MEMO		Roaring40s Wind Power
To: Expert Panel considering Contact Energy Ltd's application for approvals regarding the Southland Wind Farm proposal		
From: Paul Botha Roaring40s Wind Power		
Subject: SWF – New Zealand wind farm database		**12 December 2025**

In response to the Panel's request for Contact Energy Ltd to *"prepare a landscape-focussed 'stocktake' table of the Project compared to other wind farms referenced in the landscape evidence"*, I have compiled a database of the relevant operational and consented wind farms in New Zealand. The database has 20 columns of information per wind farm site and the information in each column is described below under the separate headings.

The general methodology for compiling the database was as follows:

- I started with a database which included the general location of all operational wind farms in New Zealand, which I had previously prepared for other purposes.
- I added several more recently consented and under construction projects to that database, to complete the list of the wind farms referenced in the technical assessments of Mr Coombs (Isthmus) and Mr Bray (Wayfinder).[1] I also added two consented projects specifically requested by the Panel (namely Puketoi Wind Farm and Kaiwaikawe Wind Farm), as well as relevant others as discussed below.
- For each of those wind farms I obtained the locations of the individual wind turbines within the wind farm. A number of these I had already obtained and verified but other wind turbine co-ordinates were obtained from consent documents (where the project was not yet constructed) and aerial imagery (constructed projects).
- One of the variables requested by the Panel was the distance to the closest non-sealed road. I have not been able to accurately determine that distance for each wind farm for the reasons described below. The road database I have access to (from LINZ's Data Service) does not differentiate between private un-sealed roads and public ones. It is therefore not possible from that information to determine where the closest public non-sealed road ends, and a private access begins. To illustrate this, I use an example from Turitea Stage 2, Turitea Stage 1, Te Rere Hau and Pahiatua all shown in **Figure 1** below. The dotted pink lines are unsealed roads. As can be seen from the Figure, the wind farm tracks in Te Rere Hau and some of the Turitea Stage 1 tracks are shown as unsealed roads. At some point in Turitea Stage 1, South Range Road (which is public) ends and a private road starts. It is difficult to discern where that is exactly, in the time available. Likewise North Range Road, shown as an

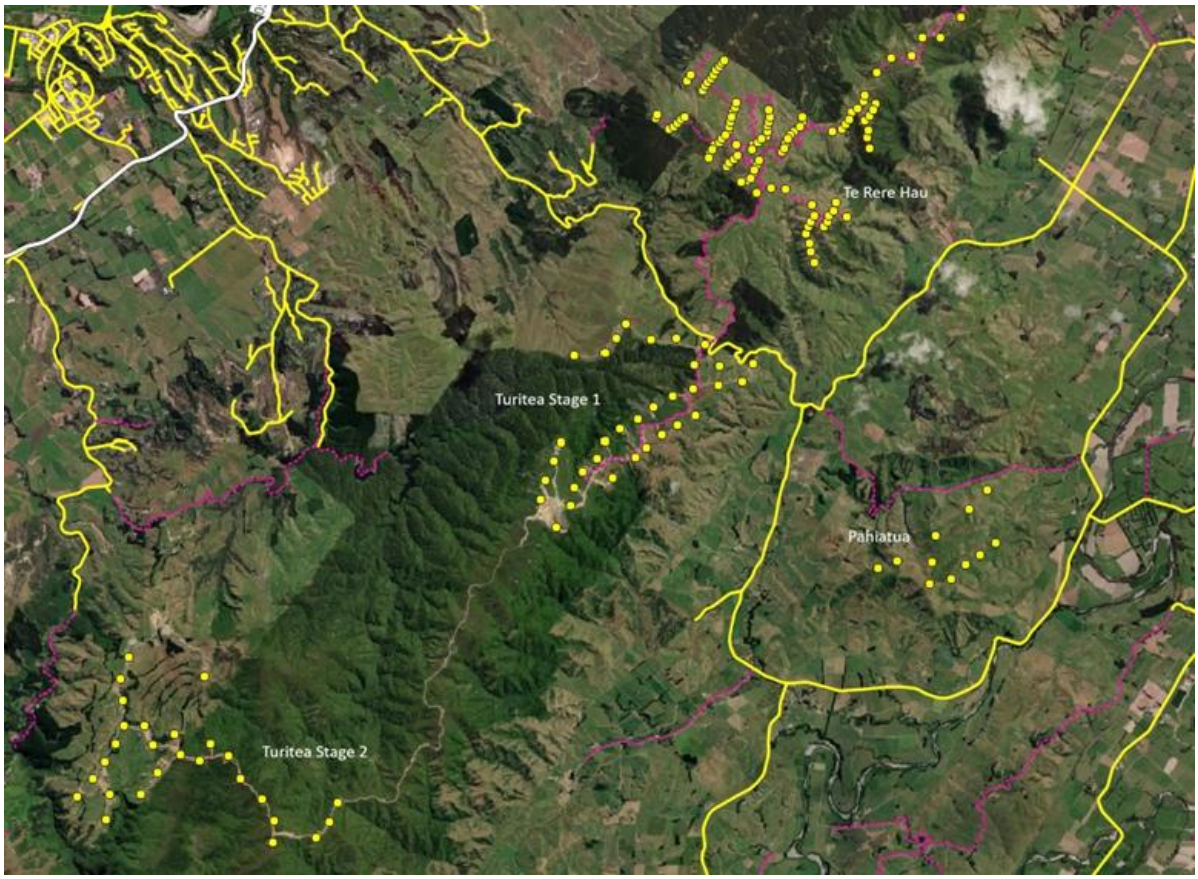
[1] The list is taken from the main body of those assessments. Mr Bray's appendix refers to various other projects in which he has been involved; if the Panel would like this exercise expanded to cover other projects, that can be achieved.

