Boffa Miskell

Memorandum

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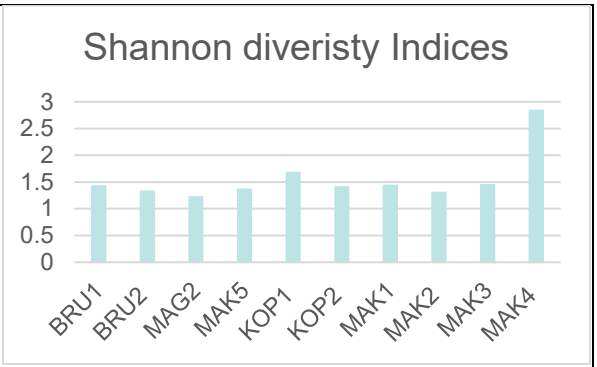
Attention:	Tom Anderson, Nick Bowmar, Lynley Fletcher
Company:	Incite, Meridian Energy
Date:	29.08.2023
From:	Dr Vaughan Keesing
Message Ref:	Mt Munro Windfarm section 92 responses

Dear all please find below the ecological responses to the various ecological Section 92 requests and several of the Erosion and Sediment control queries also.

Erosion and Sediment control	
63. Consent conditions offered contain no discharge monitoring requirements or standards. These should be considered in relation to the sensitivity of receiving catchments. Are you proposing a discharge standard to protect the values of the receiving environments?	We note from the ecological perspective the likely receiving environments are the small headwater tributaries which are currently all in unfenced farmlands and are well adapted to regular sediment and nutrient inputs and are not comprised of overly sensitive macroinvertebrates (see figure 5 AEE). The majority of benthic invertebrate abundances are diptera and Mollusca in the Kopuaranga and Bruce and all but the Makakahi 2 and 4 (least affected). The one affected Mangaroa tributary has low mayfly but some caddis but a low MCI and QMCI - not sensitive. Therefore we have suggested that these data be used as an effects baseline but that there is no need for a calendar monitoring regime but rather an event based system whereby the erosion and sediment monitoring system on site be a trigger such that potential effects (measured by monitoring discharge) are related directly to a project event and not the effect of the ongoing farming (natural) events.
65. Table 31 of the Ecological Assessment provides a summary of the overall level of adverse effects from a substantive sediment discharge event. This table indicates a low magnitude of effects and a low to very low level of effect from a substantive sediment discharge event. Please clarify how this is measured (both the substantive sediment discharge event and level of effect). It is unclear how the potential sediment discharge has been estimated and how this then impacts on the freshwater environment. Further	The assumption that an event even if discharging substantive sediment will be temporary, flushed and is within the experience of these systems. It comes from a long-gained understanding at construction sites such as West Wind, Mill Creek and Transmission Gully, where earthwork management failures did not collapse the benthic community but altered proportions of taxa for short periods. Indeed at the

understanding of this may assist in determining discharge monitoring standards and requirements.	Westwind wind farm the management regime resulted in better out comes than the original farming practices. So the expectation is a low magnitude of effect for what might be very occasional event discharges that overwhelm the defences. As to a measure, a substantial discharge would be one that causes deposition that is across the stream (say 70% of the wetted width), is over 10 cm deep, lasts more than a further rain event, and is over 20% of the receiving habitats downstream linear length. These are somewhat arbitrary measures, but ones we have found to be effective, measurable and telling. The SAM 2 (Clapcott et al. 2011) processes are sufficient protocol to measure these factors.
Aquatic Ecology	
66. In relation to the stream classification method, the hydroclasses of waterways have been classed as either permanent, intermittent, or ephemeral, however the method undertaken to define these hydroclasses is not stated and is unclear. For instance, page 41 of the Ecology Assessment states that perennial and intermittent reaches were determined based on having a defined channel and flowing water, however we note that by definition intermittent reaches might not always contain flowing water. Additionally, Map 14 appears not to display intermittent reaches. The boundary between intermittent and ephemeral is particularly important as this determines whether the waterbody is a 'river' in terms of the RMA. Existing methods are available, such as the Auckland Unitary Plan (AUP) Practice and Guidance Note River/Stream Classification. Please provide information to demonstrate the stream classifications in accordance with the Guidance Note River/Stream Classification method.	The following methodology outlines how waterways on site were classed as either perennial, intermittent or ephemeral: Each waterway was walked on site by two qualified freshwater ecologists. Site observations and notes were recorded of the stream system, including presence of surface water, the flow, signs of aquatic life and the presence of an active bed. Subsequently, using aerial imagery the site notes were crossed referenced with the aerial imagery and each waterway was marked with the boundary between perennial / intermittent / ephemeral, accepting that those zones are fluid and dependent on the time of year and amount of preceding rain. This is in reality an abridged version of the AUP method. I.e. evidence of natural pools, well defined channels, and a distinguishable bank and bed, surface water presence, rooted terrestrial vegetation, flood plain evidence of organic debris and evidence of substrate sorting processes (in an active bed) bed relative to the ground water table. However, considering no interactions are proposed of the project in the intermittent areas, the top end of perennial or lower ephemeral, the accurate depiction of the intermittent zone is not crucial to an effects decision. We supply a new map which illustrates this point (Appendix 2) and that the only interactions are with top of the gully ephemeral systems.

