Appendix M

Shadow Flicker Blade Glint Assessment

KENTBRUCK GREEN POWER HUB

Shadow Flicker and Blade Glint Assessment

Kentbruck Green Power Hub

Neoen Australia Pty Ltd

2 December 2024

→ **The Power of Commitment**

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GHD Pty Ltd | ABN 39 008 488 373

999 Hay Street, Level 10

Perth, Western Australia 6000, Australia

T +61 8 6222 8222 | **F** +61 8 6222 8555 | **E** permail@ghd.com | **ghd.com**

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1. Introduction

Neoen Australia Pty Ltd have engaged GHD to undertake an updated shadow flicker and blade glint assessment for the proposed Kentbruck Green Energy Hub.

1.1 Purpose of this report

The purpose of this report is to assess the potential shadow flicker and blade glint impacts at 354[1] receptor locations for 105 specific wind turbine generator (WTG) locations proposed as part of the Kentbruck Green Energy Hub (the Project). The Project requires assessment under the Environment Effects Act 1978 through the preparation of an Environment Effects Statement (EES). This report is intended to satisfy the requirements of the Scoping Requirements for Kentbruck Green Power Hub Environment Effects Statement, specifically to assess the potential for significant visual effects from shadow flicker and blade glint and identify measures for mitigating and managing these effects.

1.2 Project overview

The proposed wind farm development is in far Southwest Victoria, approximately 330 km West of Melbourne (Glenelg Shire Council area), as labelled in Figure 1. The proposed development incorporates approximately 8,350 hectares of private and public land and sits around 3 km from Nelson and 17 km from Portland. The proposed wind farm, shown in Figure 2, will have 105 wind turbines and nameplate capacity up to 600 MW, with a hub height of up to 175 m, rotor diameter of 190 m, and maximum tip height of 270 m.

Figure 1 Map showing wind farm location. Source Google Earth Pro

[1] From the original 355 receptors, Neoen subsequently advised that *Receptor 674* is a working shed and not a dwelling, and can therefore be removed from this assessment.

Figure 2 Overview of wind farm arrangement

Coordinates of proposed wind turbines assessed in this report can be found in Appendix A of this report.

1.3 Methodology

GHD has undertaken a desktop-based shadow flicker assessment using the EMD windPRO 4.0 software package against the provided wind turbine layout and sensitive receptor locations provided by Neoen.

The model simulates the path of the sun during the year and can calculate the position of the sun relative to wind turbines, dwellings, and terrain, and thereby predict the possible shadow flicker durations in the vicinity of the wind farm development from a purely geometrical standpoint. This calculation gives the theoretical number of hours of shadow flicker experienced at the dwelling.

1.4 Information provided

An updated 105 wind turbine location model has been used in this assessment and retrieved from the file *'Kentbruck_ Update_061123.zip'* provided by Neoen via email on 5 December 2023.

354 receptor locations modelled are retrieved from the file *'SensitiveReceivers_20230419'* provided by Umwelt via email on 6 June 2023.

Rotor diameter, hub height, and maximum tip height information was provided to GHD via email from Neoen on 12th July 2022.

1.5 Reference documents and assessment requirements

The shadow flicker and blade glint assessment was completed to ensure that the relevant EES Scoping Requirements have been satisfied. These requirements are as specified within Section 4.4 of the Scoping Requirements which require for:

– Identification of key issues of the potential for nearby residents / communities to be exposed to significant effects to the visual amenity, including blade glint and shadow flicker, from project infrastructure.
– Assessment of the landscape and visual effects of the project, including on public and private views, and effects of blade glint and shadow flicker on neighbouring dwellings and communities. Use photomontages and other visual techniques to support the assessment.
– Outlining and evaluation of any potential design and siting options that could avoid and minimise potential effects on landscape and visual amenity of neighbouring residences and communities and additional management strategies that may further minimise potential effects.

It should be noted that no landscape and visual effects of shadow flicker were assessed as per Section 4.4 of the EES Scoping Requirements, as calculations were based on a worst-case shadow flicker, which assumes no coverage or obstacles due to trees or objects. Design and micro-siting options to minimise shadow flicker were not in scope, and the expectation is that there is an appropriate agreement in place with the affected landowner.

In addition to Section 4.4 of the Scoping Requirements, GHD has conducted the shadow flicker modelling in accordance with the current Victorian legislation and guidelines, notably:

– Section 5.1.2 (b) in DELWP's Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (Department of Environment, Land, Water and Planning, November 2021)[2]
– Section 5.1.2 (c) in DELWP's Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria (Department of Environment, Land, Water and Planning, November 2021)

The above guidelines for wind farm development in Victoria state that shadow flicker experienced immediately surrounding the area of a dwelling must not exceed 30 hours per year. In addition, the Draft National Wind Farm Development Guidelines, July 2010 includes acceptable shadow flicker criteria of 30 hours per year (theoretical) and 10 hours per year (expected, including cloud cover).

Exception is given if the operator of the wind energy facility has entered into an agreement with a landowner under which the landowner acknowledges and accepts that shadow flicker may exceed 30 hours per annum at the landowner's dwelling.

In addition to the current Victorian legislation and guidelines, GHD has conducted the shadow flicker modelling with consideration for the objectives outlined in:

– Section 4.4 of the Scoping Requirements for Kentbruck Green Power Hub Environment Effects Statement (EES) (January 2020)

The scoping requirement's main objective is to minimise and manage potential adverse effects on landscape and visual amenity, to mitigate potential issues for nearby residents / communities to be exposed to significant effects to the visual amenity, including blade glint and shadow flicker, from project infrastructure.

The likely effects will assess the landscape and visual effects of the project, including on public and private views, and effects of blade glint and shadow flicker on neighbouring dwellings and communities.