unsealed road, heads towards Te Rere Hau, however the change from public to private road cannot be determined from the LINZ road database. The unsealed road to the west of Turitea Stage 2 appears public as there are houses there, but it may also be a private right of way. A number of the wind farms have unsealed farm or forestry tracks within close proximity and the transition from public to private road is unknown.

- The last three columns in the database have been completed by Brad Coombs of Isthmus and Shannon Bray of Wayfinder.
- Mr Coombs and Mr Bray have reviewed this memorandum and the table more generally to verify the details of the projects with which they are familiar, from their previous work. Buddle Findlay has also completed a search of relevant wind farm consent decisions to assist in the completion of the database.
- The completed database is attached in **Appendix 1**.

Some more specific comments in respect of each of the fields in the table are set out below.

Figure 1. Example of un-sealed roads around wind farms.



Columns 1 and 2 Wind farms included in the list

I commenced this process shortly after the Panel's Overview Conference, before Minute 3 was issued on 4 December 2025. As such, I started with a long list of projects; I initially listed all operational wind farms (including single wind turbines), however the list of operational wind farms was narrowed after the helpful guidance in Minute 3 was issued. The list now includes all the

projects noted in the body of the reports by Mr Coombs and Mr Bray. I have also included Kaiwaikawe, Puketoi, Waipipi, Harapaki, Te Rere Hau repowering, Pahiatua and Mt Munro, the first two being specifically requested by the Panel for inclusion, the latter three being the most recently approved wind farm consents. Waipipi and Harapaki are two other wind farms constructed in relatively recent times. I have treated the Te Rere Hau Repowering and the Te Rere Hau Aokautere Extension as a single project, despite these being two separate applications and approvals, both under the COVID-19 Recovery (Fast-track Consenting) Act 2020.

Two previously consented wind farms, among those discussed in the expert assessments, have not been included on the list, namely Long Gully and Motorimu. The Long Gully proposal was for 25 two-bladed Windflow turbines and was granted consents in 2010, which have now lapsed. The turbines proposed would have had a tip height of 46.5m and significantly smaller than turbines being consented and installed in New Zealand now. The Motorimu wind farm proposal was originally for 127 wind turbines, with a maximum tip height of 81m. Consent was originally granted for 75 turbines in 2007 with the granting of a further four turbines as a result of an appeal on the original decision. The Motorimu wind farm consent was surrendered by Mighty River Power (now Mercury) during the Board of Inquiry hearing for the Turitea wind farm. Again, the scale of the turbines in the Motorimu consent were significantly different to turbines currently being installed in New Zealand. Being consents from approximately 15 years ago, which are no longer in existence, relevant information was difficult to compile.

