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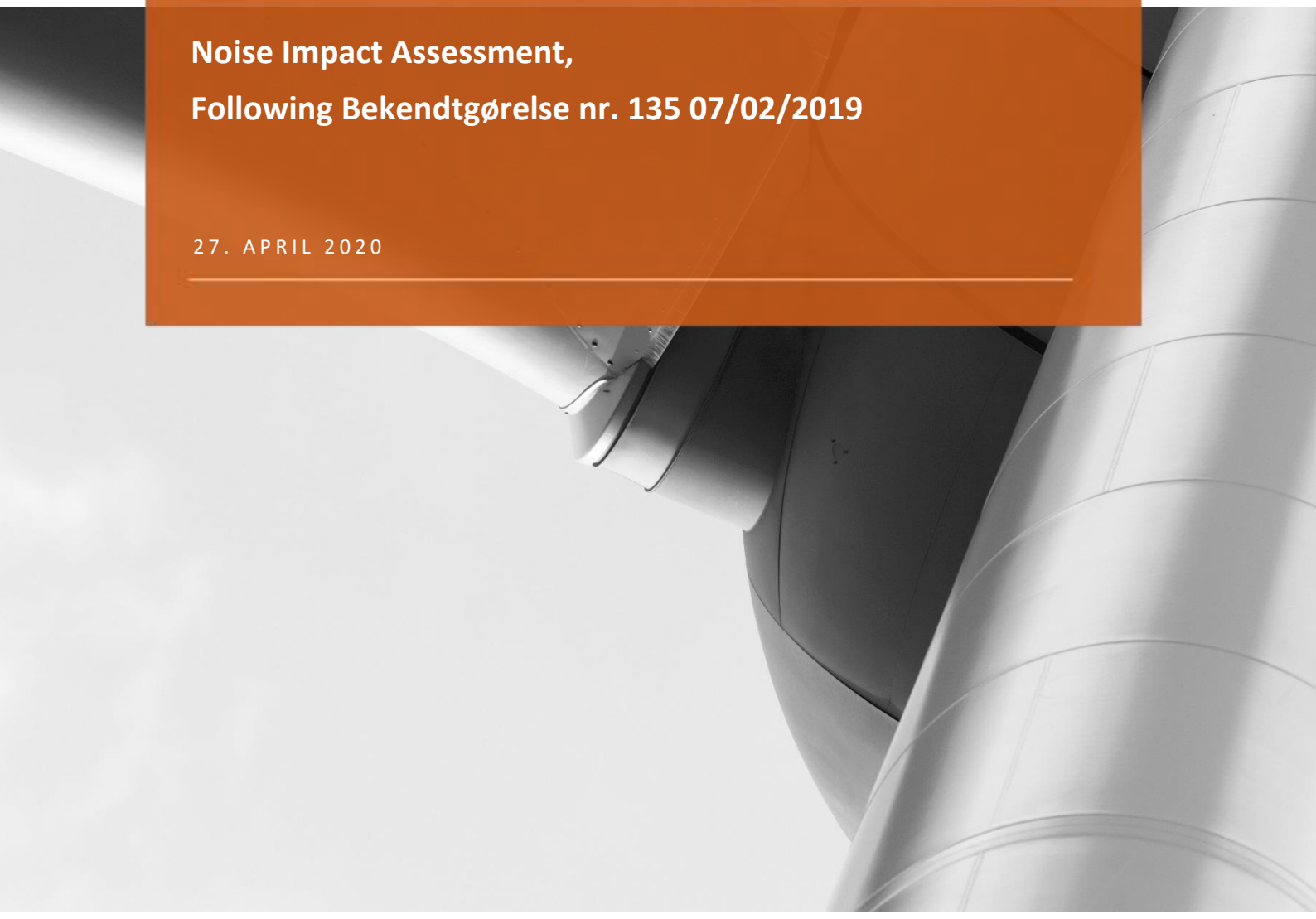
Vesterhav Nord Wind Farm

Noise Impact Assessment,
Following Bekendtgørelse nr. 135 07/02/2019

27. APRIL 2020



Vesterhav Nord

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1	17.02.2020	190919_19105_C_1_TS_1	All	Final report, revised source noise data
2	14.04.2020	190919_19105_C_1_TS_2	All	Final report, accepted
3	27.04.2020	190919_19105_C_1_TS_3	All	Final report, revised source noise data

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1 Executive Summary

This report presents the results of the noise assessment for the Vesterhav Nord wind farm project in Denmark . The project consists of 21 Siemens-Gamesa SG-8.4-167-DD wind turbines with 109.1 m hub height.

The calculation methods follow the current Danish regulation (Bekendtgørelse nr. 135 07/02/2019 from the Danish Environmental Agency) [1].

The calculations are performed for both normal and low frequency noise. It is checked that the calculated noise level at neighbors to operating wind turbines situated in the zone inside of the exclusion line is below the allowed threshold. The exclusion line for the normal noise outlines the zone within which the noise contribution from the new wind farm is above the noise thresholds minus 15 dB (commonly used value). For the low frequency noise, the usual 15 dB delimitation interpreted from the guideline [2] has proven to be unnecessarely conservative. Instead, a 10 dB criteria has been applied.

Finally for both the normal and low frequency noise, the noise immision of Vesterhav Nord wind farm complies with the Danish Regulation, bekendtgørelse nr. 135 07/02/2019.

Content

List of Figures

List of tables

2 Method

The noise thresholds and propagation model are described in “Bekendtgørelse nr. 135 07/02/2019” from the Danish Environmental Protection Agency [1].

Two types of noise thresholds are considered: for the normal noise in the range 63 Hz to 10 kHz and for low frequency noise from 10 Hz to 160 Hz. In both cases the aggregated dB(A) value at the receptors are compared to the noise threshold.

The noise thresholds for normal noise and low frequency noise are described below, according to [1].

> The noise impact from WTGs are not allowed to exceed the following limits: (Wind speeds in 10 m height)
> 1) At outdoor areas maximum 15 m from neighbor settlements in the open land.
> a) 44 db(A) at wind speed 8 m/s.
> b) 42 db(A) at wind speed 6 m/s.
> 2) At outdoor areas in residential or recreational areas.
> a) 39 db(A) at wind speed 8 m/s in residential areas.
> b) 37 db(A) at wind speed 6 m/s in residential areas.
> The low frequency noise impact from WTGs are not allowed to exceed 20 dB indoor at wind speeds 8 and 6 m/s

Figure 1 Noise threshold at dwellings for normal noise and low frequency noise

The propagation model takes into account that the wind turbines are defined as offshore turbines. For offshore wind turbines, a lower ground attenuation is used than for onshore wind turbines. A transition zone at the coastline (200m) is then included, behind which onshore ground attenuation is used. Any water surface behind the coastline (between coastline and receptor) is considered land surface, meaning that the ground attenuation does not change back to offshore conditions.

From offshore wind turbines there is an additional contribution from multiple reflections introduced in the 2019 noise regulation. At each dwelling, the combined multiple reflection component of the noise is calculated assuming wind direction from the closest offshore wind turbine and a reduction in the contribution from multiple reflections from offshore turbines that are at an angle to the direction from the closest offshore wind turbine. The multiple reflections build up across water and upon crossing the coastline the multiple reflection contribution is maintained but not increased any further. Reentering water surface does not change multiple reflections. Onshore wind turbines do not contribute with multiple reflection and are not considered when determining the wind direction.

The calculation of normal frequency range noise impact is an outdoor calculation. The calculation point for dwellings in open land is closest outdoor area surrounding the building, facing the highest noise impact, though no more than 15 m from the inhabited building. For zones with increased noise protection any location within the zone must comply with the noise threshold and the calculation point will be the section on the periphery that receives the highest noise impact.

The calculation of low frequency noise is an indoor noise calculation that differentiate between regular dwellings and cottage zones, taking into account different values of insulation for the two types of receptors. The calculation is thus more conservative for cottage zones with lower insulation attenuation than for regular dwellings.

The calculation point of low frequency noise at cottage zones is defined as the closest point of a cottage zone to a planned or operating turbine. Cottage zones are identified from the official zoning plan

"Kommuneplanrammer, vedtaget" available at kort.plandata.dk from Erhverstyrelsen (ministry of Industry). Cottages or light dwellings not located in this particular zoning are considered regular dwellings.

The calculation point of low frequency noise at regular dwellings is defined as the closest point of a dwelling to a planned or operating turbine. As it is the case with domestic turbines (less than 25 kW), the dwelling of the owner of a turbine shall not be considered according to "Bekendtgørelse nr. 135 07/02/2019". Note that for domestic turbines, dwellings further than 500 m from the turbine have been ignored since the low frequency contribution becomes negligible (less than 10 dB(A)) at this distance.

According to the guideline for noise from wind turbines from the Environmental Agency [2], the noise impact from the planned wind farm will be irrelevant if it is less than 15 dB below the noise impact from operating wind turbines.

In order to identify which neighbors need to be re-assessed an exclusion line is drawn around the planned wind farm where the noise impact from the planned wind farm is 15 dB below threshold. A receptor outside this exclusion line will, if the noise received from wind turbines exceed the threshold, receive from the new wind farm less than 15 dB below what it is already receiving from operating wind turbines and can therefore be excluded from a reassessment. Reassessment of noise impact at neighbors will thus only have to be done inside the exclusion line.

The calculation of an exclusion line has been made in each of the cases (normal and low frequency noise). However, in the case of low frequency noise, the application of the 15 dB line would imply to evaluate the contribution of the low frequency noise from Vesterhav Nord to the low frequency noise from operating wind turbines close to summer houses more than 17 km away from Vesterhav Nord. This large distance seems too restrictive and not sensible (see section 5.1). Instead, a 10 dB exclusion line corresponding to a 10 dB difference between contributions from new and operating wind turbines is calculated. Details of the results are presented in the following sections.

The 15 dB (normal frequency range) and 10 dB (low frequency range) limitations of the exclusion lines related to the thresholds listed in Figure 1 are presented in Table 1.

Table 1. Value of the 15 dB and 10 dB delimitation of the exclusion lines for the different thresholds

Type of Demand	Threshold [dB(A)]	Exclusion line for threshold - 15 dB [dB(A)]	Exclusion line for threshold - 10 dB [dB(A)]
Normal noise, open land, 8m/s	44	29	/
Normal noise, open land, 6m/s	42	27	/
Normal noise, zones of increased noise protection, 8m/s	39	24	/
Normal noise, zones of increased noise protection, 6m/s	37	22	/
Low Frequency noise	20	(5)	**10**

Within the exclusion lines, the receptors to include in the calculation are identified as those where noise from operating turbine may approach the noise threshold relevant for the receptor in question.

It is more difficult to make a delimitation of which operating wind turbines can be excluded from the calculation. For receptors close to the new wind farm, the guideline [2] (which has until now been used as guideline for the interpretation of the regulations) states that individual operating wind turbines that contribute with less than 15 dB below the contribution of the combined new wind farm can be excluded. However, when considering neighbors to operating wind turbines, this guideline is less practical as the contribution from the new wind farm is relatively small, which would imply that operating turbines with even very small contributions cannot be excluded. In practice, a sensical evaluation of which operating turbines to include is made, including any turbines that could contribute significantly to the noise impact at the receptor. Those wind turbines may well be situated outside the exclusion line. In the present case the offshore wind farm planned at Vesterhav Syd is included although its contribution is minimal. The contributions from this wind farm is so small that normally it would be excluded. However, since the wind farm is located offshore and is subject to the new noise propagation model for offshore wind turbines, it has been the aim to avoid any doubt. By including Vesterhav Syd it is hoped to remove it as a potential item of contention.

All receptors and all wind turbines are calculated using the 2019 regulation no matter which regulation was used when they received their permit.

All the figures presented in this report uses symbols in red to represent a planned wind turbine (Vesterhav Nord), and blue to represent an operating turbine. Note that in this respect Vesterhav Syd is also considered an operating wind farm (with blue symbols).

3 Data Basis

The source noise levels of the wind turbines at Vesterhav Nord has been provided by Vattenfall in the form of a source noise specification from Siemens Gamesa[3], and are presented in Figure 2 and Figure 3. The noise data are based on measurements at Østerild National Test Center, conducted by SWECO, accredited by DANAK for noise measurements.

WTG: Siemens SWT-8.0-167 8000 167.0 !O!
Noise: Standard+PB+HWRT - measured Østerild - 2020-03

Source	Source/Date	Creator	Edited
Sweco	02/03/2020	USER	06/04/2020 10.02

Report No.: P6-006-20

Low frequency data

Status	Hub height	Wind speed	LwA,ref	10,0 Hz	12,5 Hz	16,0 Hz	20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	109,10	6,0	93,9	47,0	53,2	58,9	65,0	69,2	73,2	77,0	80,0	84,9	84,0	85,5	87,7	88,7
From Windcat	109,10	8,0	98,5	50,6	57,1	63,1	68,6	74,4	78,0	81,8	84,8	87,1	92,3	90,0	91,9	92,5

Figure 2. Source noise level (low frequency range)

WTG: Siemens SWT-8.0-167 8000 167.0 !O!
Noise: Standard+PB+HWRT - measured Østerild - 2020-03

Source	Source/Date	Creator	Edited
Sweco	02/03/2020	USER	06/04/2020 10.02

Report No.: P6-006-20

Octave data

Status	Hub height	Wind speed	LwA,ref	Pure tones	63	125	250	500	1000	2000	4000	8000
	[m]	[m/s]	[dB(A)]		[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	109,10	6,0	108,4	No	88,2	92,3	96,9	100,0	103,1	104,1	97,9	81,4
From Windcat	109,10	8,0	111,7	No	94,0	96,4	99,5	103,0	106,2	107,4	101,6	84,4

Figure 3. Source noise level (normal frequency range)

The Vesterhav Syd wind farm consists of the same wind turbine type with the same source noise data.

The operating onshore wind turbines are identified through the national register of wind turbines (Energistyrelsens stamdataregister) and their source noise levels are identified using the following key:

1. Wind turbines larger than 2 MW are using the source noise data provided by the wind turbine supplier. For this size wind turbines complete datasets will be available
2. Wind turbines less than 2 MW will use the Source Noise Project (Kildestøjsprojekt) data for normal range noise. This is a dataset released by SWECO in 2015 where an average source noise level is compiled for each turbine type based on actual in situ source noise measurements of the wind turbines. In case of critically large variation, the standard deviation (uncertainty) is added to the source noise level. This dataset does not supply low frequency noise data.
3. For wind turbine types equal to or below 2 MW that does not appear in the Source Noise Project database and for low frequency calculations of wind turbines equal to and below 2 MW, the generic source noise data issued by the Danish EPA (Miljøstyrelsen) [2] in the guideline for wind turbine noise are used.

4 Normal Noise

4.1 15dB Exclusion Line

Operating turbines have been identified in the vicinity of Vesterhav Nord wind farm (Figure 4 and Figure 5).

Any area to which the Vesterhav Nord turbines contribute with a noise impact of less than 15 dB below the relevant threshold is not considered for reassessment and therefore not included in the calculation. For dwellings in the open land, these areas have to be within the red lines, for zones with increased noise protection these areas have to be within the blue lines.

The figures also include the noise receptors facing Vesterhav Nord directly.