67. In relation to ecological values, the assessment of rarity contained in Appendix 6 incorrectly labels the status of longfin eel to be not threatened, when it does in fact have a threatened status. There is no science basis for this, and the position taken has been used to justify a low rarity value for all waterways assessed. A more appropriate valuation would be moderate rarity for all waterways where longfin eel occurs due to its threatened classification. Please provide justification on why this classification has been used. Diversity for all streams has been rated as low. However, in contrast the macroinvertebrate results (Figure 6) show good water quality being indicated at most sites monitored at least once, and four sites have returned >50% %EPT taxa richness. This data provides evidence that diversity is greater than low in a number of instances, and this is not reflected in the ecological valuation. Please provide justification as to why this classification has been used. Table 6 of EIANZ (2018) states that an area has Moderate value if it rates Moderate for two or more assessment matters and Low or Very Low for the remainder. A review consistent with the above would likely result in changes from low to moderate value, which has implications for the overall level of effect. Please review the ecological valuation considering these points or justify why the ecological valuation shows the area as having a low value.	The Appendix correctly labels long fin eel as At Risk - Declining (Appendix 6, page 1, rarity and distinctiveness"). However, it then goes on to explain why long fin eel, in this catchment and indeed in most catchments around New Zealand, are not considered "rare" for the purposes of value. This is because rarity is a function of numeric abundance and / or frequency of presence. Long fin eel is one of the most ubiquitous species in the fish records and one of the most abundant and therefore regardless of its threat classification it is not rare. Given ecological value is not a statutory assessment the assessor is entitled to provide evidence-based decisions as to the fit or not of a species to a value criteria - we have done that. The presence of long fin eel in any stream does not, in our opinion, render the stream habitat as of moderate habitat or as "moderate rarity" under rarity. In regard to Diversity. The assessment of diversity, we see, has been solely with regard to the physical habitat and its complexity. We agree that consideration of the faunal and flora diversities is also a component. We concur that the benthic macroinvertebrate fauna surveyed are now (they were much poorer in 20911), of an average species richness for pastural hard bottomed streams (an average of 28 taxa (21-33). As a comparison we have collected data on the upper Whakamoekau Stream, a stream south of the site, near Masterton, which is similar in form and condition in the same land use and had a species richness ranging 28-44 and averaged 35 taxa. So the Mt Munro streams in general are a little below average in diversity in terms of benthic macroinvertebrates. To assist in terms diversity we have undertaken a Shannon diversity indices score (a commonly used diversity indices for invertebrate assemblage samples). The scores for the data collected are all between 1.35 and 1.7 except MAK4 which had a diversity indices of 2.8. The Whakamoekau stream examples averages 2.4.

