whether or not long fin eel cause the rarity criterion to be applied for the tributaries where it is found (KOP 1 & 2, MAK 1, 3, 4, 5 and the Mangaroa) I say that long fin eel (despite being classified as At risk -Declining) remains one of the most frequently surveyed and abundant fish in NZ waterways. They are not “rare” in the common meaning of the word, and there is growing evidence that they are not in decline. The threat classification (Dunn et al 2017) states that *“Recent data suggests that the abundance of the longfin eel may be stable or increasing in commercial fisheries and that new Total Allowable Commercial Catch limits in the South Island should further decrease pressure on populations”*. Long fin eel remains a commercial fishery and that alone causes me to take issue with considering it rare. My understanding is that the panel which determines the classifications was concerned about its lowland habitat degradation and about public perception, and not the eel population itself and so retained the classification out of caution. It is for these reasons that despite it retaining the classification I do not determine the presence of long fin eel to make a stream of high (or higher) value. Mr Forbes relies on the classification and does not consider these other matters are determinative.
33. In addition, four of the five parts of the measure of value are in my opinion low or lower in the assessment and these outweigh the one moderate component.
34. While we may argue over the interpretation of the macroinvertebrate assemblage condition and fish diversity, in my view that disagreement is immaterial to the outcome.
35. Regardless of whether or not the values are low or moderate the management response and extent of the offset will be the same

because these are driven by the SEV-ECR calculation which does not consider the value ranking at all. In addition, Meridian does not seek to avoid effects management if the level of effect (the product of value and magnitude) was to be low or “less than minor”. At the start of the project the direction of the NPS FM (2020) to avoid loss of extent was accepted, and any stream loss (no matter how minor) was to be managed.

36. It is my opinion that the key question arising for this project was to determine if avoidance of an effect was paramount (because of high and very high values) and if Principle 2 (a) of the offset guidance in the NPS FM (2020) Appendix 6 could be in play, i.e. “residual adverse effects cannot be offset because of the irreplaceability or vulnerability of the extent or values affected”.
37. Once that question was answered in the negative, the question turned to how the mitigation hierarchy would be addressed.

MAGNITUDE OF EFFECT AND EFFECTS MANAGEMENT

38. In this same vein the difference in opinion as to the magnitude of the 210m change in the Mangaroa is in the end neither here nor there.
39. While I use the Mangaroa tributary in total as the scale basis for assessing the loss (not the catchment in total) which I understand is also what Dr Forbes considers appropriate (that measure being Ca. 2500m) and set the 210m loss against this – as I repeated in the S92 response, a 7-8% change (not a loss, as only 4% is actually lost) is a low (1-15% = low) magnitude of effect.
40. This discussion is repeated in the second JWS without resolution. However, I fail to see why resolution has not been reached unless Dr Forbes disagrees that a less than 10% loss is low.
41. Whether it is a low value and low magnitude impact, resulting in a very low effect or a moderate value suffering a moderate magnitude impact (as Dr Forbes would have it) and so a moderate level of effect, the effects management response is the same. That is, to minimise the extent of loss, then mitigate residual adverse effects through the best

type of culvert/bridge, followed by the offsetting of any remaining impact.

- 42. That offset is calculated based on the SEV-ECR models and is not impacted by the value of magnitude assessment outcomes.
- 43. The data and use of the SEV and ECR model outputs (the offset ratios) is an agreed point and so the effects management approach represents an agreed process and outcome.

STREAM CLASSIFICATION

- 44. As recorded in the JWS, we had hoped that the classification of streams on the Project site would be resolved by overlaying the wetland locations. The logic here was that any sections classified as ephemeral, which also might also have wetland characteristics, would be captured by a wetland management approach. Dr Forbes's concern as to a difference in management approach for sediment discharges which might affect ephemeral versus intermittent waterways would then be addressed.
- 45. However, the wetland survey locations and stream classification data were found not to intersect. I remain confident that the data collection by the field ecologists was undertaken in a systematic way and reflected good practice.
- 46. In any case, we are now agreed that the new proposed condition EC13, which requires a reassessment prior to works resolves the difference in opinion on this question.

RECEIVING ENVIRONMENT MONITORING

- 47. As noted earlier, the freshwater monitoring conditions have been largely resolved through further discussions with Dr Forbes after the first JWS.
- 48. Dr Forbes and I disagreed only on the need for Meridian to undertake regular calendar monitoring in addition to baseline and incident

monitoring (i.e. EC17(c)). As I understand Dr Forbes's position, he considers that regular monitoring might assist in incident interpretation and is useful data.

49. I have been conducting the regular interval monitoring at streams for the Transmission Gully roading project now for eight years.
50. This programme of monitoring has never assisted the consent holder or the regional council in interpreting incident data results or in moderating issues with a sediment discharge which might have affected a stream. To me this type of monitoring is data collection for data's sake, and is either typically filed and not considered further.
51. I have found such regular types of monitoring to impose an additional cost with no benefit and that it typically does not contextualise an incident to the point where it can be used to attribute a cause to an effect. There is a high level of natural variability in benthic macroinvertebrate assemblages in rural streams reflecting seasonal changes and sporadic inputs of organic matter, sediments etc. While in general the various descriptive metrics taken over numerous measures over a long time typically reflect a relatively stable condition year to year, any set of spot measures, given they represent only small areas of a much larger habitat, can vary widely simply due to subtle shifts in sediments and macrophyte and organic matter. This is true of other metrics also. Thus, regular monitoring does measure the natural variability, but unless those can be used to widen the baseline consent test metrics, they have no purpose or use to Meridian, and provide no practical assistance for managing the earthworks effects.

CONCLUSIONS

52. I understand that the only outstanding points of difference between Dr Forbes and I in respect of freshwater ecology are firstly the interpretations of data relating to the values assessment and whether the Mangaroa tributary in particular is of low or moderate value and specifically for the Mangaroa tributary if the effects to that tributary are of low or moderate magnitude of effect.

53. I maintain that this difference in opinion of value and magnitude of effect has no bearing on the freshwater effects management or the principles of offset being applied.
54. The outcome of the effects management is the same and is determined through the SEV-ECR method which does not use the value or magnitude of effect outcome.
55. In any event this is an academic disagreement, because the effects management approach is now agreed in all respects, as is recorded in the second JWS.
56. Lastly, we still disagree about the need for regular monitoring of freshwater throughout the earthworks.
57. The potential effects of sediment discharge from earthworks will be managed through the EC17 baseline and incident monitoring protocols and do not use the value or magnitude of effects assessment.
58. The additional regular monitoring that Dr Forbes seeks will serve no useful purpose in the management response. It therefore represents monitoring for monitoring's sake and imposes additional cost on the consent holder for no benefit. I therefore consider the requirement to be unnecessary and excessive.

A handwritten signature in blue ink, appearing to be 'V. Keesing', written in a cursive style.

Vaughan Keesing

6 September 2024