

# MIKE MOORE

*BSc, Dip LA, MRRP, ANZILA*

LANDSCAPE ARCHITECT

## Memorandum

To Craig Shearer

From Mike Moore

Date 23 October 2018

**Subject Proposed Kaimai Wind Farm, Section 92 request response**

Further to your email dated 16 August 2018, I respond to the HDC S92 request as follows. The request text is copied in italics with my response to each point provided below.

### **Report No 12 – Landscape and Visual Effects Assessment Report**

*Within the report Thorpe Road should be Thorp Road.*

Noted.

*Please provide further consideration of the visual effects of the quarry activities with the site*

Details as to the quarrying and clean-filling activities have become clearer recently and I assess the visual effects of these as follows:

A quarry is proposed on the top of the spur to the north of and adjacent to, turbine 10 and is adjacent to Proposed Road 3 to its east. This spur is at a height of 240 – 250m in this vicinity and the spurs to both east and west are higher, reaching approx. 300m. The spur top landform is relatively broad with minor rocky promontories. The vegetation cover is mainly pasture but there is also a small exotic woodlot and the quarry area will impact a few scattered native trees in an area identified in the ecology report (Kessels Ecology, 2018) as secondary broadleaf treeland. Whilst cross sectional details of the quarry have not been

provided, it will essentially lower the ridge landform by up to approximately 10m. A mobile crusher will be on site at times.

The landscape effects of the quarry will be to modify the natural landforms and the existing vegetation cover. Along with the turbines and associated earthworks, the quarry will be a further element that modifies the existing naturalness of the rural landscape character. It is intended however, to immediately rehabilitate the quarry following the construction phase of the project and it is my recommendation that this should include:

- Leaving any final quarry rock faces with as irregular / natural form as practicable, including reducing the coherence of any benching.
- Modifying the landform as required to blend as naturally as possible with adjacent landforms.
- Spreading overburden and soil and re-sowing in pasture grass.

In the context of the wind farm generally, this additional modification will be of only low significance.

In terms of visual effects, the quarry site is located on the ridge top to the west of Romaru Stream. This ridge is generally lower than those either side and the end of the ridge also provides substantial screening from viewpoints to the south. Visibility generally, is therefore low and the only areas potentially impacted is where views up the valleys between turbines 13 and 14, and 14 and 15 are possible from the Rawhiti Road / State Highway 26 vicinity. The quarry will not be visible in any of the simulations prepared with the possible exception of B9 and B12. From these viewpoints however, given the viewing angle, any additional effects beyond those associated with forming the platform for Turbine 10 will be minimal. Likewise, any visibility from other viewpoints on Rawhiti Road, State Highway 26 or dwellings in the area to the southwest of the wind farm will be low.

In the context of the proposed development generally, and assuming immediate rehabilitation as recommended, the quarry will not significantly increase the landscape or visual effects of the wind farm, particularly given its low levels of visibility. I would not modify any of the effects ratings already given.

The clean fill sites are illustrated in the KGA Geotechnical report dated 17 October 2018 and are largely located in gully and hollow landforms on more gently sloping, stable land. A number of representative cross sections are shown in this report. It is intended that the clean

fill sites are to be spread with topsoil and sown in pasture immediately following completion, to blend with the surrounding land. Not all sites will be 'open' at the same time.

The clean fill sites will add to the adverse visual effects of the wind farm during the construction phase but their medium - long term landscape and visual effects will be minimal as long as they are integrated with sensitivity to the landform and do not read in the landscape as obviously artificial landforms. If appropriately formed, they will blend unperceptively with the farmland surrounding. Given this situation I would not modify any of the effects ratings already given.

*No landscape evaluation of the substation, new transmission lines is provided within the report. Please provide.*

### The substation and pylons

The substation is to be located at the southeast periphery of the site adjacent to the existing power transmission line and on the main Kaimai Range ridgeline. An envelope approach for consenting has been taken as detailed design requirements are not yet known. As described in the Construction Report (Energy3 Services Ltd), a compound will be required to include an electrical control building (up to 5m high) and the associated substation equipment (up to 12m high). The compound will be secured with a 2.4m high fence. The Civil Drawings (see Tektus Plan 212 Rev A) show that the substation is to be located on an L shaped flat platform, built up by up to 10m in some places, approximately 65 x 53m in footprint. There is an existing 110kV transmission pylon in this vicinity and two additional pylons are to be located near the substation. Three indicative pylon options are illustrated in the Construction Report (Energy3 Services Ltd), all lattice construction and approximately 26.5m high. These will have a character generally similar to the existing pylons.