	 We suggest that an average SW diversity for similar hard bottomed rural streams is around 2. Thus it is perhaps fair to say the majority of the tributaries have a low, not moderate diversity while the MAK4 site has a moderate or better diversity, although the physical conditions are still limited. The one moderate MK tributary site does not change the averaged condition. We note that the MAK4 site is not likely to be affected its only interaction is that the transmission line passes over it and that will not require any disturbance. We note also that the MAK1 interaction is well above the stream, involving the upper riparian and not the bed. We note that the MAG2 sites macroinvertebrate fauna will influence the SEV outcome related to the culverting.
68. In relation to your proposal to culvert 210m of the Mangaroa tributary, we note that your evaluation of the magnitude of effect has not considered the duration of effect. The culvert installation would be permanent (i.e., c. 25 yrs + as per EIANZ 2018 Table 9). The character of the zone of influence would be partially changed, which is in line with a moderate magnitude of effect. Please review the proposed magnitude of effect in line with best practice guidance for ecological impact assessment as outlined here and detailed in EIANZ (2018), and also the corresponding overall level of effect for these proposed culverting works (following review of value and magnitude as above). As a result of the review, please provide any amendments or provide justification as to why the provided magnitude of effect and corresponding overall level of effect for the culverting works are appropriate.	We agree that the effect can be viewed as permeant. We also note that the effect is nevertheless reversable. While the culverts will change the aquatic habitat over 210 or so meters, two (culverts 1 & 2 in T&T response, Appendix A) are in a tributary of at least 3000m, we consider that the magnitude of effect in this instance is far more a spatial scale issues than a temporal one and that the view in the initial assessment was not that the aquatic habitat “lost” was only a temporary effect, it was always considered a “permanent” effect and the magnitude assessment undertaken with that accounted for. The third culvert (Culvert C7 is a replacement of an existing culvert), is a 30 m culvert in a 1500m tributary (2%), spatially and at a permanent temporal consideration, a low magnitude effect . The value of the MAG2 tributary and the tributary at large remains, from our assessment, low (of average to low macroinvertebrate assemblage and low habitat condition despite a generally hard substrate and the magnitude of effect 210 m of permeant loss of a 3000-meter tributary remains, in our opinion a low magnitude of

	effect – the resultant level of effect remains very low (less than minor).
69 In line with requirements of the National Policy Statement for Freshwater Management 2020 (NPS-FM), please provide an assessment of alternatives to avoid the proposed 210m of culverting of the Mangaroa tributary. Please also describe how the mitigation hierarchy has been applied in the decision making to culvert the Mangaroa tributary. These assessments should consider both alternative alignments and alternative methods of stream crossings (e.g., stream simulation culverts) as means of reducing freshwater habitat loss and loss of freshwater values.	It is not possible to divert or create a new stream section that does not involve some loss. Following the engineering requirements to place culverts (at those lengths) not arches or bridging, the instream structures that replace 210m of stream cannot be minimised, except to ensure that the culvert effects do not include armouring of the stream bed above and below the headwalls and that the installation is as per the NES permitted activity guidance in so far as the headwalls and culvert bed are set below the natural stream bed and the sizing is appropriate, such that fish passage is fully facilitated (which is expressed in the AEE). It is also likely under that regime that the bed of the culvert will accumulate gravels and that too will assist fish passage. The stream habitat lost to the culverts cannot be remedied. We assessed the level of effect of culverting 210m of the 3000m of tributary as very low, we consider that this equates to a minor or less than minor level of effect, not more than minor. The NPS FM (3.21. 1.(d)) states that more than minor residual adverse effects are offset and that lesser effects receive no further management. As a precautionary approach (and also we note that it covers the discussion above about the overall level of effect being low or moderate) we have recommended to Meridian that there be an offset nevertheless, and in part to ensure all less than minor potential effects are accounted for (ephemeral reaches, riparian effects and fish passage). We consider that this approach is a more than fair and responsible undertaking in a farmed small stream catchment.
70 Please describe specific treatments to ensure fish passage would be achievable through the 210m of culverting in the Mangaroa tributary.	The recommended approach is to ensure that the bed of the culvert and headwalls are sufficiently sunk into the bed such that there is no lip or barrier to a benthic traveling fish; that there be no armouring of the bed above or below the headwalls; ands that the culvert is sufficiently sized (be it a pipe or box) that the natural stream width (bank to bank) is accommodated such that there is no velocity change within the culvert. These three considerations will ensure the same fish passage ability as is currently available. We note that in terms of