1.6 Scope and limitations

This report has been prepared by GHD for and may only be used and relied on by for the purpose agreed between GHD and Neoen as set out in Section 1.1 of this report.

GHD otherwise disclaims responsibility to any person other than arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

[2] https://www.planning.vic.gov.au/permits-and-applications/specific-permit-topics/renewable-energy-facilities/wind-energy-facilities

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information and data provided by Neoen and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

This assessment has been undertaken based on 105 specific turbine and dwelling locations as provided by Neoen. Development approvals typically allow some degree of flexibility in turbine siting prior to finalisation and micro siting of the turbine locations and construction. Since the turbine siting envelope that is allowed in the development approvals is fairly narrow it is unlikely the final turbine layout will cause material increase in the expected shadow flicker hours stated in the guidelines. Should there be an exceedance, the expectation is that there is an appropriate agreement in place with the affected landowner.

GHD engineers have not visited the Kentbruck site as part of this assessment and have therefore not examined local conditions near the receptors assessed, such as blockage from trees or other obstacles. The shadow flicker worst case is modelled on the basis of no tree coverage or obstacles blocking shadow flicker.

2. Shadow flicker and blade glint assessment

2.1 Shadow Flicker

As the blades of a wind turbine rotate during operation, they may cast periodic shadow flicker on the surrounding landscape. Shadow flicker is the fluctuation of light levels that can appear to flicker to an observer at a fixed ground location. The effect will occur under circumstances where the wind turbine location and orientation are such that at certain times of the day, the sun's rays pass behind the swept area of the rotating blades and affect the viewpoint. The extent of the flicker will depend on wind turbine geometry, cloud cover, the time of day, time of year, and geographical position of the site, and is more likely to be an issue for turbines located to the east or west of a receptor.

In accordance with Clauses 19.01-2S and 52.32-5 of the Glenelg Planning Scheme and Section 5.1.2(c) of the DELWP's Policy and Planning Guidelines, the shadow flicker experienced immediately surrounding the area of a dwelling (garden fenced area) must **not exceed 30 hours per year** as a result of the operation of the wind energy facility, according to worst case modelling.

2.2 Blade glint

Blade glint is caused by the reflection of sun light from a wind turbine blade which can be experienced by an observer as a repeating flash of light emitted from a wind turbine. The amount of blade glint experienced depends upon the yaw orientation of the turbine (rotor plane of rotation), the pitch angle of the blades, the rotation of the blades, relative position of the sun, the wind turbine's locations, and the dwelling (shadow receptor) location.

To reduce the possibility of the occurrence, modern wind turbines blades can be painted in a low-reflectivity coating. Section 5.1.2 (b) of the DELWP's 'Policy and Planning Guidelines - Development of Wind Energy Facilities in Victoria states *"Blades should be finished with a surface treatment of low reflectivity to ensure that glint is minimised.*"

Therefore, the risk of blade glint from a new development using current wind turbine technology is considered to be very low as Neoen will be specifying low-reflectivity blades in their wind farm technical specifications.

2.3 Turbines modelled

At the time of this report, the exact turbine model and manufacturer is yet to be determined as typically in wind farm development, a procurement process is carried out after planning approval is obtained. Therefore, this assessment should be considered preliminary.

Neoen have requested the following turbine variant and hub height to be modelled for this assessment as shown in Table 1.

Table 1 Wind turbine generators modelled

Qty WTGs	Turbine OEM	Turbine model	Max. Blade Chord [m]	Rotor Diameter [m]	Hub height AGL [m]	Rotor tip height [m]
105	N/A	N/A	4.87	190	175	270

Table 1 shows the turbine modelled had a hub height of 175 m and rotor diameter of 190 m, which equates to a top tip height of 270 m and lower tip height of 80 m. This reflects a conservative approach to modelling shadow flicker as the dimensions cover all candidate turbines shown in Table 2 and models the highest (and largest) rotor swept area, which will project shadows over the longest distance.

Table 2 Candidate wind turbine generators

Turbine OEM	Turbine model	Max. Blade Chord [m]	Rotor Diameter [m]	Hub height AGL [m]
GE	GE 6.0-164	4.00	164	167
Vestas	V162-6.2	4.32	162	149
Siemens Gamesa	SG 6.2-170	4.50	170	165
Nordex	N163/5.7	4.15	163	148

2.4 Shadow receptor locations

Modelled receptor/dwelling locations (including nearby campsites and lookouts) are also taken from the file *'SensitiveReceivers_20230419'* provided by Umwelt via email on 6 June 2023 and are shown in Appendix B.

3. Calculations and results

3.1 Assumptions and exclusions

The shadow flicker model was calculated to a distance of 265 x blade chord length (m)[3] from the turbines and was performed at 1-minute time intervals with a spatial resolution of 10 m. The turbine orientation is such that the rotor plane is facing the azimuth at 180° relative to all receptors. An SRTM digital terrain model was used to calculate turbine and sun visibility with visibility line-of-sight algorithm checks set at every 10 m.

A list of inputs and assumptions applied within the model are summarised below and are generally conservative:

– Maximum distance for influence of 265 x blade chord length (m).
– Minimum sun height over horizon for influence.
– Day step for calculation 1 day.
– Time step for calculation 1 minute.
– Eye height 1.5 m.
– Grid resolution 10 m.
– Dwelling window size 2 x 2 m[4].
– Maximum value of shadow flicker duration within 50 m of the centre of dwelling.
– Windows are perpendicular to wind farm.
– Orography was considered.
– The rotor plane (yaw) is always perpendicular to the line from the WTG to the sun.
– All wind turbines are always spinning.
– Any vegetation blocking visibility of wind turbines has been neglected.

The above assumptions and inputs are a combination of the Victorian legislation and guidelines, draft nation guidelines and is supplemented by standard GHD assumptions

3.2 Calculations

Shadow flicker was calculated using both worst case and realistic results.