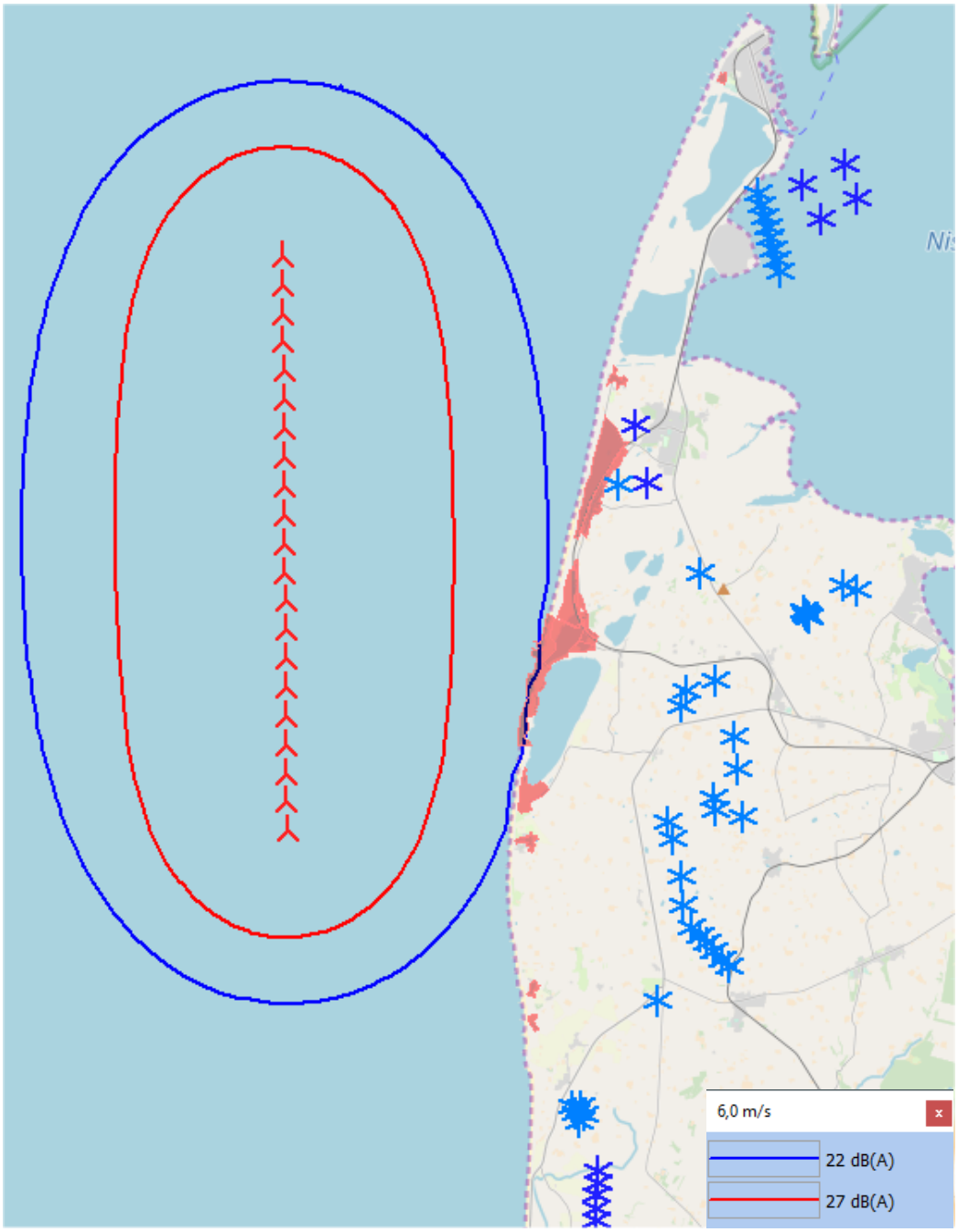
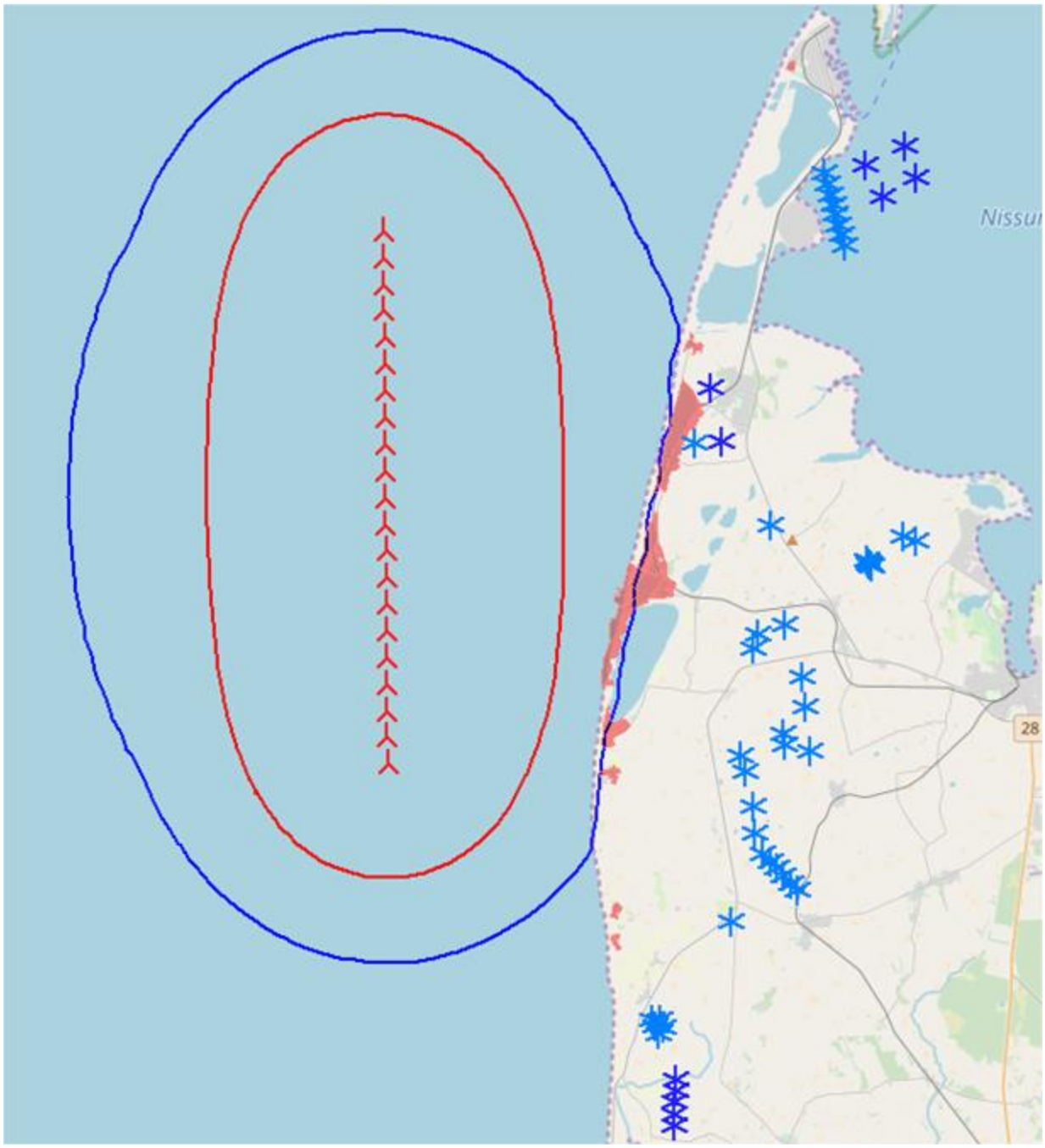


Figure 4. 15 dB(A) exclusion lines at 6m/s for normal noise.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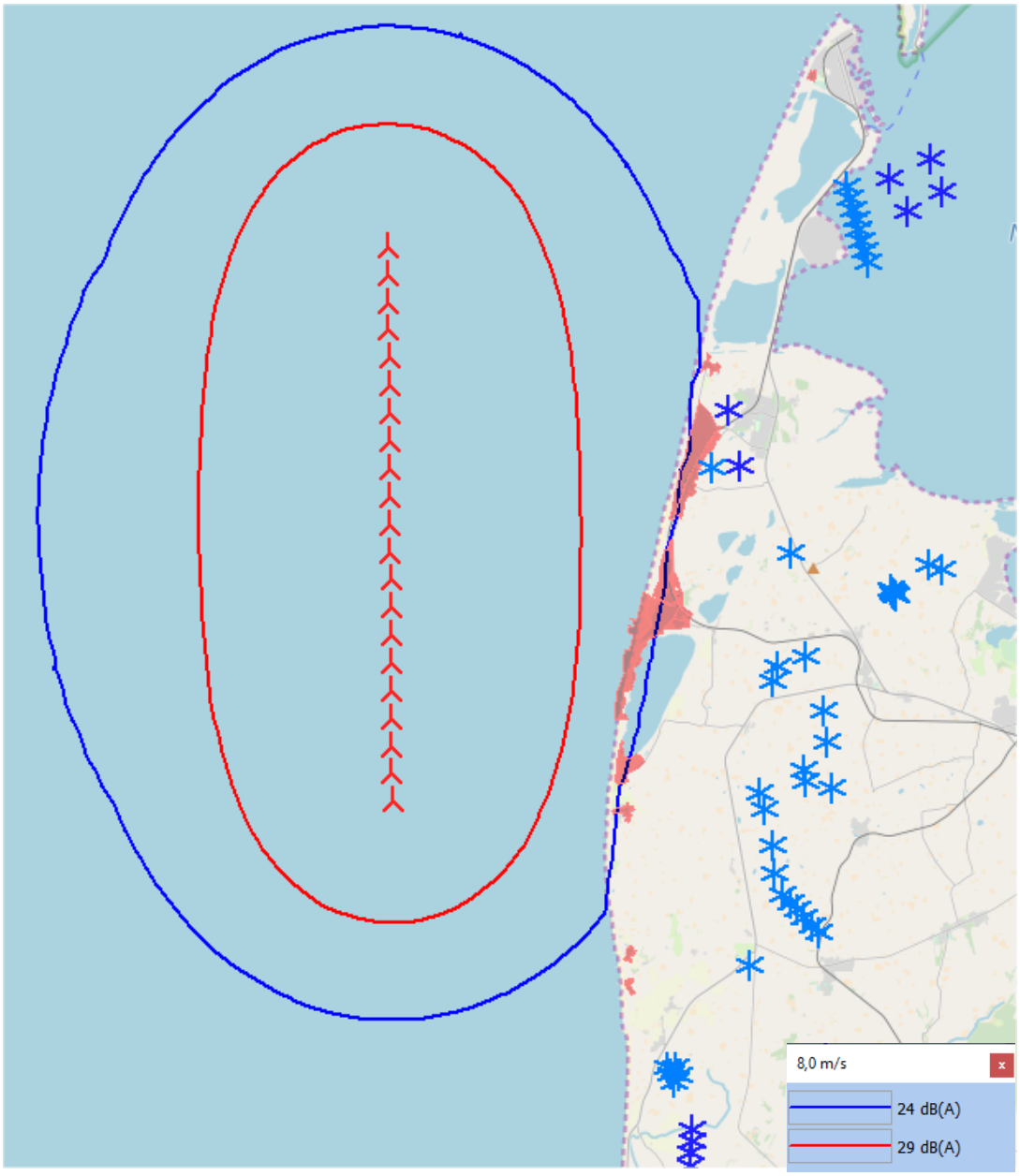

Figure 5. 15 dB(A) exclusion lines at 8m/s for normal noise

4.2 Results Near Operating Wind Turbines

All neighbours to operating wind turbines are located outside the exclusion zones. Therefore no neighbours to operating wind turbines need to be reassessed.

4.3 Results Normal Noise

Since the calculated noise lines at noise threshold values (39 and 37 dB respectively) are not reaching the coast, it can be concluded that the limits for the normal noise are fulfilled (Figure 6). The highest noise level, at Ferring Klit recreational area, reaches 27.4 dB at 8 m/s, while at Vrist cottage zone 2 the noise level is 36.9 dB, mostly from the contribution from local operating turbines.

The detailed calculation is presented in Appendix A.

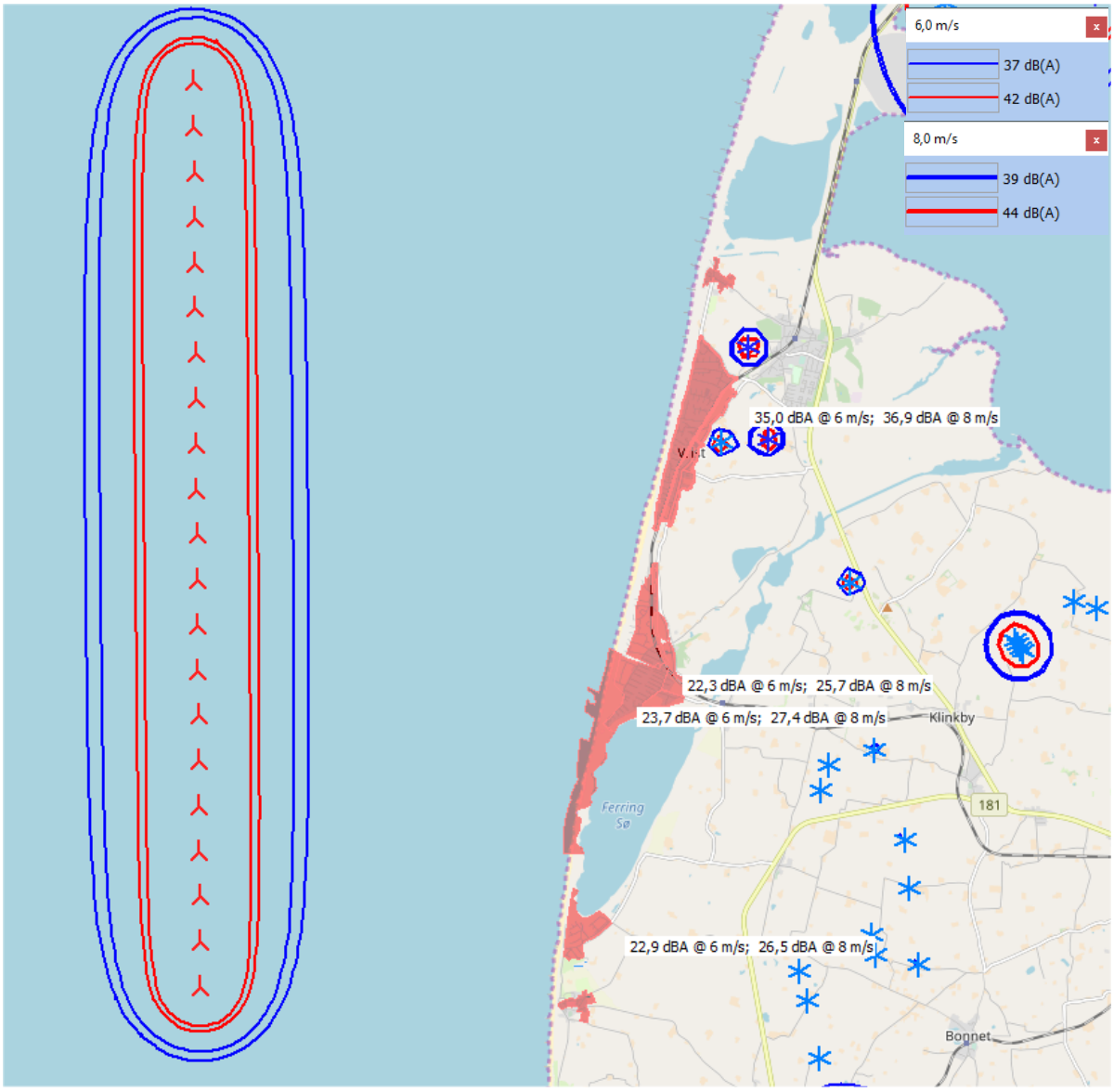

Figure 6. Normal frequency range noise calculation at 6 and 8 m/s

5 Low Frequency Noise

5.1 15/10dB Exclusion Line

The 10 dB and the 15 dB exclusion lines for low frequency noise around Vesterhav Nord are plotted on a map respectively in Figure 7 and Figure 8.