	length of culvert, it is Inanga that suffer most in terms of travel through darkened areas, but there are no Inanga this far up the catchment.
71 Please provide a full set of Stream Ecological Valuation data and offset calculations to demonstrate a no-net loss position for the affected waterways for each of the main activities/effects. The formula and steps to be followed can be found on page 56 of the document below: https://knowledgeauckland.org.nz/media/1397/tr2011-009-streamecological-valuation.pdf The offset calculation must include the standard multiplier for risk and time lag as the positive effects from the restoration treatment (riparian restoration) will lag behind the time of culverting by about 5-10 years (+) and planting native trees is uncertain regarding weather, pests and other factors beyond your control.	Arguably with a residual effect outcome that is less than minor there is no offset requirement for the culverting of the Mangaroa (2) tributary. However, and because we have encouraged a precautionary approach, an offset (such that there is net aquatic gain) has been offered that involves the fencing from stock and the revegetation of the riparian zone (as well as instream habitat enhancement). Currently the AEE recommends a 3:1 ratio (enhancement to effect area (Ca. 240m)) - this is a reasonable ratio not uncommon or even a little generous as compared to other projects given that the level of effect does not, in our opinion, direct Meridian to offset for this level of effect. The proposed offset ratio means around 720m (but that will depend on the final total length of culvert/s) of stream would receive enhancements (those enhancements would mean a 0.3 SEV gain/m if that model was to be used). There is around 1000m of stream available in the catchment beyond the culverts and we promote the use of all of this area, but 720m active revegetation (both sides to 10m)). If we used the SEV ECR system the ratio would hinge upon what the predicted SEV of the enhanced stream would be. If, for example we accept that the current SEV is 0.4 (and 0.5 for SEVI-P) and that the resultant new forested stream could be 0.7 (a conservative outcome), then the ECR would be 2.5. We suggest that there is little need (and nothing to gain) in actually undertaking an SEV analysis, but rather to agree on the likely current condition and the possible future condition with the safety net that regardless of the ECR the proposed 720m stream enhancement and protection of most of the upper tributary in this valley will produce a net gain that exceeds the likely SEV out come if we were to use the SEV model approach.
72 In tandem with the above point, please clarify what corresponding structures are required (such as concrete aprons, bed armouring, etc) in addition to the culverts. Please describe and quantify the effects if there are any additional structures and determine the quantity of restoration required to address these effects.	To our knowledge the installation method and the other structures associated with the culvert have not as yet been designed. We have recommended that there be no additional armouring and that the headwall and apron will be set in the stream bed along with the culvert such that there will not be an un-natural gradient change or

	surface (gravels and sediments will cover the bed), that the culvert be the same gradient as the current stream bed and no flow velocity change and so no additional effects related to ancillary culvert infrastructure or installation with regard to fish passage and flow.
73 Please provide a protocol in accordance with best practice for managing effects to instream values during instream works (e.g. culvert installation), including temporary diversions, so that works can be undertaken in the dry and provide for fish salvage. This may be included within the site specific erosion sediment control plan for the culverts.	Again the detail from the engineers is not as yet published. We have recommended that a standard fish / koura salvage and relocation process be in place, which BML have successfully carried out on numerous projects in the last 10 years. We have also recommended an offline installation to minimise sediment and time of stream disturbance. Salvage, given the small stream size, will involve reach isolation by way of a mesh fencing above and below the works and then repeated EFM fishing. Our MPI accepted protocol (we hold a range of national permits to salvage and translocate fish) is to fish a reach until our catch is 10% or less of the numeric averaged first two catch abundances, and that there are no threatened or at risk species in the catch. The sediment control plans and management is developed and co-ordinated by Mr Ridley.
74 Please provide a method for monitoring the effects of sediment released from the site. During the site visit, the ecologists discussed using existing instream survey sites as baseline sites that erosion and sediment events could be monitored at when triggered at the earthworks site. Please provide details of this monitoring including confirming sites, methods, duration, frequency, and any discharge standards.	We do not anticipate there being any measurable sediment discharges from earthworks for turbine installation and consider the road development has a low risk discharge profile that could reach any intermittent or perennial stream habitat. The primary risk relates to the three culvert installations and establishment of a bridge abutments. It is not possible to avoid all sediment discharge when installing culverts, but the process usually requires a brief period of turbidity. The existing benthic macroinvertebrate data at MAG 2 and MAK sites are baseline measures (including the 2011 samples) against which comparisons can be undertaken and SAM [1] methods employed. However, while some of the streams are stony bottomed all receive season rain event sediments yearly and the level of deposited sediments is highly variable. We do not consider a calendar monitoring regime is required. The first component of sediment management sits with those experts (see

[1] Joanne Clapcott et al., *Sediment Assessment Methods: Protocols and Guidelines for Assessing the Effects of Deposited Fine Sediment on in-Stream Values* (Nelson: Cawthron Institute, 2011).