3.2.1 Worst case shadow flicker

As a first pass check, 'worst case' amounts of shadow flicker were calculated. These are considered highly conservative due to the following assumption in addition to the above:

– The sun is shining the entire day, from sunrise to sunset, with zero cloud cover.

3.2.2 Expected case shadow flicker

The 'expected case' modelling differs from the worst-case model as the results are scaled according to the statistical likelihood of cloud cover for different times of day, and month of year. Expected case shadow calculation are based on the following:

– Historical cloud cover statistics taken from Mount Gambier Airport (approximately 55 km from the site).

Mount Gambier was selected as it is the closest weather station to Kentbruck Green Power Hub.

[3] National Wind Farm Development Guidelines – Draft, July 2010 – Environment Protection and Heritage Council
[4] "Windows" are used as per the Victorian Guidelines. The worst case was modelled using "Greenhouse Mode", which simulates the ensure receptor being covered in windows like a greenhouse.

3.2.3 Results

Due to the significant number of receptor locations assessed, only those with calculated shadow flicker greater than zero are shown below i.e., all other receptors were calculated to have zero hours of shadow flicker per year.

Table 3 ***Calculated shadow flicker 105 x WTG at 175 m hub height and 190 m rotor diameter***

Receptor ID	Easting [m]*	Southing [m]*	Elevation ASL [m]	Worst case Shadow Flicker [h/year]	Shadow Flicker [days/year]	Max Shadow hours per day [h/day]	Expected Case Shadow Flicker [h/year]
Receptor 21	520294	5778057	24.8	64:51	111	0:51	29:05
Receptor 675	519804	5778416	31.0	86:32	134	0:47	37:55

**UTM(South) WGS84 Zone 54*

Neoen has confirmed that they have entered an agreement with the landowner of Receptor 21 and 675.

Table 4 ***Calculated worst case and expected case shadow flicker overview 105 x WTG at 175 m hub height and 190 m rotor diameter***

Receptor ID	Worst Case Exceedance [hour/year]	Expected Case Exceedance [hour/year]	Dwelling Status
Receptor 21	34:51	19:05	Host landowner
Receptor 675	56:32	27:55	Host landowner

Table 4 above shows the *exceedance* in estimated shadow flicker, meaning that for the worst case it shows the estimated number of hours above 30 hours/year, and for the expected case it shows the estimated number of hours above 10 hours/year. These exceedances are shown relative to the 10 and 30 hours/year limits as per the draft national guidelines.

3.2.4 Shadow flicker map

The below indicative shadow flicker maps highlight the areas inside which worst case shadow flicker is 30 hour/year or greater of shadow flicker (red). Due to the large area of the windfarm, the map has been divided into two sections.