For the calculation of low frequency noise, a 15 dB exclusion critera means that the zone within the exclusion line will include a large part of Western Jutland. Inside this very large zone, receptors near operating wind turbines will need to be reassessed. Particularly for low frequency noise in cottage zones, this area becomes very large (up to 17 km from Vesterhav Nord). It is our evaluation that it will not be relevant for the environmental impact to consider noise impact from Vesterhav Nord this far away from the wind farm.

The reasons for this are:

1. A low frequency noise contribution between 5 and 10 dB will not likely be noticeable and is therefore not environmentally relevant.
2. A margin of 10 dB between the contribution from Vesterhav Nord and the contribution from the operating wind turbines is considered to provide a adequate protection of neigbors to operating wind turbines. Neighbors to operating wind turbines will indeed not notice any increase in low frequency noise impact with the addition of Vesterhav Nord wind farm when such a 10 dB margin is met.

We have therefore instead considered a less conservative 10 dB exclusion line within which the contribution from Vesterhav is above 10 dB and thus at receptors where the combined low frequency noise impact reaches threshold, the margin between operating and new wind turbines is less than 10 dB.

A 10 dB noise line delimiting a 10 dB(A) exclusion line is thus calculated (Figure 8).

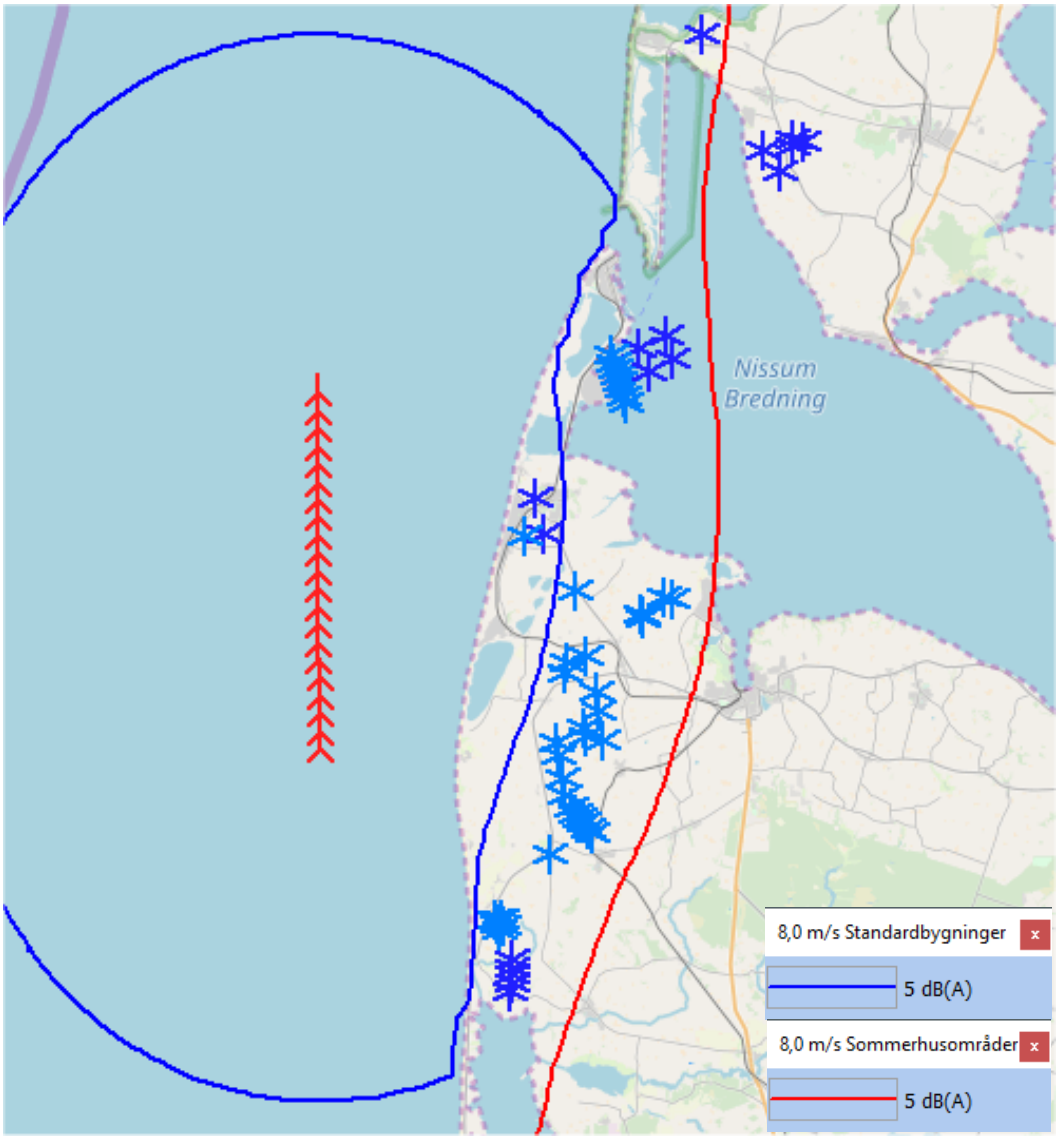

Figure 7. Delimitation of the 15 dB exclusion line for regular dwellings (blue) and cottage zones (red) at 8 m/s (calculated for low frequency noise).

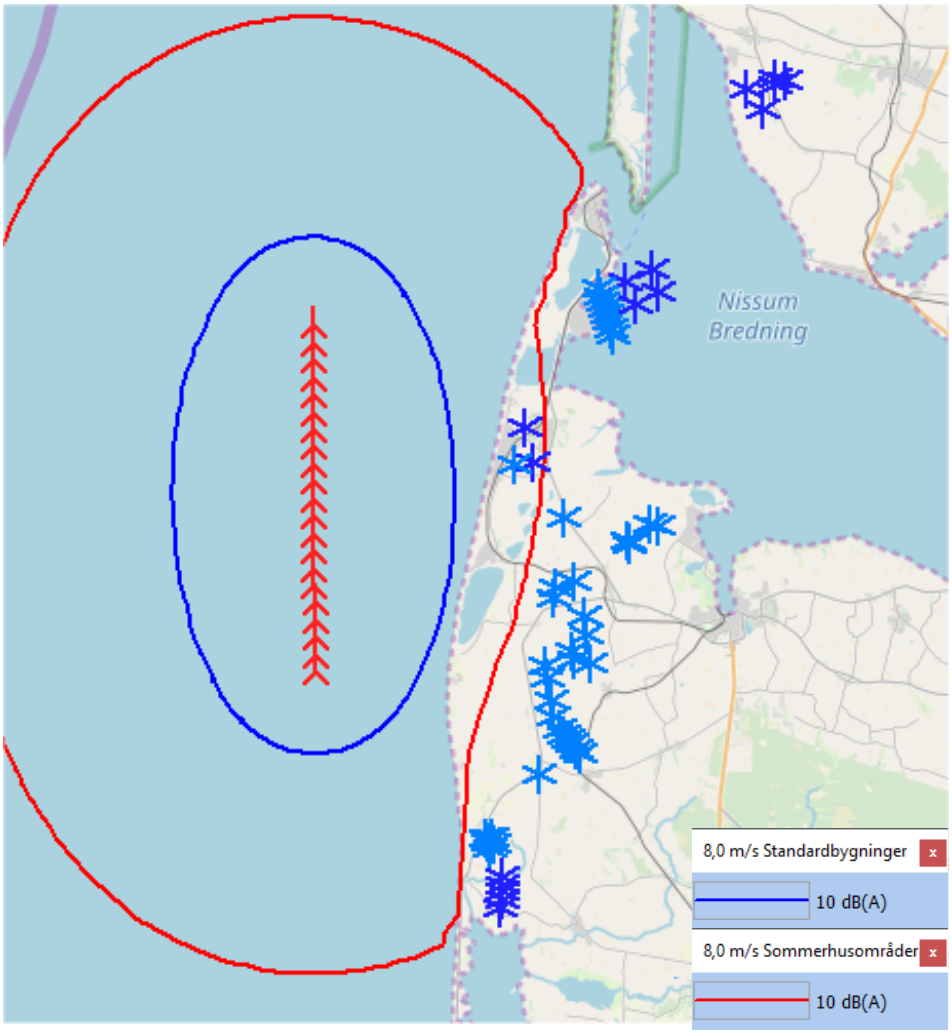

Figure 8. Delimitation of the 10 dB exclusion line for regular dwellings (blue) and cottage zones (red) at 8 m/s (calculated for low frequency noise, 2019) with already operating turbines.

Some operating turbines can be found within two 10 dB exclusion lines. The largest zone is delimited by the red line and the coast. In this zone cottage zones near operating turbines must be reassessed and the relevant operating wind turbines included in the claculation. The second zone, between the coast and the blue line, concerns the regular dwellings. In this zone any dwelling or noise sensitive area near operating turbines must be reassessed and the relevant operating wind turbines be included in the calculation. The above figures includes the operating turbines relevant for the two types of receptors.

5.2 Results Near Operating Wind Turbines

The cottage zones within the 10 dB exclusion line have been identified and are presented in Figure 9. Those on the coastline and near operating wind turbines are selected for the analysis, including regular dwellings near operating turbines within the corresponding exclusion line (Figure 10). For clarity, cottage zones are given a blue color.

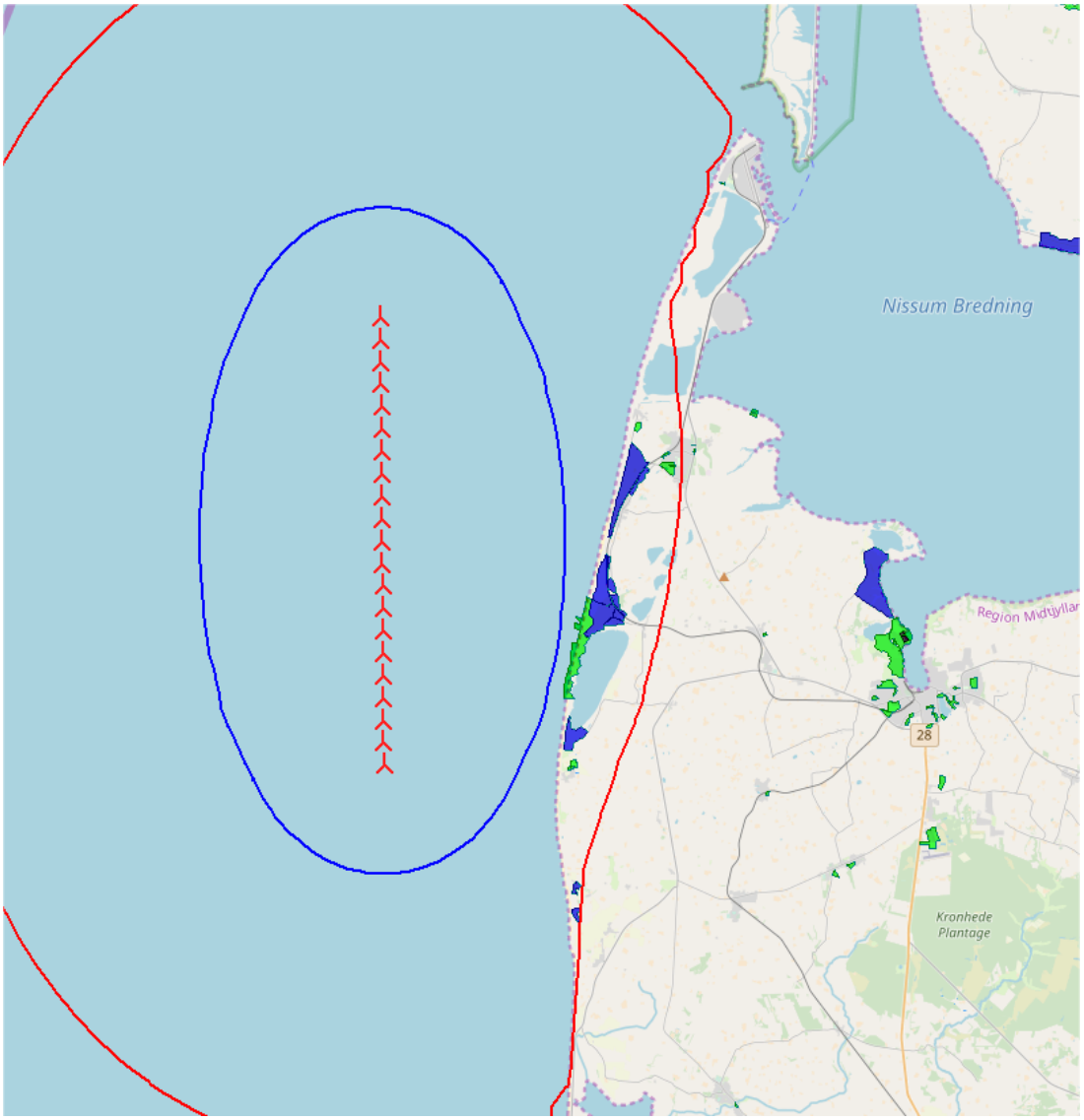

Figure 9. Overwiew map of cottage zones (blue) and recreational areas (in green) within/close to the 10 dB line at 8 m/s

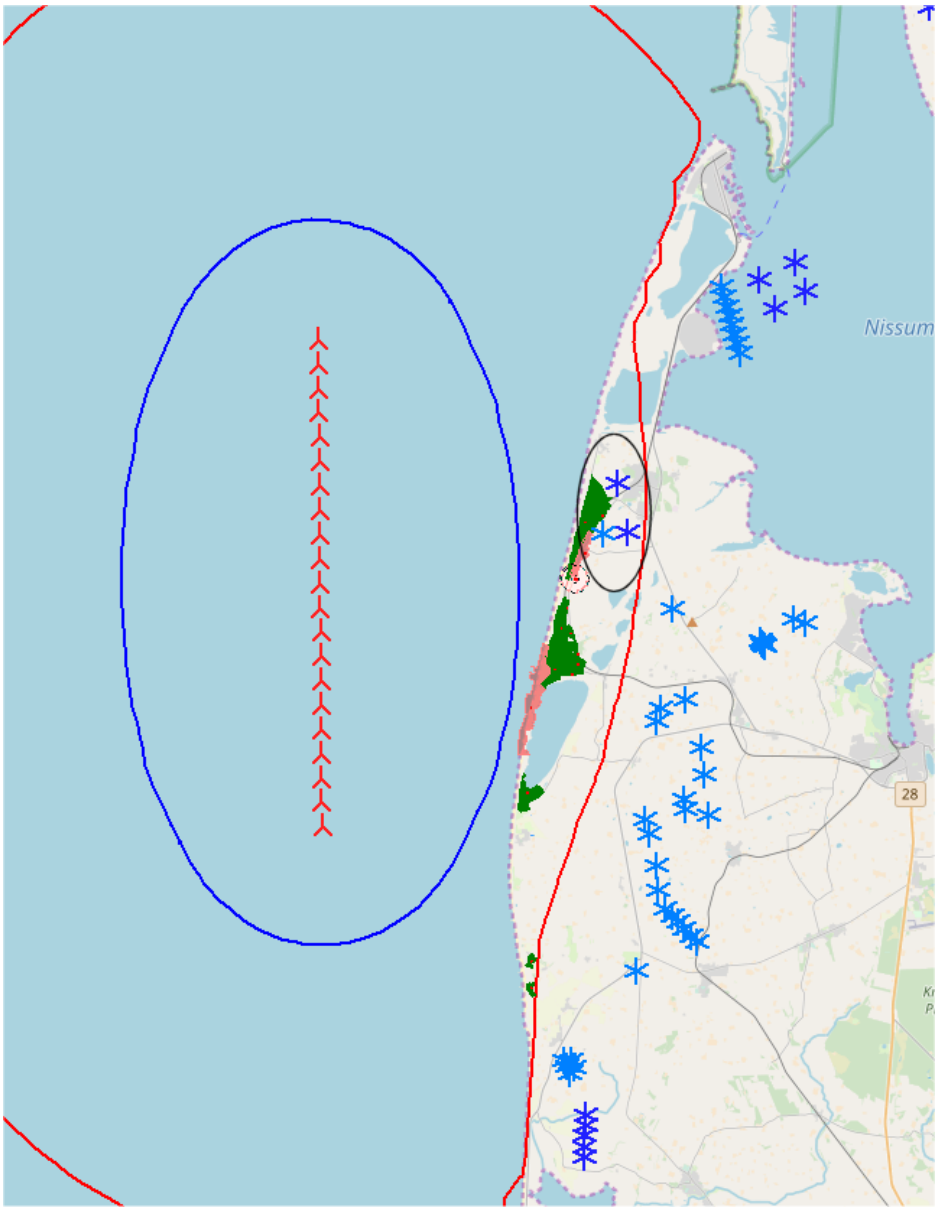

Figure 10. Overview map with the area where the impact at neighbors to operating wind turbines need to be reassessed; (Cottage zones marked with green color).