	Mr G Ridley) and the indication of stream effects will rest first on the earthworks sediment management team alerting of discharge and location and amount and receiving environment. From that alert an ecological survey using SAM and then benthic macroinvertebrates can be undertaken in the identified receiving habitat to establish if a lasting adverse effect has occurred (or is likely).
75 In tandem with the above point, please describe possible remediation measures that can be adopted in the event of a sediment release to freshwater.	In these farmed stream environments sediment discharge is a frequent event, although rarely on a large scale. The benthic fauna usually recovers rapidly. While there have been exploratory uses of sediment vacuums (in urban sites) and one example we monitored through TG in the Ration catchment, it is unlikely a discharge event will be of such a scale as to affected 100's of meters of intermittent / perennial stream. We feel it is that magnitude of a discharge that, in these streams would warrant active cleaning. If such a magnitude of effect was to occur in the Mangaroa or Makakahi tributaries then a vacuum truck may be an option if truck access is available.
76 Regarding the proposed freshwater offseting, please provide the following information: b. The location, area (ha) and timing of the freshwater offset. c. The proposed planted species composition and spacing. d. A description and quantification of what is meant in the ecological assessment as "improvements to substrate and flow heterogeneity" at the offset site. What would these restoration treatments constitute? e. The proposed mechanism of legal protection (conservation covenant) of the freshwater offset site to ensure the positive effects are protected in perpetuity. f. The width of riparian planting. On site your ecologist stated that riparian planting would be 20m either side of the stream. Please confirm. g. Please describe and detail the proposed methodology of determining the proposed offset and if it's successful (such as using SEV monitoring).	Appendix 1 illustrates the area considered appropriate as the offset with (for stream effects (250m)) a near 900m linear reach of the main Mangaroa tributary, with a 10m either side revegetation programme, a range of woody weirs installed to cause flow heterogeneity and increase retention, and the deposition of a large amount of small woody debris in stream. The precise treatment we consider better put into an offset design report post consent rather than as notes to a section 92, but the essence will be a seral broadleaf revegetation focused on woody species (makomako, karamu, heketara, tarata, mahoe, kamahi, kanono and mapou) planted at a 1m spacing and planted as 1L plants, with guards and a weed mat and maintained until an 80% canopy cover and absence of serious ecological weeds. In terms of legal protection we envisage a covenant in favour of perhaps Regional Counsel, which is in force while the culverts remain in stream. We consider that 10m either side of this small stream is sufficient to provide all the instream functions and support required,

	and at those dimensions it will be self sustaining[2]. Success, we suggest can be monitored through site inspection to warrant successful riparian development and a post woody installation stream physical habitat assessment. To expect an improvement in macroinvertebrate or fish taxa in anything but a very long time is unrealistic since the source of any new EPT taxa, for example, is very distant and may not in reality ever be able to colonise this stream.
Terrestrial Ecology	
77 There is no general section or comment on terrestrial invertebrates. We note that indigenous vegetation that is likely to be habitat for threatened or at-risk invertebrate species is avoided. Therefore, there are unlikely to be any impacts. We also note the extensive survey undertaken for lizards and birds which could also have resulted in the discovery of invertebrates should they have been present and so we are comfortable that the risks to threatened or at-risk invertebrates is low. However, it would be useful if you could please confirm that the assumption of low risk is valid and provide an explanation as to why.	We confirm that the ecology team on the project also considered the risk to indigenous invertebrate assemblages or taxa was low to extremely low (so low as to be non-existent) because there is no habitat of these taxa in the wind farm envelope. The most likely habitats are in the southern lower-mid gully forest remnants which are untouched by the project.
78 We note and agree that the wetlands within Horizons' region that are likely to be lost are not those that the One Plan 2022 seeks to protect. We also note and agree that the NPS-FM identifies these sites as "wetlands" and therefore the effects management hierarchy is to be followed and, if these wetlands are lost, then some kind of offset or compensatory response is warranted. There is one of these such (non-indigenous dominated boggy ground) "wetlands" that is earmarked as "partially within" the effects envelope in the Greater Wellington Region. We note that the intent is to avoid the "partially within" wetlands. However, the application in general has taken an effects envelope approach to provide flexibility in design and that these approaches usually assume total loss of the values within. There is a condition for 1:1 wetland loss offset/compensation with no upper limit/maximum area for the loss, and no condition specifically specifying avoidance of wetlands in the first instance. Therefore, the loss of the partial extent of "partially within" wetlands remains in scope and avoidance is not the inherent	We have advised, and Meridian have acknowledged, that it is preferable to avoid all and any adverse effects to natural inland wetland regardless of their quality and we identified those habitats within the construction foot print and within 100m of earthworks for that purpose. To that end we can confirm that all of those wetland features identified in the GWRC region, because all of these features only just in or adjacent to the road / tower envelope will be actively avoided, i.e. the actual roading and works are shifted so as to not affect these wetland. Therefore, no wetland identified in the GWRC jurisdiction will be affected. However, the road cannot in all circumstances avoid several of the long narrow features in the Horizons jurisdiction. It remains uncertain how much will be affected until full design and the designs for the road, in particular, we understand will not be concluded until advanced site survey and hence an envelope approach.