Where wind farms have been built in different stages, those stages have been listed separately.

If the Panel would be assisted by information regarding any other wind farm, this can be provided.

Column 3 Wind farm status

The wind farm status identifies whether the wind farm is operational, under construction or consented. As Kaiwera Downs is being built in stages, it is listed twice with stage 1 operational and stage 2 under construction. SWF has been listed as 'Application lodged'.

Columns 4 – 11 Wind farm and wind turbine characteristics

These eight columns include several characteristics on the wind farm and the wind turbines installed. For all operational wind farms and those under construction the turbine dimensions tabulated are for the turbine models installed or being installed rather that the consented turbine dimensions. For the consented but not-yet-built projects, I have included the consented wind turbine dimensions. The Puketoi and Mt Cass project sites were originally consented several years ago and it is difficult to find information on variations completed subsequently. I note that the Puketoi Project is listed in the FTAA for future variations. For both these projects, I have set out the most recently publicly available information that I could find on those projects, including in terms of wind turbine type and layout.

Wind farm characteristics listed in the table include number of turbines, individual turbine capacity (MW), wind farm capacity (MW) and year installed. Where the wind farm is not yet built, the year installed is represented by the year of consent. For projects under construction, I have listed the year of expected commissioning.

Wind turbine characteristics include turbine hub height (m), rotor diameter (m), tip height (m) and rotational speed (rpm).

Column 12 Closest non-wind farm landowner dwelling

The distance to the closest non-wind farm landowner dwellings is the shortest measured distance between a turbine tower and the closest house, where known. Any other relevant information discerned from consent decisions (for example distance to closest town or location of larger number of dwellings) is also included. For sites I have worked on, I have measured the distance off Google Earth where it was not readily available from other documentation (landscape, noise, shadow flicker assessments or site drawings). For some sites (e.g. Turitea 1) the closest house is visible in Google Earth and can be easily measured, however it is generally not possible to tell whether that house is associated with the wind farm development or not. In this case I have listed the closest residence and made a note that it may be associated with the project. In some cases, houses, sheds and other non-inhabited building structures are difficult to discern from each other and therefore the distance to what is clearly a house has been tabulated. There is a very small chance that a closer building could be a dwelling however this would only reduce the distance.

Column 13 Nearest adjacent wind farm

The tabulated distance to the nearest wind farm is the distance between closest turbines on adjacent wind farms. For Harapaki, as that project is under two separate consents (issued to different parties originally), I have listed the consented distance apart. For the Te Rere Hau and the Tararua wind farms, which were built in 3 stages each, I have listed the distance to a neighbouring wind farm rather than one of the other wind farm stages. For each of the two stages of Turitea and the Kaiwera Downs projects I have listed separate distances as the stages in each are known. In listing the distance to the closest wind farm, I have included the name of the “neighbouring project” in Column 13. I have not listed a separation distance where the closest wind farm is further than 10km away.

Column 14 Nearest state highway

For the 'distance to the closest state highway', I have measured the straight-line distance between the turbine within the wind farm which is closest to a state highway. For the three stages of the Te Rere Hau wind farm and stages one and two of the Tararua wind farm, I have used the same distance to the closest state highway as I am uncertain which turbines were built in each stage and therefore have used the same distance for all three stages. For Turitea and Kaiwera Downs, I have listed different distances for each stage as the turbine locations in each stage are known.

Column 15 Nearest sealed road, other than state highway

This field does not consider state highways as that data is in column 14. As discussed above, the database used for sealed roads is the LINZ Data Service 1:50,000 road database; for this field I filtered that data to show sealed roads only. For wind farms built in stages, I have used the same logic as I have for deriving the distance to state highways. Two wind farms had some of the wind

farm tracks shown as sealed (West Wind and Mill Creek) and as I know much of them are not sealed I have taken the distance to the closest public sealed road.