One area near Harboøre is identified where neighbours to operating wind turbines need to be reassessed. A detailed map is presented in the following figure, including the result of the cumulative noise impact (Vesterhav Nord, Vesterhav Syd and operating turbines) for the most relevant points of each receptor.

In this case, three wind turbines with relevant calculation points nearby have been identified. Since the calculation points are inside only the cottage zone exclusion lines, only this type of receptors must be considered. The highest noise level of 16.3 dB at 8 m/s is calculated at Vrist cottage zone (Figure 11).

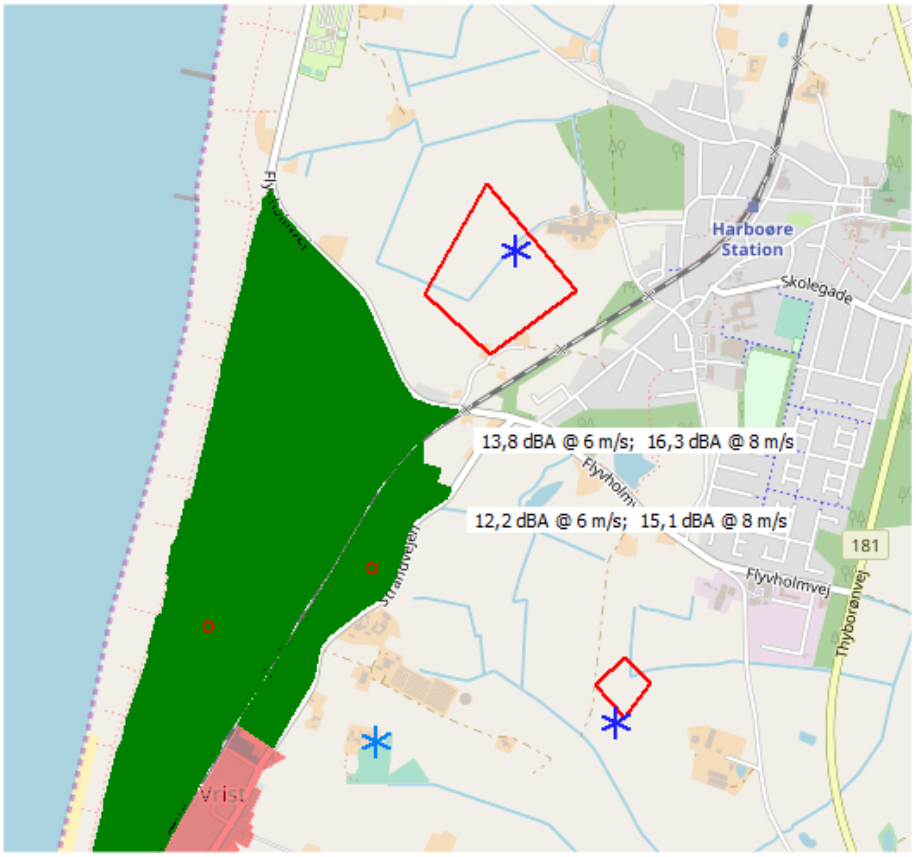

Figure 11. Calculated low frequency noise from new and operating turbines at relevant calculation points – Harboøre with 20 dB threshold at cottage zones and regular dwellings respectively in red and blue.

5.3 Results Low Frequency Noise

Applying a 10 dB exclusion line to delimit the need for reassessment of low frequency noise from operating turbines has resulted in a few cases where the cumulative noise at neighbours to operating turbine has been calculated. The threshold of 20 dB is not exceeded in any of these cases.

The calculated noise lines at 20 dB threshold is not reaching the coast neither for regular dwelling or cottage zones (Figure 12). The highest noise level at Vejlby cottage zone 5, reaches 13.8 dB at 8 m/s, while Vrist cottage zone 1 receives 16.3 dB at 8 m/s, mostly from operating wind turbines. It can thus be concluded that the thresholds for the low frequency noise are fulfilled.

The details of the calculation are presented in Appendix B.

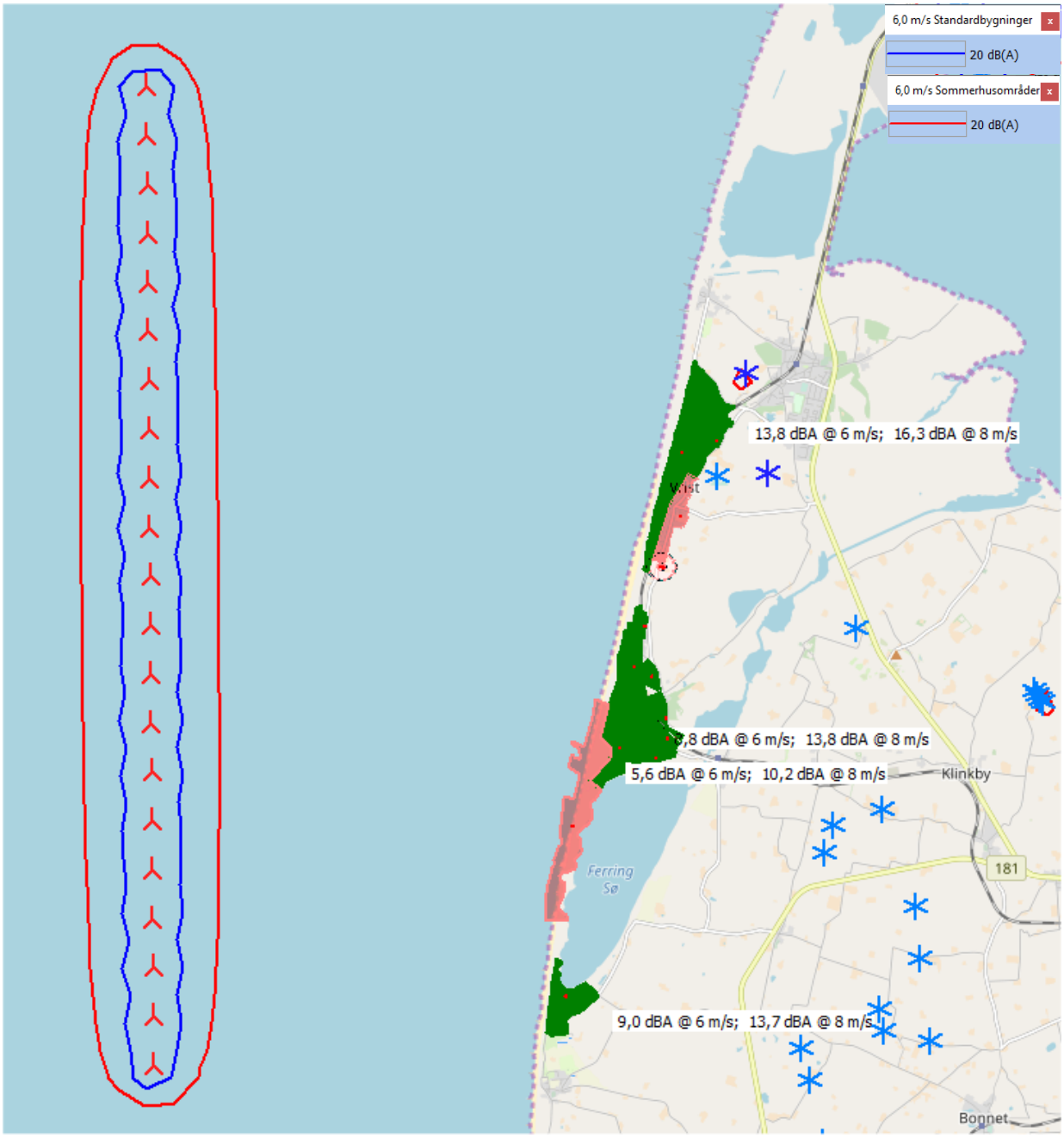

Figure 12. Low Frequency noise calculation results for regular dwellings (blue lines) and cottage zones (red lines) at 6 m/s. Cottage zones are marked with green color for clarity.

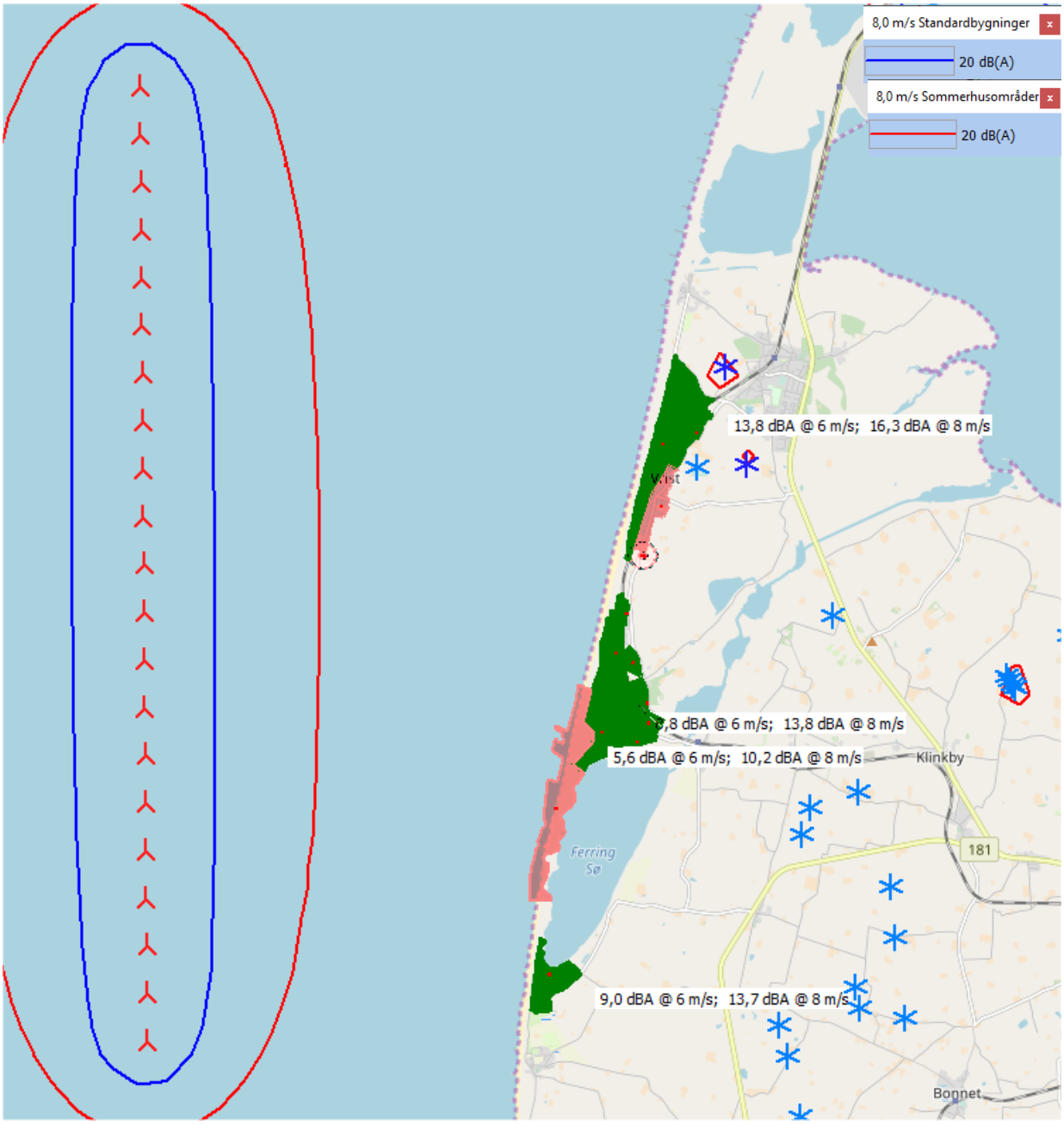

Figure 13. Low Frequency noise calculation results for regular dwellings (blue lines) and cottage zones (red lines) at 8 m/s. Cottage zones are marked with green color for clarity.

6 References

[1] D. M. o. F. a. t. Environment, "Bekendtgørelse nr. 135 af 07/02/2019, Bekendtgørelse om støj fra Vindmøller, j.nr. 2018-5949," Lovtidende, 2019.

[2] T. D. E. P. A. (Miljøstyrelsen), "Støj fra vindmøller, Vejledning fra Miljøstyrelsen nr. 1, 2012.," Miljøministeriet, 2012.

[3] SWECO, "Wind Turbine Noise Measurement, IEC 61400-11 ED. 3.1, SG-8.6.167 DD Rev. 1 + PB + HWRT," 2020.

Appendix A. WindPRO Calculation: Normal noise

Project:
Vesterhav (19105)

Description:
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Calculated:
08/04/2020 15.24/3.3.274

DECIBEL - Main Result

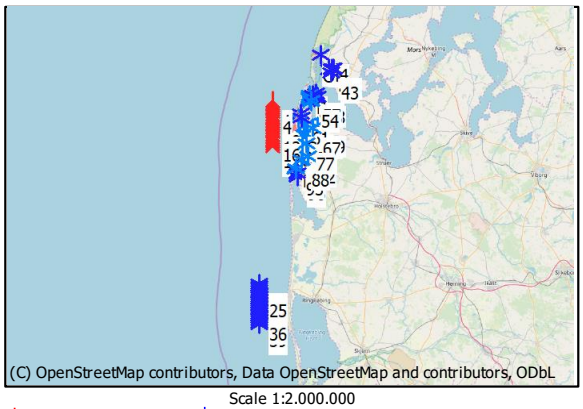
Calculation: Vesterhav nord normal VN measured + VS measured r1

Noise calculation model:
Danish 2019

The calculation is based on "BEK nr 135 af 07/02/2019" from the Danish Environmental Agency.
For wind turbines classified as offshore wind turbines multiple reflections (Lm) are applied.