[2] Stephanie Parkyn, W. B. Shaw, and Philip A. Eades, "Review of Information on Riparian Buffer Widths Necessary to Support Sustainable Vegetation and Meet Aquatic Functions," Auckland Regional Council Technical Publication (Hamilton: National Institute of Water & Atmospheric Research for Auckland Regional Council, 2000).

strategy. In this way, the application does not clearly show an intent to follow the effects hierarchy with regard to potential wetland loss. Please provide further details on how the hierarchy is followed. The proposal is to compensate for the loss of wetland extent by replacing the wetlands with 1:1 ratio of vastly improved wetland habitat value. This does not seek to limit the total loss of wetland extent, but does seek to adequately compensate for loss of ecological value. This is consistent with the pathway available for specified infrastructure, although this could put the proposal at odds with the Greater Wellington Regional Plan (GWRP) with respect to avoiding loss of extent. We note that the one wetland in the Greater Wellington Region is in the Pahiatua Ecological District, but the proposed wetland restoration sites are on the boundary of the Pahiatua/Woodville ecological District or just inside the Woodville Ecological District. This would also put the proposal at odds with the wetlands effects hierarchy within the GWRP. Please provide justification as to why this has been selected and detail as to why it's included. Please confirm whether it is possible to specifically identify and exclude the "partially within" (and possibly one of the "within") wetlands with a slight adjustment to the effects envelopes (see figures below). If it is possible, the issue with adhering to the GRWP goes away as there would be no potential loss of wetland extent in the Greater Wellington Region, and there would also be a more obvious intent to follow the effects hierarchy to avoid wetlands in the first instance. Has this been considered?	Thus we propose a tally of wetland area affected through construction. The quality (exotic grazed) and complexity of the features likely affected is low and simple and so loss of habitat minimal but more to the point the risk of offset failure low and the "lag" time to recovery low. Any improvement on the other similar features on the farm is a simple matter of revegetation (indigenous) and fencing and management. We have "pointed" to three areas for wetland restoration ass the offset which we consider contribute best to the wider landscape. Appendix 1 has a figure showing where and what these features are. The first is the stream-wetland complex that passes from several small catchment tributaries downstream past the stock yards and could form an offset of 0.78 ha. The second is a long small gully (0.13 ha) which feeds into the dammed wetland with fragmented riparian bush and the third is the upper section of a spring feed gully that while having reasonable lower riparian woody cover has an open expanded "wetland" area (0.12 ha). All three of these features require indigenous vegetation and fencing and management. The current "bank" of wetland offers just over 1 ha. The current identified possibly affected wetland sums to less than 0.3 ha. At the 1:1 offset ratio (see below)(this is sufficient offset for even the worse case.
79 With regard to the 1:1 wetland loss compensation approach and reference to previous examples (cited in Appendix C of the Consent Application, Section 9.2, paragraph 4), have the previous examples been backed by a model or other objective approach to establish that this is a fair ratio? If so, please provide that evidence which may include details of the models.	If adverse effects do occur and cannot be avoided, then we have recommend a 1:1 ratio of offset based on the size and condition of the affected wetland. In other examples we have been involved in such as M2PP, we used a 3:1 ratio because the wetlands being lost were largely indigenous and somewhat representative of dune slacks, a naturally rare system. That is those losses were of wetlands with much greater ecological value. Those examples where not offsets based on modelling. We use (in the Wellington office) a standard set of compensation / offset ratios which are 1:1 for early serial and highly degraded examples, 3:1 for young seral and good condition examples, 6:1 for middle to older seral and high integrity examples and 12:1 for old complex systems in good condition. We have found that these ratios are