The site for the proposed substation is currently grazed pastureland and there is indigenous forest in the area adjacent within the Conservation Park beyond the property boundary. The existing 110kV transmission line and pylons modify the natural / rural landscape character to a degree. The proposed substation will be approximately 130m from the nearest turbine (turbine 24) and directly adjacent to the access road to this turbine. The biophysical landscape effects of the substation and pylons include modification to the natural landform and the addition of the built elements. The platform batter slopes will be grassed and grazed and will visually blend with the surrounding farmland, although they will clearly read as a

modified landform. The pylons will be similar in scale and character to those currently existing and their lattice construction makes them visually 'light'. The external electrical equipment is also unlikely to be uniformly solid / bulky in character. The electrical control building and any cabinet structures with painted surfaces will be finished in dark colours as discussed in my report (page 10).

In terms of visibility, the substation itself, is screened by landform and the vegetation of the Kaimai Mamaku Conservation Park, from all but westward viewpoints within the lower, settled areas in the landscape below the site. Ridges will screen it from closer viewpoints to the west including Rawhiti Road, and viewing distances will generally be in excess of 6 km. The substation and pylons will be visible from the summit of Mt Karangahake but will be approximately 2.8km distant. This will be the only significant viewpoint within the Kaimai Mamaku Conservation Park impacted, as discussed below. From the east, only the pylons will be visible and will be seen at distances of approximately 3.5km and over. These will be seen, additional to those already existing and the southernmost one at least, will be partially screened.

As regards effects on landscape character, the substation and pylons will introduce another built element on the range top that will further modify its natural / rural character. It will be within the area already significantly modified by farming activity and will be seen as a minor addition to the relatively greater impact of the turbines. The small scale relative to the scale of the landscape, along with the proposed colour treatment of the substation structures will result in low adverse effects on existing landscape character. Likewise, the visually 'light' character of the pylons (see the existing pylons) will have only low adverse effects. The fact that these add to the effect of an existing element (the 110 kV transmission line) rather than introduce a wholly new element also assists in minimizing the landscape effects. In my assessment any cumulative adverse landscape effects associated with the substation and pylons will be very low.

In terms of visual effects, the substation and additional pylons will be either screened or hard to see, from westward viewpoints due to the viewing distance. I rate the effects from this area as adverse / very low. From the summit of Mt Karangahake, these elements will not be visually prominent due to the viewing distance, colour treatments and the visually permeable character of the pylons. Seen in context with the turbines they will be minor elements. I rate the visual effects as adverse / low. From eastern viewpoints, the introduction of two more pylons visible to varying degrees on the ridgeline will further modify natural landscape character but given the low impact of the existing pylons, due to their light, insubstantial

appearance relative to the bushland I do not consider that effects will be more than adverse / low. Seen in conjunction with the proposed turbines they will be a very minor element and will not give rise to cumulative effects of any significance.

### Overhead transmission lines

It is proposed that overhead transmission lines will run between turbines 14 and 15, and turbine 17 and the substation. These will be supported on approx. 12m high double wooden or concrete pole supports with an approx. 6.2m wide head array, and there will be three cables. Whilst these are additional built / utilitarian elements that will further modify the rural landscape, transmission lines of this scale have minimal bulk and low visibility from the viewing distances relevant in this case (i.e. approx. 1km and more). Power line support structures are also common features within the rural landscape and landscape character and visual amenity effects associated with those proposed, are considered to be adverse / very low.

The presence of the substation and pylons and the overhead transmission lines contribute to the overall landscape and visual effects of the wind farm project and have already been factored into the assessments described in my report.

*P45 Although it is noted that the “turbine colour is set by Civil Aviation requirements and is appropriate to mitigate visual effects as the off white colour helps to minimize contrast with generally light sky colours” please explain the potential effect of this colour when viewed against a backdrop of pasture and bush as will be partly the case here.*

When seen against pasture or bush rather than sky, the light colour will contrast more with its backdrop, making the turbine more visually prominent. I am aware of cases where in order to minimize this effect, turbines in some wind farms have been coloured to grade from the standard off-white higher up, to a darker green near the base. In this case, given the multiplicity of viewpoints, backdrops will vary but the turbines will be predominantly viewed with a sky backdrop, particularly from the closer viewpoints. In my opinion, the off-white colour is appropriate in terms of visual effects. I do not favour colour gradation near the base as this cannot be tailored to be effective from all viewpoints, and because it leads to a somewhat ‘fussy’ appearance which I consider does not integrate well with the rural landscape. Again, the colour of the turbines and the extent to which they will be viewed against land rather than sky, was factored into the assessments in my report.