The noise impact from WTGs are not allowed to exceed the following limits: (Wind speeds in 10 m height)
1) At outdoor areas maximum 15 m from neighbor settlements in the open land.
a) 44 db(A) at wind speed 8 m/s.
b) 42 db(A) at wind speed 6 m/s.
2) At outdoor areas in residential or recreational areas.
a) 39 db(A) at wind speed 8 m/s in residential areas.
b) 37 db(A) at wind speed 6 m/s in residential areas.
The low frequency noise impact from WTGs are not allowed to exceed 20 dB indoor at wind speeds 8 and 6 m/s
The limits are not to be taken into acount for houses belonging to WTG owner

All coordinates are in
UTM (north)-ETRS89 Zone: 32



Scale 1:2.000.000
New WTG
Existing WTG
Noise sensitive area

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Offshore	Ceator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones
			[m]					[kW]	[m]	[m]				[m/s]	[dB(A)]	[m/s]	[dB(A)]	
1	440.218,6	6.279.599,5		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
2	440.213,8	6.278.889,0		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
3	440.208,9	6.278.178,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
4	440.204,0	6.277.468,1		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
5	440.199,1	6.276.757,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
6	440.194,2	6.276.047,1		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
7	440.189,3	6.275.336,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
8	440.184,4	6.274.626,2		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
9	440.179,5	6.273.915,7		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
10	440.174,6	6.273.205,2		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
11	440.169,8	6.272.494,7		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
12	440.164,9	6.271.784,3		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
13	440.160,0	6.271.073,8		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
14	440.155,1	6.270.363,3		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
15	440.150,2	6.269.652,8		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
16	440.145,3	6.268.942,4		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
17	440.140,4	6.268.231,9		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
18	440.135,5	6.267.521,4		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
19	440.130,6	6.266.810,9		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
20	440.125,7	6.266.100,5		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
21	440.120,9	6.265.390,0		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
22	434.956,3	6.221.842,7		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
23	434.947,3	6.221.157,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
24	434.938,2	6.220.472,5		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
25	434.929,1	6.219.787,4		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
26	434.920,0	6.219.102,3		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
27	434.911,0	6.218.417,2		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
28	434.901,9	6.217.732,1		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
29	434.892,8	6.217.047,0		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
30	434.883,8	6.216.361,9		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
31	434.874,7	6.215.676,8		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
32	434.865,6	6.214.991,7		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
33	434.856,5	6.214.306,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
34	434.847,5	6.213.621,6		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
35	434.838,4	6.212.936,5		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
36	434.829,3	6.212.251,4		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
37	434.820,3	6.211.566,3		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
38	434.811,2	6.210.881,2		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
39	434.802,1	6.210.196,1		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
40	434.793,0	6.209.511,0		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
41	434.784,0	6.208.825,9		0,0 Siemens SWT-8.0-167 8000 167.0...	Yes	Siemens	SWT-8.0-167-8.000	8.000	167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 2020-03	6,0	108,4	8,0	111,7	No
42	459.277,7	6.289.217,5		55,0 5707150000000030734: 150 kW B...	No	BONUS	MK II-150/ 30	150	23,8	30,00		KST	Kildestøjsprojekt	6,0	95,7	8,0	96,9	No
43	458.802,1	6.288.184,8		50,0 5707150000000031212: 600 kW Ve...	No	VESTAS	V42-600	600	42,0	40,50		KST	Kildestøjsprojekt	6,0	98,0	8,0	99,1	No
44	455.718,9	6.293.657,0		17,5 5707150000001379320: 25 kW HS...	No	HSWind	Viking 25-25	25	13,0	18,00		USER	Viking 25 januar 2011	6,0	93,9	8,0	95,8	No
45	459.707,1	6.289.342,0		50,0 5707150000001464545: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
46	459.272,8	6.289.448,0		51,9 5707150000001468925: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
47	458.113,4	6.289.043,8		36,7 5707150000001481528: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
48	451.964,7	6.280.971,4		0,0 5707150000000059537: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
49	452.043,8	6.280.694,6		0,0 5707150000000059544: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
50	452.122,8	6.280.417,4		0,0 5707150000000062568: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
51	452.200,7	6.280.142,5		0,0 5707150000000062575: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
52	452.276,6	6.279.874,5		0,0 5707150000000062599: 2300 kW B...	Yes	Siemens	SWT-2.3-82 VS-2.300	2.300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	102,4 f	8,0	104,5 f	No
53	452.354,4	6.279.600,0		0,0 5707150000000062605: 2300 kW B...	Yes	Siemens	SWT-2.3-82 VS-2.300	2.300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	102,4 f	8,0	104,5 f	No
54	452.432,8	6.279.326,1		0,0 5707150000000062612: 2300 kW B...	Yes	Siemens	SWT-2.3-82 VS-2.300	2.300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	102,4 f	8,0	104,5 f	No
55	452.510,4	6.279.051,4		0,0 5707150000000062629: 2300 kW B...	Yes	Siemens	SWT-2.3-82 VS-2.300	2.300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	102,4 f	8,0	104,5 f	No
56	453.509,6	6.280.334,5		0,0 5713131347014042B0: 7000 kW S...	Yes	Siemens	SWT-7.0-154-7.000	7.000	154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	108,4 f	8,0	109,5 f	No
57	453.063,6	6.281.195,5		0,0 5713131347024042B9: 7000 kW S...	Yes	Siemens	SWT-7.0-154-7.000	7.000	154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	108,4 f	8,0	109,5 f	No
58	454.406,6	6.280.816,5		0,0 5713131347034042B8: 7000 kW S...	Yes	Siemens	SWT-7.0-154-7.000	7.000	154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	108,4 f	8,0	109,5 f	No
59	454.152,6	6.281.690,5		0,0 5713131347044042B7: 7000 kW S...	Yes	Siemens	SWT-7.0-154-7.000	7.000	154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	108,4 f	8,0	109,5 f	No
60	448.883,8	6.275.324,7		2,5 5707150000000037108: 600 kW B...	No	BONUS	MK I V-600/ 120	600	44,0	46,00		KST	Kildestøjsprojekt	6,0	97,3 f	8,0	98,3 f	No
61	449.170,9	6.273.883,5		0,0 5707150000000036750: 150 kW B...	No	BONUS	-150/ 30	150	23,0	24,50		KST	Kildestøjsprojekt	6,0	95,7 f	8,0	96,9 f	No
62	448.438,2	6.273.834,1		2,5 5713131347004025T7: 10 kW Gen...	No	GENVIND	-15	15	12,6	18,20		USER	Runtime input	6,0	93,2 b	8,0	95,1 b	No
63	453.963,7	6.271.281,5		3,2 5713131347004028J6: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SW P-25	6,0	84,1	8,0	84,4	No
64	453.141,1	6.270.498,2		3,2 5707150000000037214: 225 kW Ve...	No	VESTAS	V27-225/ 50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	96,8	8,0	98,1	No
65	453.098,9	6.270.554,6		5,0 5707150000000037221: 225 kW Ve...	No	VESTAS	V27-225/ 50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	96,8	8,0	98,1	No

To be continued on next page...

Project:
Vesterhav (19105)

Description:
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08/04/2020 15.24/3.3.274

DECIBEL - Main Result

Calculation: Vesterhav nord normal VN measured + VS measured r1

...continued from previous page

					WTG type							Noise data							
	Easting	Northing	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Offshore	Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones
			[m]					[kW]	[m]	[m]				[m/s]	[dB(A)]	[m/s]	[dB(A)]	
66	453.054,6	6.270.610,7	5,0	57071500000003738: 225 kW Ve...	No	VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	96,8	8,0	98,1	No
67	453.011,4	6.270.666,9	5,0	57071500000003745: 225 kW Ve...	No	VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	96,8	8,0	98,1	No
68	450.443,4	6.271.615,3	28,7	57131313470040247: 25 kW HS...	No	HSWind	Viking 25-25	25	13,0	18,00		USER	Viking 25 januar 2011	6,0	93,9	8,0	95,8	No
69	454.319,3	6.271.176,6	12,3	57131313470040270: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
70	450.794,7	6.268.975,3	20,0	57131313470040280: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
71	451.246,4	6.267.559,0	20,2	57131313470040293: 10 kW Gai...	Yes	GAIA WIND	GAIA 11 KW-11	11	13,0	18,20		USER	Støjmålinger	6,0	84,3	8,0	85,6	No
72	451.303,0	6.266.795,4	27,5	57131313470040317: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
73	450.063,2	6.268.751,4	18,8	57131313470040325: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
74	449.943,8	6.268.349,0	25,2	57131313470040335: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
75	451.434,6	6.265.597,5	46,1	57131313470040278: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
76	449.568,6	6.265.510,0	43,5	57131313470040287: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
77	450.712,1	6.266.073,9	38,5	57131313470040326: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
78	450.762,1	6.265.760,0	52,5	57131313470040336: 10 kW Soli...	Yes	Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	84,1	8,0	84,5	No
79	449.678,9	6.265.052,8	38,1	57131313470040337: 10 kW Soli...	Yes	Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	84,1	8,0	84,5	No
80	450.128,6	6.262.881,5	35,0	57071500000000383365: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
81	450.319,7	6.262.674,2	33,7	57071500000000120312: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
82	451.035,6	6.261.892,5	27,5	57071500000000147166: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
83	450.863,6	6.262.080,5	30,0	57071500000000147319: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
84	450.682,6	6.262.278,5	31,0	57071500000000147364: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
85	450.501,6	6.262.476,5	32,1	57071500000000147371: 2000 kW V...	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	103,0	8,0	105,0	No
86	449.938,2	6.263.434,2	34,0	57131313470040266: 25 kW Soli...	Yes	Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	84,1	8,0	84,4	No
87	449.873,8	6.264.131,4	39,6	57131313470040293: 10 kW Soli...	Yes	Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	84,1	8,0	84,5	No
88	449.273,0	6.261.061,8	17,5	57131313470040313: 10 kW TH...	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	84,3	8,0	86,8	No
89	447.095,4	6.258.491,4	10,0	57071500000000038211: 750 kW NE...	No	MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	97,8 f	8,0	98,7 f	No
90	447.314,1	6.258.459,0	10,0	57071500000000038228: 750 kW NE...	No	MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	97,8 f	8,0	98,7 f	No
91	447.181,6	6.258.286,4	10,0	57071500000000038235: 750 kW NE...	No	MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	97,8 f	8,0	98,7 f	No
92	447.398,7	6.258.258,8	10,0	57071500000000038242: 750 kW NE...	No	MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	97,8 f	8,0	98,7 f	No
93	447.270,2	6.258.079,0	9,6	57071500000000038259: 750 kW NE...	No	MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	97,8 f	8,0	98,7 f	No
94	447.655,7	6.255.636,8	0,0	Generisk 107dB 4000 120.0 H hu...	Yes	Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	105,0 f	8,0	106,0 f	No
95	447.724,7	6.256.849,8	0,9	Generisk 107dB 4000 120.0 H hu...	Yes	Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	105,0 f	8,0	106,0 f	No
96	447.707,7	6.256.550,8	2,5	Generisk 107dB 4000 120.0 H hu...	Yes	Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	105,0 f	8,0	106,0 f	No
97	447.691,7	6.256.266,8	2,5	Generisk 107dB 4000 120.0 H hu...	Yes	Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	105,0 f	8,0	106,0 f	No
98	447.672,7	6.255.939,8	0,4	Generisk 107dB 4000 120.0 H hu...	Yes	Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	105,0 f	8,0	106,0 f	No

f) From other hub height
b) Data from Danish Environmental Agency

Calculation Results

Sound level

Noise sensitive area						Demands	Sound level	Demands fulfilled ?
No.	Name	Easting	Northing	Z [m]	Imission height [m]	Wind speed [m/s]	Noise [dB(A)]	From WTGs [dB(A)]	Noise
A	Vrist sommerhusområde 1	448.446,2	6.275.120,8	2,5	1,5	6,0	37,0	32,9	Yes
A						8,0	39,0	34,1	Yes
B	Vrist sommerhus område 2	448.222,3	6.273.983,4	1,8	1,5	6,0	37,0	35,0	Yes
B						8,0	39,0	36,9	Yes
C	Vejlby sommerhusområde 1	447.376,3	6.271.959,4	2,5	1,5	6,0	37,0	22,3	Yes
C						8,0	39,0	25,7	Yes
D	Vejlby sommerhusområde 2	447.321,2	6.271.887,9	1,4	1,5	6,0	37,0	22,2	Yes
D						8,0	39,0	25,6	Yes
E	Vejlby sommerhusområde 3	447.386,9	6.271.187,2	2,5	1,5	6,0	37,0	21,7	Yes
E						8,0	39,0	25,2	Yes
F	Vejlby sommerhusområde 4	447.380,2	6.270.651,9	2,4	1,5	6,0	37,0	21,4	Yes
F						8,0	39,0	25,0	Yes
G	Vejlby sommerhusområde 5	446.512,1	6.269.443,6	2,3	1,5	6,0	37,0	22,5	Yes
G						8,0	39,0	26,3	Yes
H	Vejlby sommerhusområde 6	447.560,5	6.270.274,6	1,6	1,5	6,0	37,0	21,2	Yes
H						8,0	39,0	24,8	Yes
I	Vejlby sommerhusområde 7	447.145,6	6.269.746,4	0,3	1,5	6,0	37,0	21,4	Yes
I						8,0	39,0	25,0	Yes
J	Ferring sommerhusområde	445.870,6	6.266.013,3	2,5	1,5	6,0	37,0	22,9	Yes
J						8,0	39,0	26,5	Yes
K	Trans sommerhusområde	446.203,4	6.261.181,6	14,3	1,5	6,0	37,0	25,0	Yes
K						8,0	39,0	27,5	Yes
L	Fjaltring sommerhusområde	446.222,4	6.260.303,1	7,5	1,5	6,0	37,0	26,7	Yes
L						8,0	39,0	28,9	Yes
M	Agger sommerhusområde 1	454.594,3	6.293.471,9	2,5	1,5	6,0	37,0	21,1	Yes
M						8,0	39,0	23,2	Yes
N	Agger sommerhusområde 2	454.948,3	6.293.302,6	2,5	1,5	6,0	37,0	23,9	Yes
N						8,0	39,0	25,8	Yes
O	Agger sommerhusområde 3	453.144,9	6.293.608,6	3,4	1,5	6,0	37,0	15,1	Yes
O						8,0	39,0	18,8	Yes
P	Vrist blandet bolig og erhverv	448.160,5	6.273.786,5	2,5	1,5	6,0	37,0	34,3	Yes
P						8,0	39,0	36,2	Yes
Q	Langerhuse blandet bolig og erhverv	448.628,6	6.276.249,3	2,5	1,5	6,0	37,0	27,5	Yes
Q						8,0	39,0	29,2	Yes
R	Thyborøn boligområde 1	451.161,9	6.283.670,9	2,5	1,5	6,0	37,0	28,9	Yes

To be continued on next page...