Column 16 Landscape feature height range

In order to determine the "Landscape Feature Height" I have adopted the following approach:

1. I used the 1:50,000 topographical maps of New Zealand which show elevation contours at 20m intervals.
2. I determined the terrain elevation of the highest and lowest wind turbine in each wind farm. This is the elevation of the base of the turbine in meters above sea level.
3. I determined the height of the terrain surrounding the landscape feature, typically the lower ground in the surrounding area and within about 5km of the wind turbines. This was also determined in metres above sea level.
4. I have then calculated the "Landscape Feature Height" by subtracting the surrounding terrain height (3 above) from the turbine base height (2 above). Given I have done this for highest and lowest turbines within the wind farm, the "Landscape Feature Height" has been expressed as a range in meters.
5. Note that for two wind farms, Waipipi and Kaiwaikawe, the surrounding terrain is very flat and can be higher than the base of the lowest turbine which yields a negative value for the "Landscape Feature Height". I have tabulated the negative value.
6. Mr Coombs and Mr Bray then reviewed the data in this column.

Column 17 Tip height / landscape feature height

This parameter is the ratio of the turbine tip height to the "Landscape Feature Height" and expressed it as a percentage. It has been derived from the tip height (column 10) and the Landscape Feature Height (Column 16). As the "Landscape Feature Height" has been represented as a range, I have expressed this ratio as a range too. As stated above for Waipipi and Kaiwaikawe, the calculation of the "Landscape Feature Height" resulted in at least one negative value. In order to represent the ratio as a positive range in Column 17, I have simply taken the absolute value of the Landscape Feature Height to represent a positive ratio. Mr Coombs and Mr Bray reviewed these values as well.

As such, the exercise I have undertaken is based on measurement and mathematical calculations. In reviewing the table, Mr Bray wished to emphasise to the Panel that, from a landscape architect's perspective, the potential effects of wind turbines on the receiving landscape cannot solely be assessed by refence to these mathematical values; rather, the effects of each project on each site will vary due to numerous factors, and the relationship of the turbines to the landform must be considered as part of a broader assessment.

Column 18 Landform type

As noted above, columns 18, 19, and 20 were completed by Mr Coombs and Mr Bray.

The description of the landform describes the basic geological land building process or outcome of the main underlying landform of the wind farm site. The majority of consented and operational wind farms in New Zealand are on ridgelines, with cuesta landforms being common, due to the

(relatively) gentle dip slope providing elevation, without the need for heavy earthworks to form roads and turbine pads. Other landform types are uplifted block ranges and coastal terraces.

Column 19 Landscape character

The description of the landscape character is a simple characterisation of the main/dominant land use on the site, generally working rural, with either pastoral or plantation forest land cover. Some sites include remnant indigenous vegetation or coastal scrub, which is noted where it is a key attribute of the site.

Column 20 Presence of ONF / ONL

Where an Outstanding Natural Feature (ONF) or Outstanding Natural Landscape (ONL) is confirmed in a District or Regional planning document, it is noted. In some cases the planning process identifying the ONF or ONL took place after the relevant wind farm was consented. In some other cases an ONL or ONF classification is not confirmed in a planning document, however landscape witnesses and/or decision-makers in respect of the wind farm confirmed the likely presence of an ONL / ONF. In the cases of Puketoi and Turitea, for example, the sites were not classified as an ONL / ONF in planning documents, however landscape witnesses and the decision-makers concluded that the wind farm sites or parts of them qualified as ONL / ONF. ONL / ONF areas confirmed in a decision are not generally mapped, but are described, for example, the Turitea wind farm site where areas were described as outstanding in the BOI decision. Where an ONL / ONF is close it is noted, with the distance.

Kind regards

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APPENDIX 1. Database of selected wind farms key characteristics.