	reasonable and when we have had to model an offset using for example the DoC model [3] that our ratios stand up well. We consider that taking a linear "drainage" wetland with perhaps 1 native species and causing an equal linear length (or area) of wetland to be revegetated in dense plantings of numerous indigenous species: several rush taxa, several sedge taxa, raupo, Eleocharis, and Machaerina (where appropriate) as well as edge protection from harakeke, Ti koura and pukatea, then that is more than sufficient and well in advance of anything these exotic small sediment wetlands could achieve without assistance even if farming patterns and effects substantially changed. The referenced successes have been most recently related to the Mackays to Pekapeka motorway where we caused through offset the creation of 4 ha of various types of wetland to offset 1.8 ha which was infilled or lost to the road.
80 Please confirm whether the wetland offsets/compensation sites involve any other third party other than the landowner/occupier of the land that the windfarm is on (i.e., does it require the permission of the neighbouring properties?).	They do not, all are on the property on which the windfarm is proposed and on the same landowner. However, there remains scope to reorganise which wetland features are the focus of an offset as there are a number of potential features in close proximity that for the requirements.
81 The effect on pipits is identified as "low" (Appendix C of the Consent Application, end of par 4, Section 8.5.2, pg. 83), whereas Table 36 identifies the effects as "very low". Mr James Lambie is of the view that "very low" is the correct assessment using the EIANZ framework and therefore it is understandable that you have not suggested a condition requiring pre-clearance surveys even though farmland tracks are prime real estate for this high value species. However, disturbance of nesting pipit may be avoidable in the first instance through a condition that requires the grass to be maintained (through grazing or mowing) at a low height and for pre-clearance checks if the grass is suitably tall. Have you considered this as a possible methodology?	We accept and concur that so long as the grassed landscape remains well managed and grazed including the tracks then the opportunity for pipit to be nesting is remote. The inclusion of a condition requiring appropriate pasture management within the proposed construction envelope to remove the potential for pipit nesting prior to construction is recommended.
82 The application states that the effect on lizards is likely to be very low (Appendix C of the Consent Application,	We accept that an accidental discovery protocol is at least advisable even while

[3] F. J. F Maseyk et al., "A Disaggregated Biodiversity Offset Accounting Model to Improve Estimation of Ecological Equivalency and No Net Loss," *Biological Conservation* 204 (2016): 322–32.