Project:
Vesterhav (19105)

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Calculated:
08/04/2020 15.24/3.3.274

DECIBEL - Main Result

Calculation: Vesterhav nord normal VN measured + VS measured r1

...continued from previous page

Noise sensitive area

No.	Name	Easting	Northing	Z [m]	Imission height [m]	Wind speed [m/s]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Demands fulfilled ? Noise
R						8,0	39,0	30,2	Yes
S	Ferring boligområde	445.755,2	6.265.049,5	17,5	1,5	6,0	37,0	23,0	Yes
S						8,0	39,0	26,4	Yes
T	Ferring klit Rekreativt område	445.869,0	6.267.729,1	4,0	1,5	6,0	37,0	23,7	Yes
T						8,0	39,0	27,4	Yes

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	8903	9645	10445	10484	11052	11461	11218	11868	12040	13997	18982	19765	19192	19667	18945	9670	8581	11538	15524	11037
2	8603	9270	9939	9977	10525	10918	10654	11322	11473	13355	18311	19089	19724	20167	19476	9272	8358	11816	14871	10470
3	8353	8913	9460	9495	10020	10396	10109	10794	10919	12722	17643	18417	20266	20678	20018	8900	8189	12129	14224	9922
4	8155	8598	9011	9044	9537	9897	9585	10289	10383	12096	16978	17747	20819	21201	20571	8557	8058	12474	13584	9395
5	7972	8332	8597	8628	9082	9426	9087	9809	9870	11481	16317	17081	21381	21735	21133	8252	7989	12850	12950	8894
6	7785	8119	8224	8252	8662	8986	8618	9359	9382	10877	15660	16417	21952	22279	21703	7995	7982	13253	12323	8423
7	7606	7965	7893	7922	8281	8582	8184	8942	8924	10287	15008	15757	22531	22831	22281	7768	8038	13682	11696	7988
8	7441	7872	7587	7644	7946	8220	7792	8564	8501	9713	14361	15102	23117	23393	22866	7556	8156	14133	11079	7595
9	7300	7842	7337	7424	7662	7906	7446	8230	8118	9158	13721	14451	23710	23962	23459	7405	8333	14604	10474	7249
10	7201	7877	7149	7267	7436	7645	7154	7946	7782	8625	13089	13807	24309	24539	24057	7321	8566	15095	9882	6904
11	7171	7974	7005	7177	7272	7442	6924	7700	7498	8121	12464	13169	24914	25122	24662	7304	8849	15602	9307	6609
12	7212	8134	6844	7155	7175	7304	6751	7501	7272	7649	11850	12539	25524	25712	25272	7357	9179	16125	8753	6380
13	7321	8350	6754	7171	7147	7233	6558	7366	7111	7216	11246	11919	26140	26308	25887	7477	9551	16661	8222	6223
14	7497	8620	6739	7252	7189	7231	6423	7298	7018	6830	10653	11309	26760	26909	26507	7662	9959	17210	7720	6112
15	7734	8939	6798	7402	7282	7299	6365	7299	6996	6498	10074	10711	27384	27516	27131	7906	10400	17771	7253	5996
16	8027	9300	6929	7614	7435	7434	6387	7368	7041	6231	9512	10128	28013	28127	27760	8205	10870	18342	6828	5846
17	8370	9701	7130	7886	7651	7634	6486	7505	7156	6036	8972	9562	28646	28743	28392	8552	11364	18922	6454	5751
18	8758	10135	7393	8210	7925	7892	6660	7704	7338	5901	8456	9016	29282	29363	29028	8943	11881	19511	6139	5725
19	9184	10600	7713	8580	8251	8192	6903	7963	7583	5795	7971	8495	29921	29988	29668	9371	12417	20108	5894	5771
20	9644	11090	8084	8992	8624	8532	7208	8274	7884	5722	7522	8003	30564	30616	30310	9832	12969	20712	5727	5893
21	10133	11604	8497	9439	9037	8916	7568	8633	8235	5733	7115	7546	31209	31247	30956	10321	13536	21323	5645	6096
22	52134	53622	50033	51170	50480	49843	48875	49688	49372	45223	40883	40077	73946	73913	73910	52242	55980	63917	44353	46862
23	52801	54288	50699	51837	51146	50507	49542	50353	50039	45890	41545	40737	74610	74577	74576	52909	56647	64582	45018	47530
24	53470	54955	51366	52505	51812	51172	50210	51018	50705	46558	42208	41398	75275	75240	75243	53577	57315	65248	45684	48199
25	54138	55623	52033	53173	52479	51838	50879	51683	51373	47226	42872	42060	75939	75904	75910	54245	57983	65914	46350	48869
26	54807	56291	52700	53842	53147	52504	51548	52349	52041	47894	43536	42723	76604	76568	76578	54913	58652	66580	47017	49539
27	55476	56959	53368	54511	53815	53170	52217	53016	52709	48563	44201	43386	77270	77233	77246	55582	59320	67247	47685	50209
28	56146	57628	54036	55180	54483	53837	52887	53683	53378	49233	44867	44050	77936	77898	77914	56251	59990	67914	48353	50880
29	56816	58297	54705	55850	55152	54504	53557	54350	54047	49903	45533	44715	78602	78563	78582	56921	60659	68581	49021	51551
30	57487	58966	55374	56520	55821	55172	54227	55018	54716	50573	46200	45381	79268	79229	79251	57591	61329	69249	49690	52223
31	58157	59636	56044	57190	56491	55840	54898	55687	55386	51244	46867	46046	79935	79895	79920	58261	62000	69918	50360	52894
32	58829	60306	56714	57861	57161	56509	55569	56355	56056	51915	47535	46713	80602	80561	80589	58932	62670	70586	51029	53567
33	59500	60977	57384	58532	57831	57178	56241	57024	56727	52587	48203	47380	81269	81228	81259	59603	63341	71255	51700	54239
34	60172	61648	58055	59204	58501	57847	56913	57694	57398	53258	48872	48047	81937	81895	81928	60274	64012	71924	52370	54912
35	60844	62319	58726	59875	59172	58517	57585	58364	58069	53931	49541	48715	82605	82562	82598	60946	64684	72593	53041	55585
36	61516	62990	59397	60548	59844	59187	58257	59034	58741	54603	50211	49384	83273	83230	83269	61617	65356	73263	53712	56258
37	62189	63662	60069	61220	60515	59858	58930	59705	59413	55276	50881	50053	83942	83898	83939	62290	66028	73933	54384	56932
38	62862	64334	60741	61893	61187	60528	59603	60375	60085	55949	51551	50722	84611	84566	84610	62962	66700	74604	55056	57606
39	63535	65006	61413	62566	61859	61200	60276	61047	60757	56622	52222	51392	85280	85234	85281	63635	67373	75274	55728	58280
40	64208	65679	62085	63239	62532	61871	60950	61718	61430	57296	52893	52062	85949	85903	85952	64308	68045	75945	56401	58955
41	64882	66351	62758	63912	63205	62543	61624	62390	62103	57970	53565	52733	86618	86572	86623	64981	68719	76616	57074	59629
42	17653	17989	20957	21027	21598	21881	22215	22274	22527	25993	30578	31321	6298	5952	7501	19019	16549	9611	27300	22469
43	16554	16878	19838	19907	20475	20755	21088	21146	21396	24862	29441	30184	6699	6374	7779	17904	15460	8668	26166	21346
44	19656	20211	23244	23321	23965	24335	24680	24765	25099	28498	33461	34260	1140	848	2572	21216	18441	10685	29956	24763
45	18022	18346	21305	21374	21940	22218	22550	22608	22855	26321	30876	31614	6553	6191	7791	19373	16926	10039	27616	22812
46	17829	18172	21145	21214	21788	22074	22408	22468	22723	26189	30785	31528	6146	5793	7368	19203	16721	9734	27501	22658
47	16802	17178	20172	20243	20831	21131	21468	21532	21803	25266	29939	30695	5598	5273	6692	18210	15674	8555	26607	21696
48	6658	7081	10108	10183	10802	11146	11489	11568	11889	15312	20232	21031	12470	12411	12569	8109	5529	2816	16741	11642
49	6481	6878	9899	9973	10587	10924	11267	11343	11659	15089	19990	20787	12728	12666	12838	7908	5372	3104	16510	11434
50	6311	6681	9694	9767	10374	10705	11047	11122	11431	14867	19749	20543	12988	12923	13108	7712	5225	3392	16279	11228
51	6152	6492	9494	9566	10167	10490	10832	10904	11207	14650	19510	20302	13248	13178	13377	7524	5092	3678	16053	11025
52	6005	6315	9303	9375	9969	10285	10625	10696	10992	14440	19280	20069	13502	13429	13639	7346	4974	3957	15834	10830
53	5865	6142	9113	9184	9770	10078	10417	10485	10775	14228	19044	19831	13762	13687	13909	7168	4854	4242	15611	10634
54	5736	5977	8928	8998	9576	9876	10213	10280	10561	14019	18811	19595	14024	13945	14178	6996	4741	4527	15391	10444
55	5618	5821	8748	8817	9386	9677	10013	10076	10351	13811	18579	19359	14287	14205	14449	6829	4642	4812	15173	10256

To be continued on next page...

Project:
Vesterhav (19105)

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Calculated:
08/04/2020 15.24/3.3.274

DECIBEL - Main Result

Calculation: Vesterhav nord normal VN measured + VS measured r1

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
56	7211	7444	10374	10442	11007	11291	11626	11687	11952	15416	20131	20903	12916	12816	13160	8455	6212	4080	16760	11879
57	7512	7848	10841	10913	11506	11820	12160	12229	12521	15972	20784	21568	12095	12006	12293	8880	6442	3121	17357	12368
58	8204	8406	11300	11367	11916	12183	12514	12570	12816	16282	20917	21676	12408	12291	12738	9404	7215	4321	17595	12791
59	8614	8897	11851	11921	12494	12784	13120	13182	13451	16914	21629	22398	11535	11423	11844	9919	7579	3587	18260	13363
60	482	649	3684	3761	4400	4783	5128	5221	5553	8936	14005	14825	18689	18669	18649	1677	950	8651	10422	5214
61	992	803	2622	2685	3233	3537	3878	3952	4273	7698	12659	13471	20000	19967	19997	1015	2398	9988	9127	4105
62	395	262	2149	2223	2848	3227	3572	3666	3998	7381	12458	13280	20245	20224	20202	282	2337	10207	8867	3684
63	6351	6242	6459	6569	6411	6175	6484	6249	6338	8867	12422	13062	21946	21833	22223	6257	7290	12702	9789	7194
64	6064	6011	5576	5867	5573	5252	5589	5313	5389	7750	11298	11946	22757	22653	22990	5805	7310	13320	8659	6326
65	6005	5943	5535	5814	5528	5214	5549	5277	5354	7745	11317	11968	22703	22600	22934	5742	7240	13258	8660	6289
66	5945	5873	5493	5759	5482	5176	5508	5240	5318	7739	11335	11989	22649	22546	22878	5677	7168	13197	8660	6246
67	5885	5805	5452	5705	5438	5139	5468	5204	5284	7734	11354	12011	22596	22493	22822	5613	7097	13135	8662	6204
68	3148	3204	3053	3035	2975	2965	3180	3069	3191	6491	10899	11662	21947	21883	22035	2907	4972	12077	7639	3794
69	6705	6601	6798	6932	6758	6506	6822	6577	6663	9108	12567	13192	22047	21931	22344	6628	7623	12887	10007	7538
70	4868	5536	3528	4272	3680	3089	3491	3103	3110	4953	8706	9409	24501	24424	24622	4768	7567	14700	5875	4047
71	6234	7000	4648	5542	4868	4166	4505	4151	4098	4791	7820	8453	25848	25763	25996	6155	9054	16112	5488	4869
72	6883	7714	5189	6144	5439	4694	5000	4659	4596	4707	7288	7885	26600	26513	26754	6817	9799	16876	5251	5149
73	4570	5431	2991	3862	3195	2525	2892	2522	2489	4219	8147	8877	24834	24768	24924	4501	7593	14960	5179	3391
74	4839	5770	3138	4081	3377	2650	2982	2630	2575	3899	7736	8462	25251	25186	25338	4784	7963	15370	4821	3383
75	7965	8868	6157	7177	6443	5660	5861	5603	5530	4865	6567	7100	27778	27687	27941	7914	10986	18075	5117	5547
76	7287	8438	5254	6386	5612	4791	4746	4690	4601	3053	5172	5811	28113	28046	28202	7285	10719	18231	3254	3872
77	7199	8171	5337	6382	5636	4841	5010	4777	4701	4097	6359	6952	27387	27306	27519	7159	10347	17603	4482	4714
78	7502	8485	5621	6676	5926	5126	5269	5058	4980	4177	6172	6747	27692	27610	27828	7464	10664	17915	4471	4858
79	7756	8908	5716	6853	6079	5258	5186	5155	5066	3305	4906	5509	28546	28477	28642	7755	11186	18677	3333	4206
80	9966	11124	7901	9053	8275	7458	7273	7350	7258	4903	4049	4420	30628	30549	30752	9969	13395	20815	4342	5995
81	10219	11364	8162	9310	8533	7714	7547	7608	7517	5185	4163	4494	30809	30727	30940	10218	13625	21014	4605	6277
82	11182	12281	9156	10288	9515	8694	8580	8594	8504	6236	4716	4906	31504	31413	31664	11172	14510	21779	5609	7337
83	10949	12059	8915	10051	9278	8457	8331	8355	8265	5984	4567	4789	31335	31246	31488	10941	14295	21592	5365	7082
84	10704	11825	8663	9803	9029	8208	8069	8105	8015	5719	4420	4678	31158	31072	31304	10699	14070	21398	5111	6814
85	10461	11594	8412	9556	8780	7960	7808	7856	7765	5453	4286	4580	30983	30899	31121	10458	13847	21205	4857	6546
86	9383	10547	7316	8469	7691	6873	6697	6765	6674	4389	4107	4560	30107	30031	30221	9386	12823	20274	3946	5458
87	8695	9849	6642	7787	7011	6191	6063	6086	5995	3913	4434	4959	29427	29353	29535	8695	12123	19582	3650	4926
88	11559	12813	9424	10611	9831	9035	8624	8911	8806	5655	2960	3021	32552	32479	32653	11585	15132	22688	4793	7050
89	13980	15366	11813	13007	12250	11520	10805	11376	11195	7318	2834	2011	35467	35413	35510	14046	17732	25506	6316	8956
90	14010	15385	11842	13038	12277	11540	10848	11397	11228	7387	2940	2143	35456	35399	35506	14072	17749	25504	6383	9013
91	14184	15565	12016	13211	12453	11719	11014	11576	11400	7534	3056	2233	35651	35595	35698	14248	17930	25695	6532	9169
92	14210	15581	12042	13238	12476	11737	11053	11594	11430	7599	3158	2359	35636	35578	35690	14271	17943	25689	6595	9222
93	14390	15767	12222	13418	12658	11922	11225	11779	11608	7754	3281	2459	35837	35780	35888	14453	18131	25886	6750	9385
94	16833	18192	14666	15863	15098	14351	13686	14211	14059	10226	5732	4881	38167	38102	38243	16891	20550	28252	9223	11855
95	15622	16978	13454	14652	13886	13137	12482	12997	12849	9043	4591	3766	36961	36897	37032	15679	19335	27040	8040	10662
96	15921	17277	13753	14950	14185	13436	12779	13296	13147	9334	4869	4036	37258	37194	37331	15977	19635	27339	8331	10956
97	16204	17562	14037	15234	14469	13720	13061	13580	13431	9612	5135	4295	37541	37476	37614	16261	19919	27623	8607	11235
98	16531	17889	14363	15560	14795	14048	13386	13907	13757	9930	5444	4598	37866	37801	37940	16588	20246	27950	8926	11557

Project:
Vesterhav (19105)