*How is the “2km” sensitive viewpoints cut off arrived at, ie as referenced on P20 and P52. Can it please be explained further as to why those within 2km are likely to be more sensitive than those slightly further or at a greater distance away. Why is a 2km point chosen?*

There is an obvious relationship between viewing distance and the degree of dominance turbines have in views. The 2km distance arises from my assessment as to the degree of dominance the turbines are likely to have in views toward the site. This assessment is based on viewing the site from the various public viewpoints surrounding, aided by the photo-simulations, and envisaging the effects. At approximately 2km or less, it is my assessment that turbines of the scale proposed are likely to be dominant elements in views toward the site. I note for completeness, that the assessment of visual effects is of course, not confined to viewpoints less than 2km from the site.

### **Landscape and Visual Effects Assessment Review by Brown NZ Ltd**

#### **Landscape Effects**

*There is no mention of the substation or analysis of its effects at pp. 15 and 16. Where the “Main Kaimai Range Ridgeline Area” is analysed in terms of its value and sensitivity, and effects on it.*

- *What will the effects of a substation (and access to it) be?*
- *Would these effects compound the High level of effect identified for the turbines?*

These points have been addressed above. I note that as explained above in addressing this issue, the substation will be seen as a minor addition to the relatively greater impact of the turbines. Whilst the substation was not specifically highlighted, my assessment and ratings as outlined in my report have taken account of the effects of the substation, transmission lines, earthworks and roading, as part of the windfarm proposal. These elements do not ‘compound’ the effect of the turbines to any appreciable extent for the reasons addressed above.

- *In relation to the rest of the application, will the juxtaposition of the lower turbines on the Kaimai Range also affect its profile, characteristics and values – in a cumulative fashion, building on the effects of the 7 more elevated turbines in that regard?*

The Kaimai Range divides this area into two primary landscapes and the proposed wind farm affects them both. On the eastern, Waihi Basin side (viewpoints B15 – 19 in particular), landscape character (and visual) effects arise primarily from the group of 7 turbines on the main ridgeline. In some places there is visibility of a few of the lower group of turbines over the top of the intervening ridgelines to the north of Mt Karangahake. In my assessment, the additional effect of these is low due to the degree of screening, distance and associated sense of separation. Overall, I assess the combined landscape effects of the proposal from this eastern side as adverse / high.

However, as mitigation for the upper turbines, the applicant is now proposing to retire the part of the site on the eastern side of the main ridge adjacent to turbines 18 – 21 from grazing, and to actively manage indigenous forest regeneration in this approximately 23.5 ha area. Revegetation on the eastern slopes so that there is eventually no pasture visible on the top of the range from eastern viewpoints would be effective landscape character / visual mitigation in my assessment in that it would remove an existing element (cleared pasture land) that modifies the natural character of the Kaimai Range. This would provide a compensatory positive effect in the longer term that would assist to reduce adverse effects on natural character associated with the presence of turbines 18 – 24. The revegetation would occur progressively and having taken advice from ecologist Simon Chapman, it is my estimation that an approximately 10 year timeframe should be anticipated for the effect of largely coherent indigenous bush cover to the ridgeline to be achieved. In my assessment the inclusion of this mitigation would result in a reduction of the ratings for the combined landscape effects of the proposal, from Adverse / High, to Adverse / Moderate – high. This rating takes account of long term biophysical benefits associated with greater area under forest cover, as well as the landscape character benefits of bushland extending to the range top, as seen from the east.

On the western, Hauraki Plain side of the range, the wind farm will be generally more visible and its entire scale more apparent. From this side the awareness of there being two distinct groups of turbines is variable. From more northerly viewpoints (e.g. simulations B6 and B7) there are clearly two groups of turbines on two distinct landforms. From here, the lower, larger group is dominant and the higher group will increase the overall wind farm impact by increasing the overall geographic spread and extending to the main, more natural and visually sensitive Kaimai Range ridgeline. In my assessment, the additional effect of these is moderate. Overall, I assess the combined landscape character effects from this perspective as adverse / moderate.

From viewing locations more directly west (e.g. simulations B9 or B12), the upper group of turbines is seen alongside and behind the lower group, and is less distinct from it. Both groups are seen on the eastern skyline. From more south-westerly angles (e.g. simulation B5), awareness of the upper group as a separate cluster is also minimal and again, both groups are seen defining the skyline. From these places, the additional effect of the upper group mainly involves an increase in the apparent scale and spread of the wind farm. In my assessment, the additional effect of the upper group from these areas is moderate. Overall, I assess the combined landscape effects from this perspective as adverse / moderate.