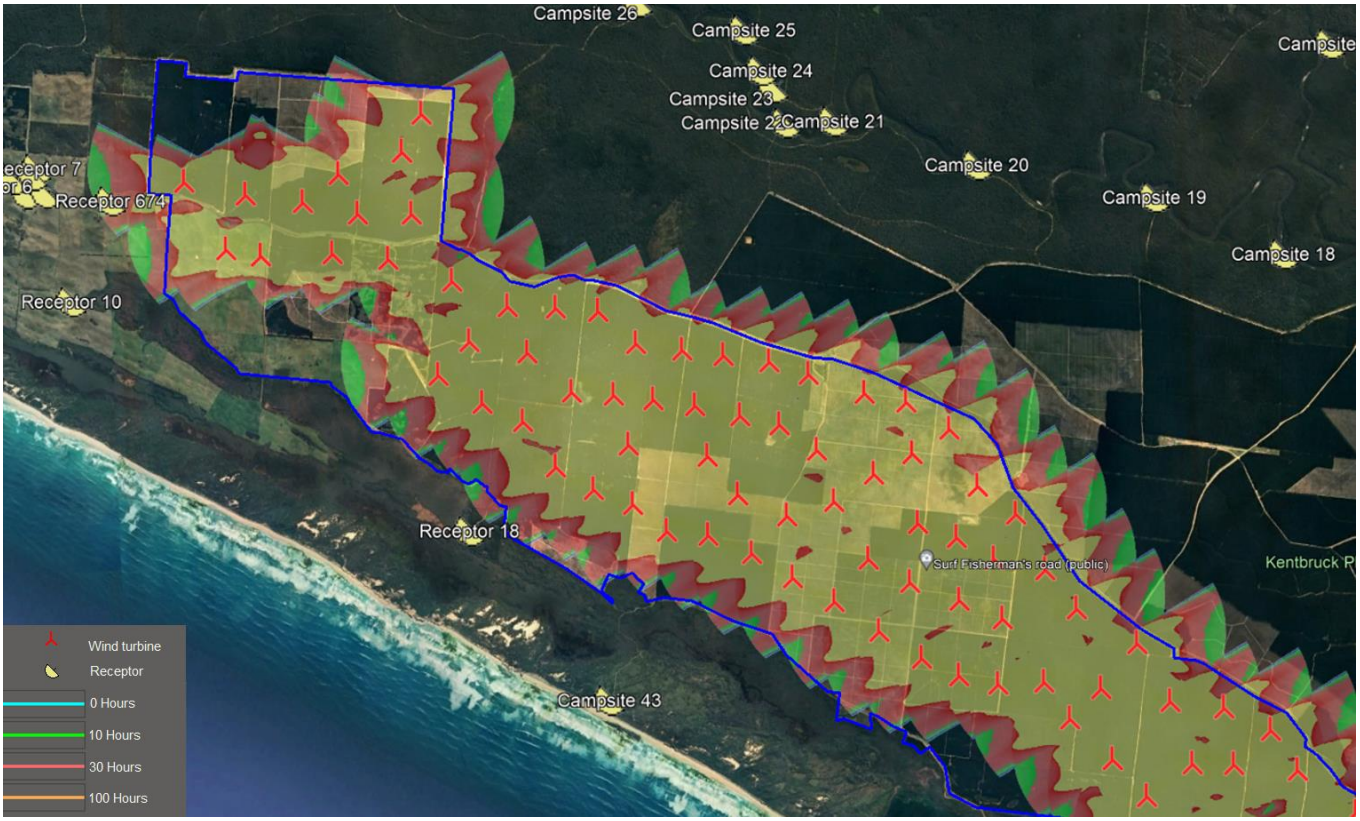

Figure 3 *Shadow flicker map (worst case results) – Western area*

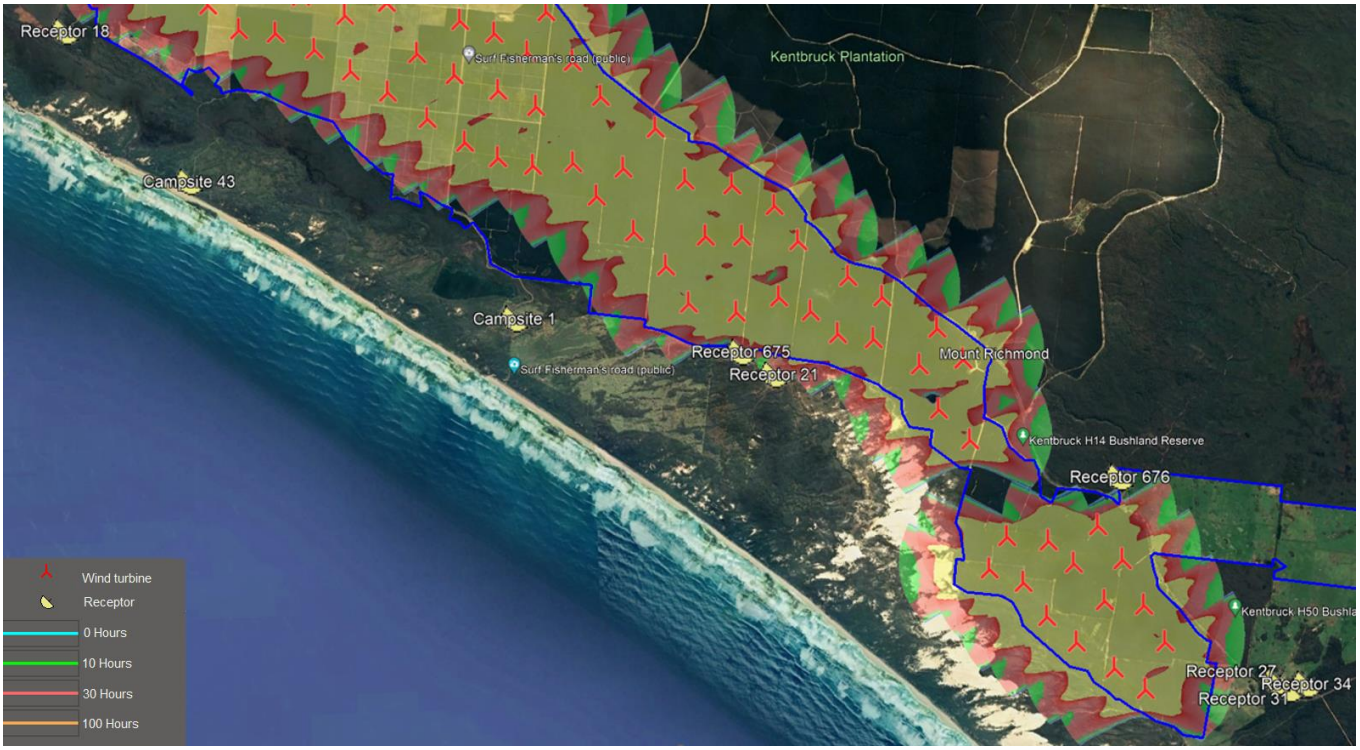

Figure 4 *Shadow flicker map (worst case results) – Central area*

3.3 Receptors with shadow flicker

Shadow flicker is calculated to occur at two receptors. The amount of shadow flicker for these receptors under the worst and expected cases is summarised in Table 5. All other receptors have zero hours of shadow flicker.

Table 5 Receptors with shadow flicker

Receptor ID	Worst Case Shadow Flicker [hour/year]	Expected Case Shadow Flicker [hour/year]	Dwelling Status
Receptor 21	64:51	29:05	Host landowner
Receptor 675	86:32	37:55	Host landowner

The amount of shadow flicker for these receptors exceeds the maximum allowed according to the Glenelg Planning Scheme and Section 5.1.2(c) of the DELWP's Policy and Planning Guidelines. Landowner agreements with affected dwellings are a common approach to resolving shadow flicker exceedances. GHD understands Neoen have agreements in place with both landowners.

4. Conclusions and recommendations

4.1 Conclusions

Shadow-flicker calculations at the Kentbruck Green Energy Hub were completed in line with Section 4.4 of the Scoping Requirements, investigating the potential for nearby residents and communities to be exposed to significant effects to the visual amenity, including blade glint and shadow flicker from project infrastructure. Modelling was undertaken in accordance with the Victoria State planning guidelines. Three receptors have been calculated to have shadow flicker greater than zero hours per year. All other receptors are calculated to have zero hours of shadow flicker per year.

Host Receptor 675 was found to have a theoretical worse case shadow flicker exceedance of approximately 56.32 hours/year when cloud cover is assumed to be zero for the full year. Receptor 21 has a theoretical worst case shadow flicker exceedance of 34.51 hours/year.