Description:
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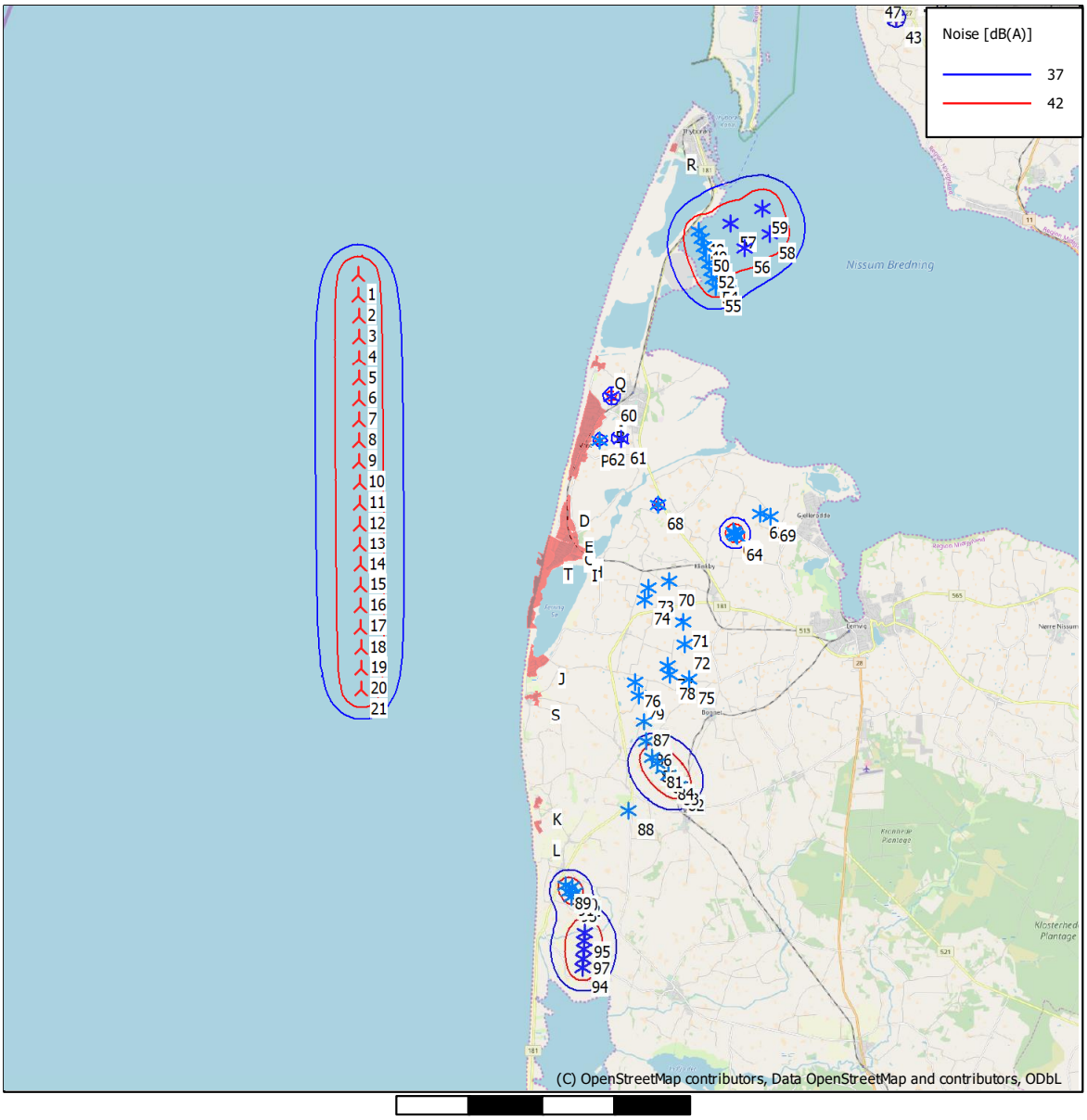
Calculated:
08/04/2020 15.24/3.3.274

DECIBEL - Map 6,0 m/s

Calculation: Vesterhav nord normal VN measured + VS measured r1



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG | Existing WTG | Noise sensitive area

Noise calculation model: Danish 2019. Wind speed: 6,0 m/s
Height above sea level: 0,0 m

Project:
Vesterhav (19105)

Description:
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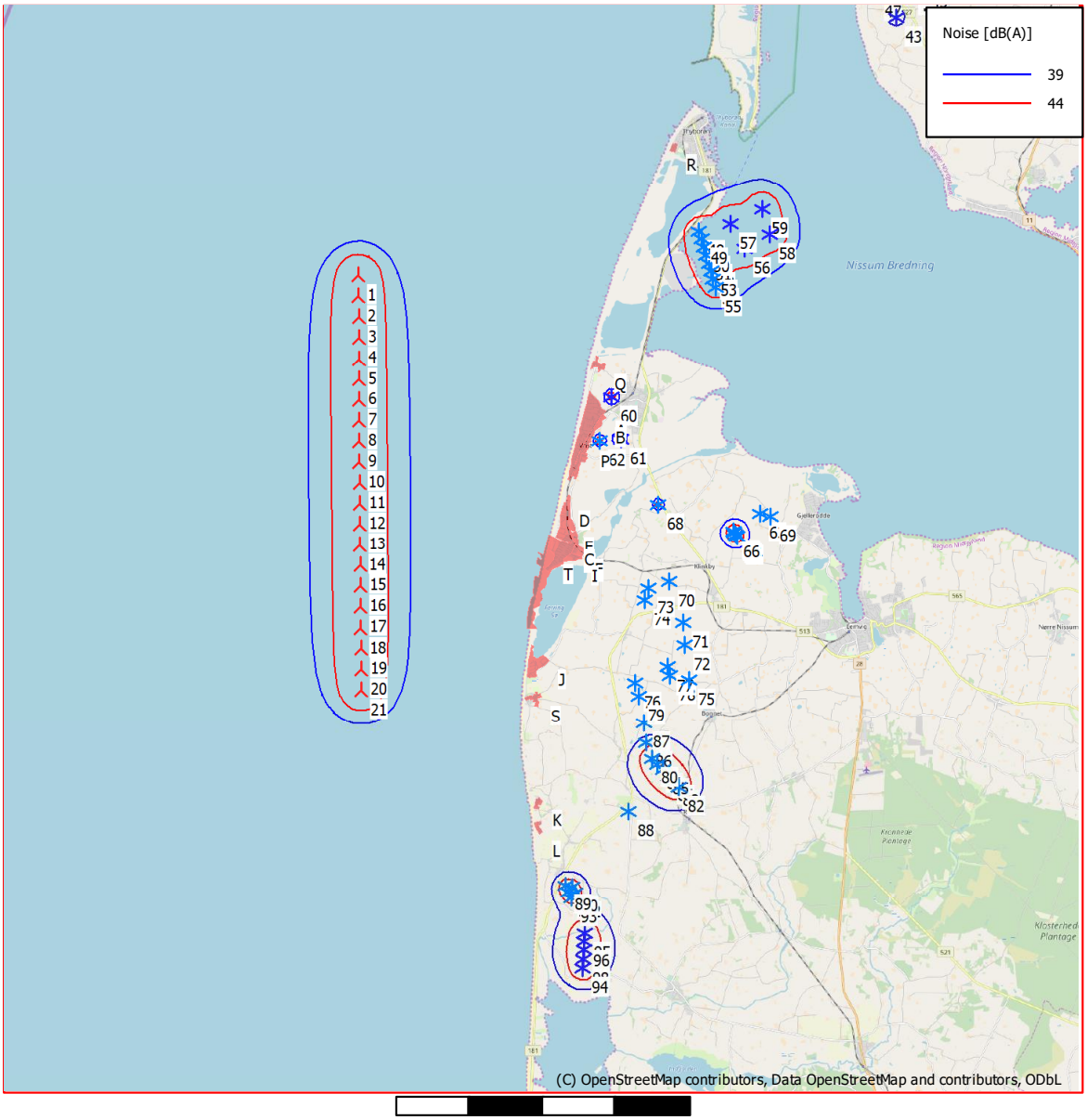
DECIBEL - Map 8,0 m/s

Calculation: Vesterhav nord normal VN measured + VS measured r1



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG | Existing WTG | Noise sensitive area

Noise calculation model: Danish 2019. Wind speed: 8,0 m/s
Height above sea level: 0,0 m

Appendix B. WindPRO Calculation: Low Frequency Noise

Project:
Vesterhav (19105)

Description:
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Calculated:
09/04/2020 03.51/3.3.274

DECIBEL - Main Result

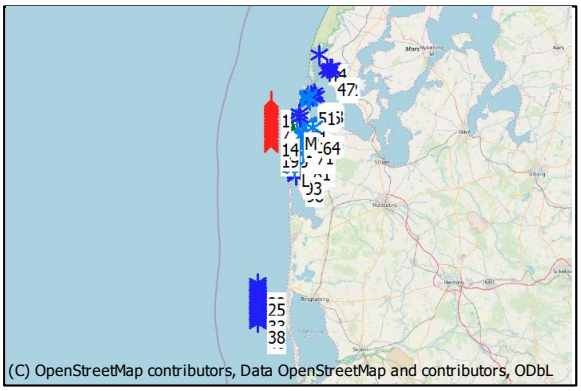
Calculation: VN Vesterhav nord LF measured + VS measured r1

Noise calculation model:
Danish low frequency 2019

The calculation is based on "BEK nr 135 af 07/02/2019" from the Danish Environmental Agency.
For wind turbines classified as offshore wind turbines multiple reflections (Lm) are applied.

The noise impact from WTGs are not allowed to exceed the following limits: (Wind speeds in 10 m height)
1) At outdoor areas maximum 15 m from neighbor settlements in the open land.
a) 44 db(A) at wind speed 8 m/s.
b) 42 db(A) at wind speed 6 m/s.
2) At outdoor areas in residential or recreational areas.
a) 39 db(A) at wind speed 8 m/s in residential areas.
b) 37 db(A) at wind speed 6 m/s in residential areas.
The low frequency noise impact from WTGs are not allowed to exceed 20 dB indoor at wind speeds 8 and 6 m/s
The limits are not to be taken into acount for houses belonging to WTG owner
Den lavfrekvente støj beregnes indendøre og må ikke overstige 20 dB ved vindhastigheder på 6 og 8 m/s i 10 m højde

All coordinates are in
UTM (north)-ETRS89 Zone: 32



Scale 1:2.000.000
New WTG
Existing WTG
Noise sensitive area

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Offshore	Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef
			[m]					[kW]	[m]	[m]				[m/s]	[dB(A)]	[m/s]	[dB(A)]
1	440.218,6	6.279.599,5	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
2	440.213,8	6.278.889,0	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
3	440.208,9	6.278.178,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
4	440.204,6	6.277.468,1	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
5	440.199,1	6.276.757,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
6	440.194,2	6.276.047,1	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
7	440.189,3	6.275.336,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
8	440.184,4	6.274.626,2	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
9	440.179,5	6.273.915,7	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
10	440.174,6	6.273.205,2	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
11	440.169,8	6.272.494,7	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
12	440.164,9	6.271.784,3	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
13	440.160,0	6.271.073,8	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
14	440.155,1	6.270.363,3	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
15	440.150,2	6.269.652,8	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
16	440.145,3	6.268.942,4	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
17	440.140,4	6.268.231,9	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
18	440.135,5	6.267.521,4	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
19	440.130,6	6.266.810,9	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
20	440.125,7	6.266.100,5	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
21	440.120,9	6.265.390,0	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
22	434.956,1	6.221.842,7	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
23	434.947,1	6.221.157,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
24	434.938,2	6.220.472,5	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
25	434.929,3	6.219.787,4	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
26	434.920,6	6.219.102,3	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
27	434.911,6	6.218.417,2	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
28	434.901,9	6.217.732,1	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
29	434.892,8	6.217.047,0	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
30	434.883,8	6.216.361,9	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
31	434.874,7	6.215.676,8	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
32	434.865,6	6.214.991,7	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
33	434.856,5	6.214.306,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
34	434.847,5	6.213.621,6	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
35	434.838,4	6.212.936,5	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
36	434.829,3	6.212.251,4	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
37	434.820,1	6.211.566,3	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
38	434.811,2	6.210.881,2	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
39	434.802,1	6.210.196,1	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
40	434.793,0	6.209.511,0	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
41	434.784,0	6.208.825,9	0,0	Siemens SWT-8.0-167 8000 167...		Siemens	SWT-8.0-167-8.0008.000		167,0	109,10	Yes	USER	Standard+PB+HWRT - measured Østerild - 202004	8,0	93,9	8,0	98,5
42	459.277,6	6.289.217,5	55,0	57071500000030734: 150 kW	No...	BONUS	MK II-150/30	150	23,8	30,00		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b
43	458.802,1	6.288.184,8	50,0	57071500000000312121: 600 kW	No...	VESTAS	V42-600	600	42,0	40,50		KST	Kildestøjsprojekt	6,0	89,3 b	8,0	90,8 b
44	455.718,9	6.293.657,0	17,5	57071500000001379320: 25 kW	No...	HSWind	Viking 25-25	25	13,0	18,00		USER	Viking 25 januar 2011	6,0	75,4 b	8,0	76,6 b
45	459.707,1	6.289.342,0	50,0	57071500000001464545: 10 kW	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
46	459.272,8	6.289.448,0	51,9	57071500000001468925: 10 kW	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
47	458.113,4	6.289.043,8	36,7	57071500000001481528: 10 kW	Yes	THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
48	451.964,7	6.280.971,4	0,0	57071500000000059537: 2000 kW	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
49	452.043,8	6.280.694,6	0,0	57071500000000059544: 2000 kW	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
50	452.122,8	6.280.417,4	0,0	57071500000000062568: 2000 kW	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
51	452.200,7	6.280.142,5	0,0	57071500000000062575: 2000 kW	Yes	VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
52	452.276,6	6.279.874,5	0,0	57071500000000062599: 2300 kW	Yes	Siemens	SWT-2.3-82 VS-2.300	2300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	92,6 f	8,0	94,5 f
53	452.354,4	6.279.600,0	0,0	57071500000000062605: 2300 kW	Yes	Siemens	SWT-2.3-82 VS-2.300	2300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	92,6 f	8,0	94,5 f
54	452.432,8	6.279.326,1	0,0	57071500000000062612: 2300 kW	Yes	Siemens	SWT-2.3-82 VS-2.300	2300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	92,6 f	8,0	94,5 f
55	452.510,4	6.279.051,4	0,0	57071500000000062629: 2300 kW	Yes	Siemens	SWT-2.3-82 VS-2.300	2300	82,4	78,30		EMD	Level 0 -SWT-2.3-82VS rev2- 104.5 dB - 04-2016	6,0	92,6 f	8,0	94,5 f
56	453.509,6	6.280.334,5	0,0	57131313470140428O: 7000 kW	Yes	Siemens	SWT-7.0-154-7.0007.000		154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	95,3 f	8,0	97,1 f
57	453.063,6	6.281.195,5	0,0	57131313470240428O: 7000 kW	Yes	Siemens	SWT-7.0-154-7.0007.000		154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	95,3 f	8,0	97,1 f
58	454.406,6	6.280.816,5	0,0	57131313470340428O: 7000 kW	Yes	Siemens	SWT-7.0-154-7.0007.000		154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	95,3 f	8,0	97,1 f
59	454.152,6	6.281.690,5	0,0	57131313470440428O: 7000 kW	Yes	Siemens	SWT-7.0-154-7.0007.000		154,0	97,30		USER	Level 0 - warranted - standard - 2014-12	6,0	95,3 f	8,0	97,1 f
60	448.883,8	6.275.324,7	2,5	57071500000000037108: 600 kW	No...	BONUS	MK IV-600/120	600	44,0	46,00		KST	Kildestøjsprojekt	6,0	89,3 b	8,0	90,8 b
61	449.170,5	6.273.883,5	0,0	57071500000000036750: 150 kW	No...	BONUS	-150/30	150	23,0	24,50		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b

To be continued on next page...