- *In a related vein, would any other cumulative effects arise in relation to landscape character and values from the 'upper' and 'lower' turbines, substation, transmission line, roading and earthworks?*

Whilst perhaps not made sufficiently explicit, my assessments have accounted for the effects of the wind farm holistically, including the turbines, earthworks, roading powerlines and substation.

- *Given that 'landscape' is both a biophysical entity and the product of human perception (as described in the NZILA Charter), to what degree does the visibility of the wind turbines – which is addressed separately under Visual Effects – affect the effects ratings under Landscape Character and Values at pages 15 – 17.*

The visibility of the wind turbines is an important factor in determining effects on the character of the landscape within which the site sits. I note Mr Brown's comments in relation to this point, and will address the landscape character effects on various visual catchments in more detail in evidence. For present purposes I record that the order in which the landscape and in turn visual effects assessment is presented in my report does not affect my conclusions as stated for each section. The visibility of the wind farm from the various areas surrounding has been factored into the landscape effects assessment (see pages 15 – 17 of my report).

Visual effects

- What are the cumulative of combined effects of the 'lower group' and the 'Higher Group' for the Paeroa (B1 – B3), SH2 (B6 and B7), Waikino (B16), and Kaimai Mamaku Conservation Park – Mt Karangahake (B20) viewpoints?

My assessment of the combined effects of the two groups of turbines from / on the various viewpoints / viewing audiences noted above are as follows. Given the proposed additional mitigation measure involving revegetation of the eastern slopes discussed above, I have modified the ratings to recognize this where appropriate.

Viewpoint / Viewing audience	Visual effects ratings	Comment
Paeroa / Residents and visitors (B1 – 3)	Lower group: Adverse / Moderate - low Higher group: Adverse / Moderate <b>Combined:</b> <b>Adverse / Moderate</b>	The lower group create the dominant impact but the addition of the upper group in a higher, more natural and visually sensitive location increases the overall geographic spread and impact.
State Highway 2 – west of the ranges / Road users (B6 and 7)	Lower group: Adverse / Low Higher group: Adverse / Moderate <b>Combined:</b> <b>Adverse / Moderate</b>	The lower group create the dominant impact but the addition of the upper group in a higher, more natural and visually sensitive location increases the overall geographic spread and impact.
Waikino / Residents and visitors (B16)	Lower group: Adverse / Low Higher group: Adverse / Moderate - high <b>Combined:</b> <b>Adverse / Moderate - high</b>	The upper group create the dominant impact. The lower group do not add to this significantly due to the degree of screening, distance and associated sense of separation. The proposed revegetation on the eastern slopes of the range will have compensatory positive effects on visual amenity values associated with naturalness and the ratings have been modified accordingly.
Kaimai Mamaku Conservation Park – Mt Karangahake / Park users (B20)	Lower group: Adverse / Low Higher group: Adverse / Moderate - high	The upper group create the dominant impact. The lower group do not add to this significantly due to being well separated from this viewpoint both by elevation and distance and because

	<b>Combined: Adverse / Moderate - high</b>	they will be seen as well integrated with the working rural nature of the western spur landscape. The proposed revegetation on the eastern slopes of the range will have compensatory positive effects on visual amenity values associated with naturalness and the ratings have been modified accordingly.
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- *To what degree would the turbines' dynamic movement compound the close proximity of the turbines in some views, especially for viewpoints like B8 and B10 (northern Rawhiti Rd)?*

The movement of the rotors compounds the visual effects of the presence of the turbines in all cases, but particularly for closer proximity viewpoints. The dynamism of the turbines has been factored into the assessments given.

- *There are markedly different ratings for the B10 viewpoint when employed to assess effects on Rawhiti Rd (p.28) versus "Close Residential / Sensitive Viewpoints – Rawhiti Road – North End" (p.33) in a subsequent part of the report. It is assumed that this relates to the sensitivity of road users versus local residents, but what do these ratings mean in a cumulative fashion for the northern Rawhiti Rd locality?*

As assumed, the different ratings relate to the varying sensitivity of road users versus local residents assumed. I acknowledge that some road users will also be close proximity local residents but believe that the distinction is still valid. I have assessed visual effects as effects on viewers, not localities.

- *In a somewhat different vein, what would the 'adverse' effects of night-time lighting (mentioned by Mr Moore) actually be – subject to active management?*

Based on advice from Peet Aviation, I understand that it is likely that at least 9 or 10 of the turbines, including those at the extremities of the site, will be required by the Civil Aviation Authority to be lit. This would probably include at least 3 on the top group of 7 turbines. Lights are required to be medium intensity red (i.e. not less than 1600 candela) and to flash 20 – 60 times per minute. Lights will be fitted to the top of the nacelles and will be shielded from below. This means that they are unlikely to be visible within approximately 2km but will be visible at

greater distance, up to at least 15km away depending on atmospheric conditions. Where visible, the lighting will modify the natural character of the night sky and of the Kaimai Range to the extent it can be perceived.