When the calculation is based on expected-case sunshine statistics from the Mount Gambier climate station (approximately 55 km away), exceedance of 27.55 hour/year occur at Receptor 675, while Receptor 21 has exceedance of 19.05 hours/year.

Neoen has confirmed that they have entered an agreement with the landowner of Receptor 21 and 675. GHD has not independently verified the status of the aforementioned properties and note that there are exceedances in the modelled worst-case and expected-case scenarios.

There are no potential shadow flicker impacts for all the other receptors because they were calculated to have zero hours of shadow flicker for both worst-case and expected-case models.

In accordance with Section 5.1.2(c) of the DELWP's Policy and Planning Guidelines, blade glint is not expected to be an issue provided that wind turbines use low reflectivity coatings on the blades of the wind turbines. The guidelines state that blades should be finished with a surface treatment of low reflectivity to minimise glint. Both the Victorian state guidelines[5] and the National Draft Guidelines[6] both support low reflectivity finishes as the appropriate mitigation.

No landscape and visual effects of shadow flicker were assessed as per Section 4.4 of the EES Scoping Requirements, as calculations were based on a worst-case shadow flicker, which assumes no coverage or obstacles due to trees or objects. Design and micro-siting options to minimise shadow flicker were not in scope, and the expectation is that there is an appropriate agreement in place with the affected landowner.

4.2 Recommendations

This assessment has been undertaken for 105 specific turbine locations and 354 dwelling locations as provided by Neoen and Umwelt. Planning approvals typically allow some degree of flexibility in turbine siting. Upon finalisation of the turbine locations prior to construction, it is recommended that Neoen undertake an updated shadow flicker assessment to minimise shadow flicker impacts on nearby receptors where possible, and to ensure there is no increase in exceedances. Since the turbine siting envelope that is allowed in the development approvals is fairly narrow it is unlikely the final turbine layout will cause material increase in the expected shadow flicker hours stated in the guidelines. Should there be an exceedance, the expectation is that there is an appropriate agreement in place with the affected landowner.

Wind turbine technical specifications and procurement documentation must specify that all wind turbine blades be coated with a low-reflectivity finish to avoid possible effects of blade glint on neighbouring dwellings and communities as reflected in the Scoping Requirements.

[5] "Policy and Planning Guidelines" for "Development of Wind Energy Facilities in Victoria", March 2019, Department of Environment, Land, Water, and Planning – Victoria State Government
[6] National Wind Farm Development Guidelines – Draft, July 2010 – Environment Protection and Heritage Council

Appendices

Appendix A

Coordinates of proposed wind turbines

WTG ID	Easting [m]*	Southing [m]*	Elevation [m]
WTG01	508689	5787383	40.0
WTG02	513954	5783736	24.8
WTG03	515713	5783575	49.5
WTG04	514311	5785630	48.8
WTG05	515053	5785347	53.9
WTG06	513367	5785107	47.6
WTG07	513172	5785924	42.0
WTG08	513787	5785816	49.5
WTG09	523752	5775479	27.3
WTG10	523171	5778193	36.6
WTG11	525052	5775634	126.3
WTG12	525321	5773425	28.6
WTG13	524319	5774245	20.0
WTG14	515619	5785208	46.6
WTG15	516534	5784047	50.0
WTG16	519322	5780196	31.7
WTG17	518620	5781850	40.0
WTG18	507938	5787485	44.4
WTG19	507567	5788186	47.6
WTG20	516180	5784824	54.8
WTG21	512880	5783512	28.1
WTG22	505966	5788522	30.5
WTG23	513462	5783244	28.4
WTG24	511846	5784770	48.6
WTG25	520877	5778999	49.0
WTG26	514004	5782897	27.6
WTG27	511997	5786127	42.4
WTG28	512907	5784579	40.0
WTG29	509545	5787054	48.4
WTG30	514558	5782556	25.1
WTG31	524722	5775055	69.9
WTG32	525399	5775114	133.9
WTG33	525714	5774414	114.2
WTG34	525778	5773087	29.1
WTG35	521273	5778643	63.0
WTG36	510521	5786058	40.0
WTG37	510282	5786687	46.9
WTG38	526022	5773847	107.3
WTG39	511101	5785507	31.9
WTG40	509030	5787977	40.0
WTG41	508937	5788807	60.0

WTG ID	Easting [m]*	Southing [m]*	Elevation [m]
WTG42	513301	5784046	38.3
WTG43	515709	5781751	33.1
WTG44	525164	5774479	71.4
WTG45	515034	5783115	32.7
WTG46	516228	5783366	40.5
WTG47	515672	5784514	50.0
WTG48	515144	5784258	46.2
WTG49	519750	5779030	30.0
WTG50	515587	5782779	30.0
WTG51	510422	5785135	20.0
WTG52	510849	5784507	34.6
WTG53	518235	5780300	31.6
WTG54	516205	5781498	30.0
WTG55	519029	5779193	27.7
WTG56	521958	5779171	80.0
WTG57	522798	5778674	40.0
WTG58	511875	5783967	40.0
WTG59	512321	5783586	24.7
WTG60	506962	5787494	30.0
WTG61	511670	5785446	40.0
WTG62	511504	5786577	50.0
WTG63	510927	5786646	40.0
WTG64	522506	5778129	40.0
WTG65	517348	5781374	35.4
WTG66	515147	5782133	30.0
WTG67	509749	5786236	40.0
WTG68	517402	5782892	57.3
WTG69	517810	5782351	50.0
WTG70	517685	5780862	29.1
WTG71	519044	5781051	40.0
WTG72	523981	5774772	20.0
WTG73	523468	5774997	22.0
WTG74	512203	5785366	36.8
WTG75	520386	5780616	50.0
WTG76	519753	5780947	40.8
WTG77	521457	5779496	74.8
WTG78	516246	5782515	30.0
WTG79	521806	5778544	71.3
WTG80	506789	5788320	39.6
WTG81	519877	5780172	44.6
WTG82	522771	5777449	40.0