1 No for SWF Panel	2 Wind Farm & District	3 Status	4 Turbine No	5 Turbine capacity (MW)	6 Wind Farm capacity (MW)	7 Year installed / consented	8 Hub height (m)	9 Rotor diameter (m)	10 Tip height (m)	11 Rotational speed (rpm)	12 Closest non-wind farm landowner dwelling	13 Nearest wind farm	14 Nearest State Highway	15 Nearest sealed Road, other than SH	16 Landscape Feature Height Range (m)	17 Tip height / landscape feature height (%)	18 Landform Type (Area & topography)	19 Landscape Character	20 Presence of ONF/ONL
1	Tararua (Stage 1) Tararua District	Operational	48	0.66	31.68	1999	50	47	73.5	28.5	2.1km	1.7km - Te Apiti	700m - SH3 (Gorge) 2.1km - SH3 (new)	1.6km	260 - 300	25% - 28%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral.	Yes
2	Tararua (Stage 2) Tararua District	Operational	55	0.66	36.3	2004	50	47	73.5	28.5	2.1km	2.3km - Te Rere Hau	4km - SH57	1.6km	260 - 360	20% - 28%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral.	Yes
3	Te Apiti Tararua District	Operational	55	1.65	90.75	2004	70	72	106	17	720m. Ashhurst 2.5km. Woodville 4.8km	1.5km - Tararua Stage 1	600m - SH3 (Gorge) 50m - SH3 (new)	62m (Saddle Road)	160 - 320	33% - 66%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral, with remnant indigenous vegetation.	Yes
4	Te Rere Hau (Stage1) Tararua District / Palmerston North City	Operational	5	0.5	2.5	2006	30	33	46.5	51	1.1km	360m - Tararua Stage 3	5.8km - SH57	950m	240 - 400	12% - 19%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral. Coastal.	Yes
5	Tararua (Stage 3) Tararua District / Palmerston North City	Operational	31	3	93	2007	65	90	110	8.6-16.1	1.4km	360m - Te Rere Hau	2.2km - SH57	1.4km	220 - 420	26% - 50%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral.	Yes
6	White Hill Southland District	Operational	29	2	58	2007	67	80	107	9.0-16.7	1.5km		5.8km - SH94	2.3km	290 - 470	23% - 37%	Strike ridge – tilted cuesta	Working rural - pastoral. Coastal.	No
7	Te Rere Hau (Stage2) Tararua District / Palmerston North City	Operational	60	0.5	30	2008	30	33	46.5	51	1.1km	360m - Tararua Stage 3	5.8km - SH57	950m	240 - 400	12% - 19%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral. Coastal.	Yes
8	West Wind Wellington City	Operational	62	2.3	142.6	2009	67	82	108	6.0-18.0	770m. South Makara Rd 1.2km. Makara village 2.1km.	2.5km - Mill Creek	6.8km - SH1	520m	60 - 350	31% - 180%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral and regenerating coastal scrub.	Close. 500m
9	Te Rere Hau (Stage3) Tararua District / Palmerston North City	Operational	32	0.5	16	2011	30	33	46.5	51	1.1km	360m - Tararua Stage 3	4km - SH57	950m	240 - 400	12% - 19%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral. Coastal.	Yes
10	Mt Cass Hurunui District	Consented	22	4.3	94.6	2012	76.5	120	136.5		900m (may be part of project)		4.7km - SH1	860m	340 - 460	30% - 40%	Cuesta dip slope	Working rural - pastoral. Coastal.	No
11	Puketoi Tararua District	Consented	53	4.3	227.9	2013 (lapse May 2031)			160		780m (may be part of project)		18km - SH2	900m	250 - 370	43% - 64%	Cuesta dip slope	Working rural - pastoral. Coastal.	Yes. Skyline only. Confirmed in the decision.
12	Mill Creek Wellington City	Operational	26	2.3	59.8	2014	67	82	108	6.0-18.0	800m. 1.1km to Makara Beach	2.5km - West Wind	5.6km - SH1	970m	70 - 220	49% - 154%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral. Coastal.	Close. 500m-600m