As indicated in my report however (page 11), an active aviation light management system is proposed (subject to CAA approval), that activates only when approaching aircraft are detected. I am informed that this lighting system has six different Aviation Authority approvals including those in Germany, Canada and the USA and most likely provides a suitable lighting option providing appropriate risk management under CAANZ Rule Part 77. This means that most of the time there will be no lighting effects. For short periods when aircraft is close enough to trigger them, the lights will be visible, but I am informed that the level of powered aircraft activity over the site would be considered low, if any, during night time. On this basis, I amend the effects rating associated with night time lighting given in my report (page 43), to adverse / very low.

#### Statutory planning Assessment

- *Why have no private dwellings been visited, including that residence identified as being 804m from the nearest turbine?*
- *What would the effects be in relation to the dwellings within 2km of the turbines – given that the viewpoint ratings for effects on those dwellings that have been assessed range from Moderate to High and the report goes on to state that “it is likely that these will be high adverse visual effects from some nearby properties” and that 15 properties are subject to the effects of shadow flicker?*
- *Which properties would be affected in this manner? At the very least, it is important to have and understanding of those properties that would be worst affected by the proposal and the impacts on views needs to be addressed.*
- *What mitigation measures is Mr Moore / Ventus proposing to address any identified effects? On p.45 of his report, Mr Moore states that “Mitigation involving planting is impractical given the scale of the structures but could be considered for offsite locations to screen particular views if desired by affected neighbours”. However, it is unclear where this might be considered necessary and / or appropriate as part of the application.*

The scope of my assessment to date has not included visits to private dwellings. There are a significant number within the 2km range that I have identified as the distance within which the turbines are likely to be seen as visually dominant elements. The approach is intended to be representative as it is not practical to present an assessment from each dwelling

potentially affected, each of which would have its own individual circumstances affecting the rating (e.g. dwelling orientation, other intervening structures and vegetation). It is nevertheless, the applicant's intention to undertake further assessment work in this regard as follows:

- (i) Undertake sample private dwelling visits within the various clusters discussed in my report to confirm the appropriateness of the visual effects assessments made in general. This will require access to be agreed by the owners.
- (ii) Overlapping to an extent with (i) above, identify those dwellings most significantly affected by other amenity factors (noise and shadow flicker) and subject to access being granted, undertake site visits, assessment of the visual effects and possible offsite mitigation tailored to the circumstances of the property concerned.
- (iii) Respond to requests by submitters for site specific assessments as the consent process continues.

With regard to the last bullet point, it is proposed that the efficacy of off-site planting mitigation is explored with affected land owners / residents as the consent process continues.

### Conclusion

*The Moore report concludes by determining that:*

- *The upper 7 turbines would have an adverse and high level of effect on landscape character and values;*
- *The lower turbines would have an adverse and moderate level of effect on landscape character and values;*
- *Other 'amenity' effects would range from adverse and low to adverse and high, with local residents most affected by the proposed wind farm.*

*However, it is unclear what these findings mean in terms of overall acceptability of the proposal from a landscape standpoint:*

- *What level of effect would the combined turbines, substation, transmission line, roading, earthworks and mitigation (if any) have?*
- *With reference to the King Salmon decision of the Supreme Court, the question of 'avoiding' all adverse effects may not be relevant to assessment of this application as we are not dealing with an ONL in the Coastal Environment; even so, "protect" probably still means*

*“protect”, with reference to section 6(b) of the Resource Management Act. Consequently, a broad judgement about the acceptability of the wind farm needs to be made. This relates to both section 6(b) and the various statutory instruments devolved from it, at both the district and regional levels (as set out in Appendix A of Mr Moore’s report).*

The landscape and visual effects assessment has considered all aspects of the project (i.e. including earthworks, substation etc) in rating the nature and magnitude of the effects.

It is agreed that a broad judgement about the acceptability of the wind farm is required. Landscape and visual effects assessment findings as to the nature and magnitude of the effects will inform this judgement but so will many other factors and statutory documents, all of which will have relevance in determining whether or not the proposed development should proceed. I understand that this is a matter that will be addressed in planning evidence and legal submissions at the hearing of the application. I note that the statutory instruments of relevance to section 6(b) (set out in my Appendix A, as also referred to by Mr Brown), are addressed in my report in any event.

Mike Moore

Registered NZILA Landscape Architect