WTG ID	Easting [m]*	Southing [m]*	Elevation [m]
WTG83	516817	5782247	33.4
WTG84	508054	5788553	40.0
WTG85	509304	5785800	30.1
WTG86	509889	5785401	27.4
WTG87	509217	5789309	53.7
WTG88	516721	5783061	49.7
WTG89	517033	5783654	59.3
WTG90	511352	5784187	40.7
WTG91	513891	5784968	50.0
WTG92	518110	5781263	40.0
WTG93	523225	5776969	49.5
WTG94	508305	5788003	50.0
WTG95	512763	5785266	40.0
WTG96	516731	5781364	26.1
WTG97	512618	5786017	40.0
WTG98	506477	5787602	20.0
WTG99	520404	5779233	47.2
WTG100	518701	5779769	27.9
WTG101	524344	5775410	55.3
WTG102	520725	5780068	48.6
WTG103	524758	5773838	26.6
WTG104	514386	5784607	48.0
WTG105	514598	5783907	35.5

**UTM(South) WGS84 Zone 54*

Appendix B

Coordinates of shadow flicker receptors

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 1	502260	5788983	21.2
Receptor 2	502683	5788825	13.3
Receptor 3	503241	5788356	10.0
Receptor 4	503638	5788637	20.9
Receptor 5	503804	5788440	28.4
Receptor 6	503900	5788685	22.9
Receptor 7	503953	5788775	20.0
Receptor 8	504067	5788436	29.8
Receptor 10	504344	5786966	10.0
Receptor 18	509643	5783670	10.0
Receptor 21	520294	5778057	24.8
Receptor 27	527672	5773193	120.0
Receptor 31	527855	5773078	116.4
Receptor 34	528114	5773141	116.1
Receptor 40	529535	5771795	140.0
Receptor 41	529903	5773865	140.0
Receptor 43	530182	5772805	139.3
Receptor 44	530203	5772837	139.4
Receptor 55	530852	5772276	133.7
Receptor 62	531294	5772198	136.8
Receptor 64	531494	5772537	140.0
Receptor 67	532240	5772174	132.6
Receptor 73	532396	5771086	120.0
Receptor 81	532814	5776105	142.2
Receptor 82	532829	5772699	130.0
Receptor 91	533355	5771808	124.1
Receptor 95	533507	5777635	120.0
Receptor 98	534350	5760464	10.0
Receptor 103	534787	5761971	70.0
Receptor 104	534838	5761742	70.0
Receptor 105	534897	5762844	82.3
Receptor 107	535077	5761019	63.8
Receptor 109	535144	5760085	10.4
Receptor 110	535188	5766859	109.9
Receptor 113	535264	5760815	70.3
Receptor 116	535373	5761341	80.0
Receptor 117	535388	5758644	3.8
Receptor 118	535406	5760993	80.6
Receptor 121	535537	5758811	13.3
Receptor 122	535585	5766716	109.4
Receptor 125	535587	5759556	45.5

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 127	535593	5758391	11.7
Receptor 128	535660	5759681	61.2
Receptor 129	535693	5759843	71.3
Receptor 130	535695	5759636	61.4
Receptor 131	535736	5761132	91.6
Receptor 134	535869	5757489	60.0
Receptor 135	535874	5757414	60.0
Receptor 136	535920	5758200	70.0
Receptor 142	536345	5768011	98.1
Receptor 143	536340	5762665	110.0
Receptor 144	536339	5760781	105.5
Receptor 148	536398	5757236	64.2
Receptor 151	536470	5762745	110.9
Receptor 153	536480	5759002	100.0
Receptor 156	536537	5762457	106.0
Receptor 160	536698	5770331	90.0
Receptor 163	536680	5760602	117.0
Receptor 164	536699	5760598	117.4
Receptor 169	536875	5762630	110.0
Receptor 170	537200	5756453	40.0
Receptor 171	537342	5762957	120.0
Receptor 174	537397	5756197	21.9
Receptor 177	537588	5756195	20.0
Receptor 178	537619	5760809	94.8
Receptor 182	538007	5769772	92.5
Receptor 183	538198	5756104	11.6
Receptor 184	538265	5769348	80.0
Receptor 189	538416	5760943	88.7
Receptor 191	538669	5769301	80.0
Receptor 193	538734	5768684	80.0
Receptor 198	538818	5759782	89.2
Receptor 201	539020	5761448	90.0
Receptor 202	539056	5758873	80.0
Receptor 203	539116	5768906	74.4
Receptor 206	539305	5767453	71.9
Receptor 207	539287	5759508	80.0
Receptor 209	539376	5765764	97.4
Receptor 211	539348	5759356	80.0
Receptor 212	539377	5761606	90.0
Receptor 213	539398	5759809	88.6
Receptor 216	539583	5767685	75.7