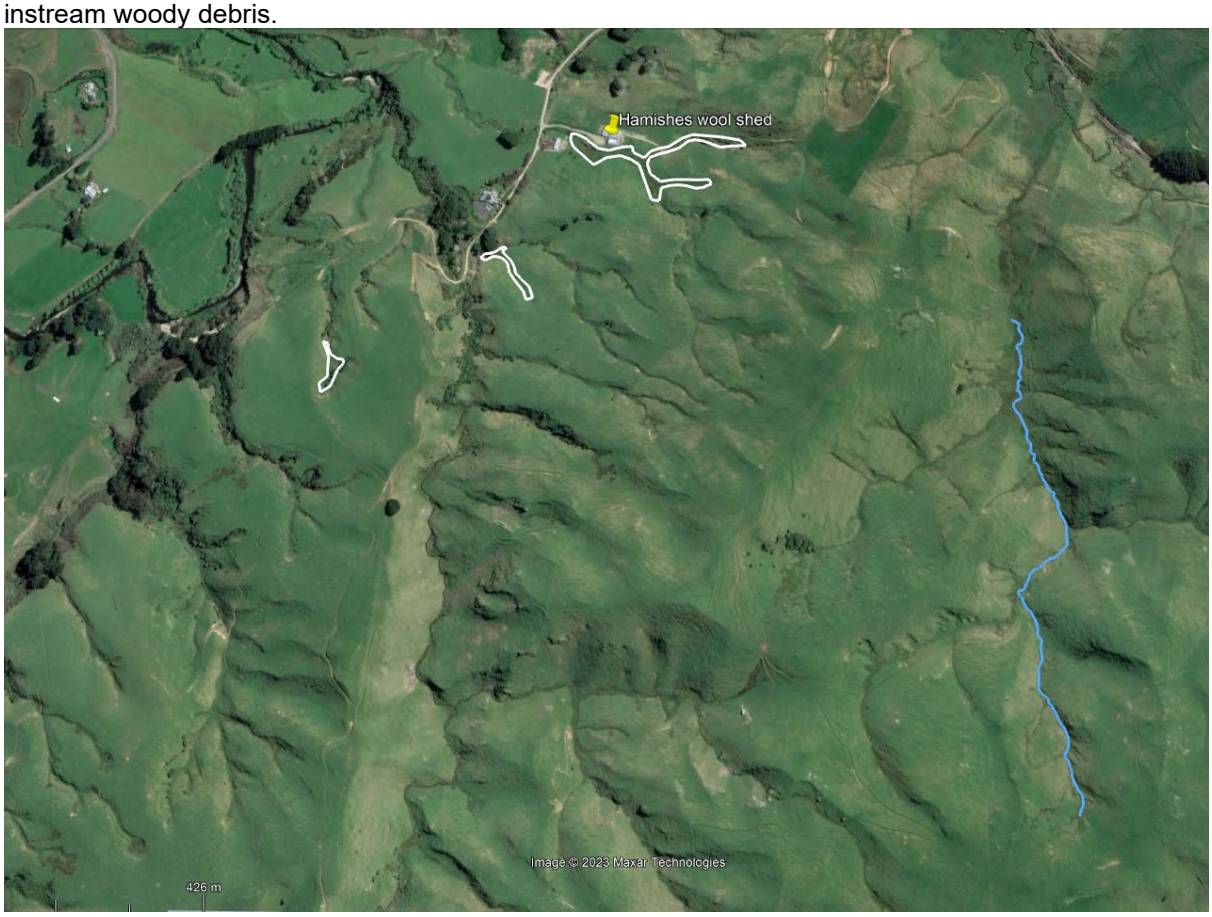
Section 8.4.1) and that mitigation is not warranted (Section 9.4). Nevertheless, a permit under the Wildlife Act is likely to be required, and that permit may have conditions (Section 9.4). Have you considered whether it may be appropriate for the Regional Councils to view this permit prior to commencing construction activity? Please also advise if you have considered whether an accidental discovery protocol should be included in order to reduce effects on lizards even further.	considering the risk of discovery and effect is remote. As to the need for the Regional Counsels to cite a Wildlife Act permit, we are unsure of the need for this, but cannot see an issue with such a curtesy, but we do not see that it needs to be a condition of consent. A permit will be required if, once detailed design is complete, areas identified as lizard habitat (as per the AEE) are affected, but that may not be the case.
83 With regard to the proposed Regional Council Ecological Condition 16 – it would be in keeping with the effects hierarchy that the total anticipated unavoidable effect of 0.32 hectares of wetland loss be specified here as the upper limit. The condition could also specify that a lesser amount of replacement is anticipated if there is a lesser loss of extent. Have you considered setting limits to manage the potential effects based on the envelope approach?	If through this process the engineering aspect cannot form a solid opinion as to which wetlands are to be avoided then we agree that an upper limit of 0.32 ha of natural inland wetland to be affected be set by way of condition and that the condition be written to enable a sum of affect to be made thro9ugh construction such that at the end the total that is actually affected be then the offset target. It is possible that through detailed design post consent more or all of the natural wetlands are avoided.
84 Please clarify what is meant by "…for 5 years…" in proposed Condition 19 in terms of the frequency of inspection and maintenance in any given year. We note that the site is likely going to require at least a spring and autumn inspection for weed clearance. It also would aid certainty if the wetland vegetation restoration condition specified a target (such as 80% indigenous canopy cover) as a logical, reasonable, and measurable extension of the "net gain" principle of offsetting to demonstrate fulfilment of a compensation outcome.	Condition 19 states that the management (required by condition 17) of the offsets wetlands must be for 5 years (in condition 17), not that 5 years is the frequency of inspection and maintenance. That is management will be for 5 years, but the condition should also say …or until the wetland revegetation succeeds in forming an 80% cover as viewed from above. Re the wetland offset and stream riparian revegetation, we agree and as noted above for the stream offset, a programme of planting and maintenance would be established by way of a management plan (required by the condition?) and that should contain measures of success, one of which would be a suitable cover target for revegetation. For a wetland rehabilitation however, this may not be of canopy cover, but rather of plant cover as the cover may be a low growing wetland species.
85 In terms of proposed Condition 21, have you considered the inclusion of a mechanism that would show that the plantings are not being counted twice given that the wetland planting is to be conjunction with stream planting (perhaps through reporting on areal extent of wetland loss and wetland planted)?	We concur with that requirement and had envisaged that the stream in Mangaroa tributary valley and the wetlands in the small catchments westward where distinct and shown as separated in the AEE. A condition clarification to that end is supported.

86 Please provide clarification on the conclusion presented in Appendix C, Consent Application, Section 9.1. It appears that the assertion that there is "…unlikely to be any adverse effects…" only refers to the loss of indigenous terrestrial vegetation and not fauna or wetlands (which are listed later). Is this the correct interpretation?	That is correct – there will be no adverse effects to any terrestrial vegetation / habitat, all other aspects have effects or potential effects which are addressed.

Appendix 1. Stream and wetland offsetting locations

The basic Stream “offset” approach, 900m with 10m either side, fenced and revegetated in seral broadleaf woody species (makomako, karamu, heketara, tarata, mahoe, kamahi, kanono and mapou).

In addition a range of small wood weirs installed to create flow heterogeneity and supply a large biomass of instream woody debris.



The white areas are the set of wetland areas that would form the offset where and depending on how much of the natural wetlands identified are in fact affected by the final road alignment and installation works (we understand that many identified in the envelope will be avoided).

Appendix 2 Aquatic hydro-class map