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13	Flat Hill Invercargill City	Operational	8	0.85	6.8	2015	55	52	81	14.6-26.2	780m (may be part of project). Bluff 3.7km.		1.3km - SH1	3km	40 - 60	135% - 203%	Granite hill	Working rural - pastoral. Coastal.	Yes
14	Waipipi South Taranaki District	Operational	31	4.3	133.3	2021	95	130	160	6.5-12.5	1.1km. Patea 4km.		2.0km - SH3	1.0km	-40 - -20	800% - 400%	Coastal terrace	Working rural - pastoral. Coastal.	No
15	Turitea-Stage1 Tararua District / Palmerston North City	Operational	33	3.6	118.8	2022	69	112	125	8.1 - 14.0	560m (may be part of project). 850m. Turitea 4km.	1.7km - Te Rere Hau	6.3km - SH57	85m (Pahiatua Track)	170 - 330	38% - 74%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral and plantation forest with some remnant indigenous vegetation.	Yes. Partial – confirmed in the BOI decision.
16	Kaiwera Downs 1 Gore District	Operational	10	4.3	43	2023	77	136	145	4.9-10.4	1.1km	10km - Proposed SWF	2.3km - SH93	4.6km	200 - 260	56% - 73%	Dissected Cuesta dip slopes. Southland syncline.	Working rural - pastoral and plantation forest.	No
17	Turitea-Stage2 Palmerston North City	Operational	27	3.8	102.6	2023	69	112	125	8.1 - 14.0	800m. Turitea & Linton 5km.	8.3km - Pahiatua	5.4km - SH57	1.0km	210 - 450	28% - 60%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral and plantation forest with some remnant indigenous vegetation.	Yes. Partial – confirmed in the decision.
18	Harapaki Hastings District	Operational	41	4.3	176.3	2024	85	120	145	5.0-11.2	1.1km	100m (This is under 2 consents)	460m - SH5	3.3km	440 - 700	21% - 33%	Cuesta dip slope	Working rural - pastoral with some remnant indigenous vegetation	Yes
19	Te Rere Hau (repower) + extension Tararua District / Palmerston North City	Consented	39	4.3	167.7	2023 & 2024	102	126	165		780m. Palmerston North 7km.	490m - Tararua Stage 3 940m - Turitea Stage 1	4km - SH57	580m Pahiatua Track	270 - 420	39% - 61%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral and plantation forestry.	Yes
20	Kaiwera Downs 2 Gore District	Under construction	36	4.3	154.8	2026	88	136	156	4.9-10.4	2.1km	4km - Proposed SWF	2.5km - SH93	2.8km	140 - 340	46% - 111%	Dissected Cuesta dip slopes	Working rural - pastoral and plantation forest. Coastal.	No
21	Kaiwaikawe Kaipara District	Under construction	12	6.4	76.8	2026	125	162	206	5.4-9.5	640m. Omamari 3.2km.		2.8km - SH12	1.6km	-20 - 40	515% - 1030%	Consolidated sand dunes / coastal terrace	Working rural - pastoral and plantation forest. Coastal.	No
22	Mt Munro Tararua District / Masterton District	Consented	20	4.5	90	2025	92	136	160		700m. Eketahuna 3.8km.		1.3km - SH2	500m	110 - 240	67% - 145%	Cuesta dip slope	Working rural - pastoral.	No
23	Pahiatua Tararua	Consented (8 WTGs)	8			2025	119	162	200		650m. Pahiatua 5.5km.	3.3km - Turitea	5.3km - SH2	1.1km	70 - 150	133% - 286%	Uplifted Greywacke block range (horsts and grabens)	Working rural - pastoral.	No

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24	Southland Wind Farm Southland District	Application lodged	55			2025	135	170	220		2.3km. Wyndham 12.2km	4km - Kaiwera Downs	8.6km - SH93	2.4km	270 - 520	42% - 81%	Cuesta dip slope. Southland syncline.	Working rural - pastoral and plantation forest with some remnant indigenous vegetation.	Not in District Plan; potential candidate ONF over part of site identified in 2019 desktop study; see technical assessments for details.