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 217	539718	5767582	76.8
Receptor 218	539873	5769732	70.0
Receptor 219	539878	5766224	86.0
Receptor 222	540016	5769682	70.0
Receptor 224	540051	5767810	70.0
Receptor 225	540033	5761472	90.0
Receptor 228	540130	5769793	68.2
Receptor 229	540127	5767911	70.0
Receptor 230	540115	5759528	81.9
Receptor 234	540205	5764187	90.4
Receptor 242	540359	5765591	89.6
Receptor 244	540471	5759481	83.0
Receptor 249	540621	5767447	70.0
Receptor 253	540773	5764641	87.8
Receptor 254	540762	5761440	86.5
Receptor 258	540881	5767461	70.0
Receptor 261	540920	5762990	85.2
Receptor 262	540972	5768423	61.0
Receptor 263	540978	5759358	80.3
Receptor 266	540993	5761186	85.0
Receptor 269	541034	5762852	83.3
Receptor 272	541092	5761158	85.1
Receptor 281	541268	5765272	83.7
Receptor 282	541250	5761436	85.7
Receptor 285	541310	5765171	83.1
Receptor 288	541341	5767576	63.4
Receptor 289	541351	5766453	70.0
Receptor 290	541447	5765440	80.2
Receptor 291	541500	5765389	80.7
Receptor 292	541477	5759563	80.0
Receptor 294	541505	5761435	83.6
Receptor 295	541506	5759362	80.0
Receptor 301	541808	5767044	66.8
Receptor 302	541802	5765763	73.5
Receptor 304	541797	5759370	80.0
Receptor 306	541832	5759568	80.0
Receptor 308	541903	5766951	68.9
Receptor 309	541918	5760613	80.0
Receptor 315	542043	5764649	80.0
Receptor 316	542061	5766979	69.3
Receptor 317	542068	5766557	70.0

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 319	542067	5759555	80.0
Receptor 321	542110	5760391	80.0
Receptor 322	542161	5763392	70.0
Receptor 325	542223	5767024	70.0
Receptor 326	542225	5767131	70.0
Receptor 333	542307	5766853	70.0
Receptor 335	542311	5763391	70.0
Receptor 341	542651	5765719	77.1
Receptor 342	542672	5766955	70.0
Receptor 345	542741	5763546	70.0
Receptor 351	542853	5764087	74.9
Receptor 355	542977	5766645	74.2
Receptor 357	542984	5759246	78.9
Receptor 358	543045	5767912	64.6
Receptor 359	543050	5767975	64.2
Receptor 360	543055	5768070	63.6
Receptor 361	543055	5768032	63.9
Receptor 362	543011	5759246	78.6
Receptor 364	543067	5763636	70.0
Receptor 365	543127	5768699	62.5
Receptor 366	543122	5767401	66.5
Receptor 367	543133	5767856	64.1
Receptor 368	543153	5767922	63.6
Receptor 370	543195	5767361	66.6
Receptor 372	543222	5770128	70.0
Receptor 376	543340	5767619	65.6
Receptor 377	543504	5765868	70.0
Receptor 381	543564	5765774	70.0
Receptor 382	543607	5767235	69.9
Receptor 384	543629	5764819	70.0
Receptor 386	543789	5761566	67.7
Receptor 387	543864	5765143	70.0
Receptor 388	543837	5759252	70.7
Receptor 391	543859	5759342	70.3
Receptor 397	543982	5760133	67.8
Receptor 399	543998	5760071	67.8
Receptor 401	544102	5758789	71.3
Receptor 402	544147	5760312	65.4
Receptor 404	544169	5763070	70.0
Receptor 409	544269	5764475	70.0
Receptor 410	544259	5760228	64.4

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 412	544324	5767460	70.0
Receptor 413	544322	5764438	70.0
Receptor 414	544347	5763158	70.0
Receptor 415	544391	5767599	70.0
Receptor 416	544409	5767365	70.0
Receptor 419	544489	5764339	70.0
Receptor 420	544491	5759557	64.7
Receptor 421	544542	5767545	70.2
Receptor 424	544574	5764282	68.2
Receptor 427	544631	5764265	69.3
Receptor 429	544672	5764122	65.5
Receptor 430	544687	5764466	70.0
Receptor 431	544728	5768947	70.4
Receptor 434	544859	5764708	70.0
Receptor 435	544877	5767854	76.6
Receptor 437	544862	5764163	67.9
Receptor 441	544910	5762170	60.0
Receptor 445	544973	5758747	65.1
Receptor 450	545017	5757410	64.8
Receptor 451	545116	5768855	73.4
Receptor 453	545108	5759137	60.3
Receptor 455	545101	5757135	64.5
Receptor 456	545171	5761553	60.0
Receptor 457	545212	5763983	68.0
Receptor 460	545248	5760820	58.1
Receptor 461	545253	5761281	59.8
Receptor 462	545312	5763055	60.0
Receptor 463	545412	5780263	45.6
Receptor 464	545364	5760229	56.4
Receptor 465	545403	5762331	60.0
Receptor 467	545462	5763877	70.0
Receptor 468	545475	5762975	60.0
Receptor 469	545477	5763015	60.0
Receptor 471	545517	5761281	59.4
Receptor 472	545515	5760212	55.5
Receptor 474	545552	5765198	80.0
Receptor 475	545656	5782431	49.1
Receptor 477	545548	5760831	57.7
Receptor 480	545580	5759914	54.7
Receptor 481	545609	5763629	60.0
Receptor 482	545605	5762789	60.0

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 485	545589	5759015	55.4
Receptor 486	545583	5757512	60.0
Receptor 490	545677	5760267	55.5
Receptor 492	545745	5768861	77.8
Receptor 493	545715	5760176	55.1
Receptor 494	545747	5763597	68.4
Receptor 496	545900	5768798	79.7
Receptor 497	545855	5760206	55.0
Receptor 498	545872	5759546	52.6
Receptor 501	545951	5763633	69.1
Receptor 502	545948	5759355	51.8
Receptor 504	546016	5760109	53.6
Receptor 505	546021	5760258	53.8
Receptor 510	546112	5758059	54.5
Receptor 511	546120	5759425	51.0
Receptor 513	546165	5763493	66.6
Receptor 516	546253	5759239	50.0
Receptor 517	546308	5760337	50.0
Receptor 518	546356	5763415	68.1
Receptor 521	546404	5760341	50.0
Receptor 522	546478	5767980	71.8
Receptor 523	546488	5768134	72.2
Receptor 525	546466	5763351	68.6
Receptor 526	546440	5757011	53.3
Receptor 528	546488	5759264	50.0
Receptor 530	546559	5762302	59.4
Receptor 531	546684	5763156	60.6
Receptor 532	546679	5759169	50.0
Receptor 533	546741	5759983	49.9
Receptor 534	546771	5762216	60.0
Receptor 536	546770	5760252	49.7
Receptor 537	546796	5762997	70.0
Receptor 538	546851	5761472	51.6
Receptor 539	546857	5761600	54.3
Receptor 540	546873	5760246	48.7
Receptor 543	546978	5767968	76.1
Receptor 544	546973	5762943	65.9
Receptor 546	547004	5760115	47.4
Receptor 548	547062	5767848	80.0
Receptor 549	547070	5767750	80.0
Receptor 551	547071	5761557	60.0

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 552	547077	5762581	60.0
Receptor 553	547083	5761468	56.0
Receptor 554	547083	5760205	46.8
Receptor 555	547122	5762714	60.0
Receptor 556	547225	5761458	51.8
Receptor 557	547259	5761423	50.0
Receptor 560	547314	5761406	49.6
Receptor 563	547359	5767504	74.4
Receptor 565	547347	5761449	49.9
Receptor 571	547573	5761585	49.8
Receptor 573	547638	5767914	71.0
Receptor 576	548031	5771641	49.1
Receptor 579	548213	5777018	41.1
Receptor 580	548252	5778362	40.0
Receptor 581	548388	5769551	70.0
Receptor 582	548518	5778450	40.0
Receptor 584	548591	5778661	40.0
Receptor 586	548730	5767909	71.5
Receptor 591	548789	5768411	70.0
Receptor 592	548814	5768692	70.0
Receptor 594	548857	5769906	70.0
Receptor 597	549025	5768940	70.0
Receptor 598	549206	5778781	44.4
Receptor 601	549415	5773854	40.0
Receptor 603	549463	5774274	40.0
Receptor 605	549511	5769825	70.0
Receptor 608	550606	5773998	35.1
Receptor 615	551267	5773749	32.4
Receptor 616	551364	5773299	31.0
Receptor 621	551766	5771479	33.0
Receptor 622	551887	5774472	33.6
Receptor 628	552552	5773686	30.7
Receptor 629	552586	5771647	29.8
Receptor 631	552934	5771361	27.6
Receptor 634	553827	5772317	26.5
Receptor 636	553902	5773515	30.0
Receptor 637	553893	5770932	22.1
Receptor 641	554049	5771565	22.5
Receptor 642	554085	5772622	27.3
Receptor 643	554197	5772856	28.1
Receptor 644	554290	5773333	30.0

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Receptor 645	554283	5771838	23.3
Receptor 649	554367	5772561	26.3
Receptor 653	554593	5774202	31.7
Receptor 654	554624	5774977	31.2
Receptor 655	554646	5774752	30.1
Receptor 656	554642	5773646	33.5
Receptor 658	554689	5772720	28.1
Receptor 659	554850	5774550	31.0
Receptor 660	554862	5774406	32.0
Receptor 661	554918	5774454	32.0
Receptor 662	554936	5772481	29.2
Receptor 663	555009	5771395	21.3
Receptor 664	555013	5771438	21.7
Receptor 666	555128	5774716	31.6
Receptor 667	555125	5772339	31.1
Receptor 669	555330	5772350	36.6
Receptor 672	542510	5761380	72.4
Receptor 675	519804	5778416	31.0
Receptor 676	525410	5776339	130
Receptor 677	531054	5774600	140
Receptor 678	550751	5773165	32.7
Receptor 679	536587	5767648	95.1
Receptor 680	541116	5763886	82.2
Campsite 1	516363	5779046	10.0
Campsite 2	536557	5764206	208.3
Campsite 3	527192	5770300	10.0
Campsite 4	532403	5753934	35.7
Campsite 5	539147	5759711	90.0
Campsite 6	540480	5754123	35.0
Campsite 7	548020	5746706	30.0
Campsite 8	552071	5767619	50.0
Campsite 9	544202	5773672	70.3
Campsite 10	543687	5773529	81.9
Campsite 11	538438	5777683	90.7
Campsite 12	536804	5785294	95.1
Campsite 13	537387	5785765	99.2
Campsite 14	534175	5790146	161.0
Campsite 15	523559	5791017	10.0
Campsite 16	523851	5788171	10.0
Campsite 17	521578	5789825	12.1
Campsite 18	520845	5787010	10.0

Dwelling ID	Easting [m]*	Southing [m]*	Elevation [m]
Campsite 19	519111	5787836	11.5
Campsite 20	516717	5788360	10.0
Campsite 21	514790	5789022	11.1
Campsite 22	514139	5789027	10.0
Campsite 23	513994	5789510	13.4
Campsite 24	513837	5789744	14.0
Campsite 25	513623	5790298	20.0
Campsite 26	512194	5790732	10.0
Campsite 27	512346	5790890	14.9
Campsite 28	511695	5791216	20.0
Campsite 29	509312	5791752	16.0
Campsite 30	509238	5791575	10.0
Campsite 31	508773	5791887	15.0
Campsite 32	507563	5793081	12.2
Campsite 33	506570	5793621	20.0
Campsite 34	505209	5793797	10.0
Campsite 35	504133	5794353	16.6
Campsite 36	502187	5795097	19.6
Campsite 37	501432	5794959	15.2
Campsite 38	499299	5795475	20.0
Campsite 39	497442	5794762	20.0
Campsite 40	499469	5790462	10.0
Campsite 41	499554	5787845	0.0
Campsite 42	501449	5786944	2.0
Campsite 43	511465	5781312	10.0
Campsite 44	535356	5758679	3.5

**UTM(South) WGS84 Zone 54*

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The Power of Commitment