Project:
Vesterhav (19105)

Description:
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09/04/2020 03.51/3.3.274

DECIBEL - Main Result

Calculation: VN Vesterhav nord LF measured + VS measured r1

...continued from previous page

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Offshore	Noise data Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef
			[m]					[kW]	[m]	[m]				[m/s]	[dB(A)]	[m/s]	[dB(A)]
62	448.438,2	6.273.834,1	2,5	57131313470040257 7: 10 kWVes...		GENVIND	-15	15	12,6	18,20		USER	Runtime input	6,0	75,4 b	8,0	76,6 b
63	453.963,7	6.271.281,5	3,2	57131313470040283 6: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
64	453.141,1	6.270.498,2	3,2	57071500000003721 4: 225 kW...		VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b
65	453.098,5	6.270.554,6	5,0	57071500000003722 1: 225 kW...		VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b
66	453.054,6	6.270.610,7	5,0	57071500000003723 8: 225 kW...		VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b
67	453.011,4	6.270.666,9	5,0	57071500000003724 5: 225 kW...		VESTAS	V27-225/50	225	27,0	31,50		KST	Kildestøjsprojekt	6,0	85,4 b	8,0	86,9 b
68	450.443,4	6.271.615,3	28,7	57131313470040244 7: 25 kWNb...		HSWind	Viking 25-25	25	13,0	18,00		USER	Viking 25 januar 2011	6,0	75,4 b	8,0	76,6 b
69	454.319,3	6.271.176,6	12,3	57131313470040272 0: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
70	450.794,5	6.268.975,3	20,0	57131313470040280 5: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
71	451.246,4	6.267.559,0	20,2	57131313470040293 5: 10 kWVes...		GAIA WIND	GAIA 11 KW-11	11	13,0	18,20		USER	Støjmålinger	6,0	69,4	8,0	70,7
72	451.303,0	6.266.795,4	27,5	57131313470040317 8: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
73	450.063,2	6.268.751,4	18,8	57131313470040325 3: 10 kWVes...		THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
74	449.943,8	6.268.349,0	25,2	57131313470040335 2: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
75	451.434,6	6.265.597,5	46,1	57131313470040278 2: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
76	449.568,6	6.265.510,0	43,5	57131313470040287 4: 10 kWVes...		THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
77	450.712,1	6.266.073,9	38,5	57131313470040326 0: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
78	450.762,1	6.265.760,0	52,5	57131313470040336 9: 10 kWVes...		Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	72,2	8,0	72,9
79	449.678,9	6.265.052,8	38,1	57131313470040337 6: 10 kWVes...		Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	72,2	8,0	72,9
80	450.128,6	6.262.881,5	35,0	57071500000008336 5: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
81	450.319,7	6.262.674,2	33,7	57071500000012031 2: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
82	451.035,6	6.261.892,5	27,5	57071500000014716 6: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
83	450.863,6	6.262.080,5	30,0	57071500000014731 9: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
84	450.682,6	6.262.278,5	31,0	57071500000014736 4: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
85	450.501,6	6.262.476,5	32,1	57071500000014737 1: 2000 kW...		VESTAS	V80-2.0MW-2.000	2.000	80,0	78,00		USER	Level 0 - GS - Mode 0 - 2013-06	6,0	92,2	8,0	95,0
86	449.938,2	6.263.434,2	34,0	57131313470040296 6: 25 kWVes...		Solid Wind Power	SWP-25-25	25	14,0	18,00		EMD	SWP-25	6,0	72,2	8,0	72,9
87	449.873,8	6.264.131,4	39,6	57131313470040297 3: 10 kWVes...		Solid Wind Power	SWP-10-10/7	10	14,0	18,00		USER	SWP 25 27 nov 2013	6,0	72,2	8,0	72,9
88	449.273,0	6.261.061,8	17,5	57131313470040313 0: 10 kWVes...		THY-MØLLEN	10-10	10	7,1	21,00		USER	Thymøllen	6,0	69,6	8,0	76,7
89	447.095,4	6.258.491,4	10,0	57071500000003821 1: 750 kW...		MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	88,9 b	8,0	91,9 b
90	447.314,1	6.258.459,0	10,0	57071500000003822 8: 750 kW...		MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	88,9 b	8,0	91,9 b
91	447.181,6	6.258.286,4	10,0	57071500000003823 5: 750 kW...		MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	88,9 b	8,0	91,9 b
92	447.398,7	6.258.258,8	10,0	57071500000003824 2: 750 kW...		MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	88,9 b	8,0	91,9 b
93	447.270,2	6.258.079,0	9,6	57071500000003825 9: 750 kW...		MICON	M1500-750/175	750	44,0	40,40		KST	Kildestøjsprojekt	6,0	88,9 b	8,0	91,9 b
94	447.655,7	6.255.636,8	0,0	Generisk 107dB 4000 120.0 ! -Yes		Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	93,4 f	8,0	97,4 f
95	447.724,7	6.256.849,8	0,9	Generisk 107dB 4000 120.0 ! -Yes		Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	93,4 f	8,0	97,4 f
96	447.707,7	6.256.550,8	2,5	Generisk 107dB 4000 120.0 ! -Yes		Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	93,4 f	8,0	97,4 f
97	447.691,7	6.256.266,8	2,5	Generisk 107dB 4000 120.0 ! -Yes		Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	93,4 f	8,0	97,4 f
98	447.672,7	6.255.939,8	0,4	Generisk 107dB 4000 120.0 ! -Yes		Generisk	107dB-4.000	4.000	120,0	100,00		USER	Level 0 - generic 106-105 - - 2016-07	6,0	93,4 f	8,0	97,4 f

f) From other hub height
b) Data from Danish Environmental Agency

Calculation Results

Sound level

Noise sensitive area No.	Name	Easting	Northing	Z [m]	Imission height [m]	Wind speed [m/s]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Demands fulfilled ? Noise
A	Vrist sommerhusområde 1	448.436,6	6.275.143,8	2,5	1,5	6,0	20,0	13,8	Yes
A						8,0	20,0	16,3	Yes
B	Vrist sommerhus område 2	448.594,6	6.274.743,8	1,8	1,5	6,0	20,0	12,2	Yes
B						8,0	20,0	15,1	Yes
C	Vejlby sommerhusområde 1	446.988,1	6.271.300,5	2,5	1,5	6,0	20,0	8,8	Yes
C						8,0	20,0	13,8	Yes
D	Vejlby sommerhusområde 2	447.321,2	6.271.887,9	1,4	1,5	6,0	20,0	8,2	Yes
D						8,0	20,0	13,1	Yes
E	Vejlby sommerhusområde 3	447.307,4	6.271.104,0	2,5	1,5	6,0	20,0	8,1	Yes
E						8,0	20,0	12,9	Yes
F	Vejlby sommerhusområde 4	447.380,2	6.270.651,9	2,4	1,5	6,0	20,0	8,0	Yes
F						8,0	20,0	12,8	Yes
G	Vejlby sommerhusområde 5	446.512,1	6.269.443,6	2,3	1,5	6,0	20,0	9,1	Yes
G						8,0	20,0	14,0	Yes
H	Vejlby sommerhusområde 6	447.442,0	6.269.965,3	1,6	1,5	6,0	20,0	7,9	Yes
H						8,0	20,0	12,6	Yes
I	Vejlby sommerhusområde 7	447.145,6	6.269.746,4	0,3	1,5	6,0	20,0	8,1	Yes
I						8,0	20,0	12,8	Yes
J	Ferring sommerhusområde	445.870,6	6.266.013,3	2,5	1,5	6,0	20,0	9,0	Yes
J						8,0	20,0	13,7	Yes
K	Trans sommerhusområde	446.203,4	6.261.181,6	14,3	1,5	6,0	20,0	9,4	Yes
K						8,0	20,0	13,6	Yes
L	Fjaltring sommerhusområde	446.222,4	6.260.303,1	7,5	1,5	6,0	20,0	10,2	Yes
L						8,0	20,0	14,4	Yes
M	Strandvejen 117, Harbøre	447.598,9	6.272.536,1	2,5	1,5	6,0	20,0	4,0	Yes
M						8,0	20,0	8,4	Yes
N	Strandvejen 119, Harbøre	447.642,0	6.272.526,8	2,5	1,5	6,0	20,0	4,0	Yes
N						8,0	20,0	8,3	Yes
O	Vrist blandet bolig og erhverv	448.160,5	6.273.786,5	2,5	1,5	6,0	20,0	6,0	Yes
O						8,0	20,0	9,4	Yes
P	Ferring klit Rekreativt område	445.883,2	6.267.807,9	4,0	1,5	6,0	20,0	5,6	Yes
P						8,0	20,0	10,2	Yes

Project:
Vesterhav (19105)

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Calculated:
09/04/2020 03.51/3.3.274

DECIBEL - Main Result

Calculation: VN Vesterhav nord LF measured + VS measured r1

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	8903	9645	10387	10484	11052	11461	11218	11868	12040	13997	18982	19765	10216	10253	9670	11037
2	8603	9270	9878	9977	10525	10918	10654	11322	11473	13355	18311	19089	9742	9780	9272	10470
3	8353	8913	9396	9495	10020	10396	10109	10794	10919	12722	17643	18417	9298	9338	8900	9922
4	8155	8598	8944	9044	9537	9897	9585	10289	10383	12096	16978	17747	8889	8930	8557	9395
5	7972	8332	8527	8628	9082	9426	9087	9809	9870	11481	16317	17081	8519	8561	8252	8894
6	7785	8119	8151	8252	8662	8986	8618	9359	9382	10877	15660	16417	8195	8238	7995	8423
7	7606	7965	7818	7922	8281	8582	8184	8942	8924	10287	15008	15757	7921	7965	7768	7988
8	7441	7872	7509	7644	7946	8220	7792	8564	8501	9713	14361	15102	7703	7747	7556	7595
9	7300	7842	7257	7424	7662	7906	7446	8230	8118	9158	13721	14451	7547	7591	7405	7249
10	7201	7877	7067	7267	7436	7645	7154	7946	7782	8625	13089	13807	7454	7498	7321	6904
11	7171	7974	6922	7177	7272	7442	6924	7700	7498	8121	12464	13169	7429	7472	7304	6609
12	7212	8134	6761	7155	7175	7304	6751	7501	7272	7649	11850	12539	7472	7514	7357	6380
13	7321	8350	6670	7171	7147	7233	6558	7366	7111	7216	11246	11919	7581	7622	7477	6223
14	7497	8620	6654	7252	7189	7231	6423	7298	7018	6830	10653	11309	7754	7793	7662	6112
15	7734	8939	6714	7402	7282	7299	6365	7299	6996	6498	10074	10711	7987	8024	7906	5996
16	8027	9300	6847	7614	7435	7434	6387	7368	7041	6231	9512	10128	8275	8310	8205	5846
17	8370	9701	7050	7886	7651	7634	6486	7505	7156	6036	8972	9562	8611	8644	8552	5751
18	8758	10135	7317	8210	7925	7892	6660	7704	7338	5901	8456	9016	8992	9022	8943	5725
19	9184	10600	7640	8580	8251	8192	6903	7963	7583	5795	7971	8495	9410	9439	9371	5771
20	9644	11090	8014	8992	8624	8532	7208	8274	7884	5722	7522	8003	9862	9889	9832	5893
21	10133	11604	8431	9439	9037	8916	7568	8633	8235	5733	7115	7546	10344	10368	10321	6096
22	52134	53622	50013	51170	50480	49843	48875	49688	49372	45223	40883	40077	52246	52248	52242	46862
23	52801	54288	50679	51837	51146	50507	49542	50353	50039	45890	41545	40737	52913	52915	52909	47530
24	53470	54955	51346	52505	51812	51172	50210	51018	50705	46558	42208	41398	53581	53582	53577	48199
25	54138	55623	52014	53173	52479	51838	50879	51683	51373	47226	42872	42060	54249	54250	54245	48869
26	54807	56291	52681	53842	53147	52504	51548	52349	52041	47894	43536	42723	54917	54918	54913	49539
27	55476	56959	53349	54511	53815	53170	52217	53016	52709	48563	44201	43386	55586	55587	55582	50209
28	56146	57628	54018	55180	54483	53837	52887	53683	53378	49233	44867	44050	56256	56256	56251	50880
29	56816	58297	54687	55850	55152	54504	53557	54350	54047	49903	45533	44715	56925	56926	56921	51551
30	57487	58966	55356	56520	55821	55172	54227	55018	54716	50573	46200	45381	57595	57596	57591	52223
31	58157	59636	56026	57190	56491	55840	54898	55687	55386	51244	46867	46046	58266	58266	58261	52894
32	58829	60306	56696	57861	57161	56509	55569	56355	56056	51915	47535	46713	58936	58937	58932	53567
33	59500	60977	57367	58532	57831	57178	56241	57024	56727	52587	48203	47380	59607	59608	59603	54239
34	60172	61648	58038	59204	58501	57847	56913	57694	57398	53258	48872	48047	60279	60279	60274	54912
35	60844	62319	58709	59875	59172	58517	57585	58364	58069	53931	49541	48715	60950	60950	60946	55585
36	61516	62990	59380	60548	59844	59187	58257	59034	58741	54603	50211	49384	61622	61622	61617	56258
37	62189	63662	60052	61220	60515	59858	58930	59705	59413	55276	50881	50053	62295	62294	62290	56932
38	62862	64334	60724	61893	61187	60528	59603	60375	60085	55949	51551	50722	62967	62967	62962	57606
39	63535	65006	61397	62566	61859	61200	60276	61047	60757	56622	52222	51392	63640	63639	63635	58280
40	64208	65679	62069	63239	62532	61871	60950	61718	61430	57296	52893	52062	64313	64312	64308	58955
41	64882	66351	62742	63912	63205	62543	61624	62390	62103	57970	53565	52733	64986	64986	64981	59629
42	17653	17989	21004	21027	21598	21881	22215	22274	22527	25993	30578	31321	20363	20346	19019	22469
43	16554	16878	19886	19907	20475	20755	21088	21146	21396	24862	29441	30184	19246	19228	17904	21346
44	19656	20211	23273	23321	23965	24335	24680	24765	25099	28498	33461	34260	22628	22621	21216	24763
45	18022	18346	21353	21374	21940	22218	22550	22608	22855	26321	30876	31614	20713	20696	19373	22812
46	17829	18172	21191	21214	21788	22074	22408	22468	22723	26189	30785	31528	20550	20533	19203	22658
47	16802	17178	20216	20243	20831	21131	21468	21532	21803	25266	29939	30695	19572	19557	18210	21696
48	6658	7081	10146	10183	10802	11146	11489	11568	11889	15312	20232	21031	9498	9487	8109	11642
49	6481	6878	9938	9973	10587	10924	11267	11343	11659	15089	19990	20787	9291	9278	7908	11434
50	6311	6681	9734	9767	10374	10705	11047	11122	11431	14867	19749	20543	9087	9074	7712	11228
51	6152	6492	9536	9566	10167	10490	10832	10904	11207	14650	19510	20302	8890	8876	7524	11025
52	6005	6315	9347	9375	9969	10285	10625	10696	10992	14440	19280	20069	8702	8687	7346	10830
53	5865	6142	9158	9184	9770	10078	10417	10485	10775	14228	19044	19831	8515	8499	7168	10634
54	5736	5977	8975	8998	9576	9876	10213	10280	10561	14019	18811	19595	8335	8318	6996	10444
55	5618	5821	8797	8817	9386	9677	10013	10076	10351	13811	18579	19359	8159	8141	6829	10256
56	7211	7444	10423	10442	11007	11291	11626	11687	11952	15416	20131	20903	9785	9767	8455	11879
57	7512	7848	10884	10913	11506	11820	12160	12229	12521	15972	20784	21568	10240	10224	8880	12368
58	8204	8406	11352	11367	11916	12183	12514	12570	12816	16282	20917	21676	10720	10699	9404	12791
59	8614	8897	11899	11921	12494	12784	13120	13182	13451	16914	21629	22398	11259	11241	9919	13363
60	482	649	3718	3761	4400	4783	5128	5221	5553	8936	14005	14825	3070	3061	1677	5214
61	992	803	2679	2685	3233	3537	3878	3952	4273	7698	12659	13471	2070	2044	1015	4105
62	395	262	2191	2223	2848	3227	3572	3666	3998	7381	12458	13280	1546	1531	282	3684
63	6351	6242	6542	6569	6411	6175	6484	6249	6338	8867	12422	13062	6487	6443	6257	7194
64	6064	6011	5660	5867	5573	5252	5589	5313	5389	7750	11298	11946	5905	5861	5805	6326
65	6005	5943	5619	5814	5528	5214	5549	5277	5354	7745	11317	11968	5846	5802	5742	6289
66	5945	5873	5577	5759	5482	5176	5508	5240	5318	7739	11335	11989	5785	5742	5677	6246

To be continued on next page...

Project:
Vesterhav (19105)

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DECIBEL - Main Result

Calculation: VN Vesterhav nord LF measured + VS measured r1

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
67	5885	5805	5536	5705	5438	5139	5468	5204	5284	7734	11354	12011	5726	5682	5613	6204
68	3148	3204	3137	3035	2975	2965	3180	3069	3191	6491	10899	11662	2990	2946	2907	3794
69	6705	6601	6882	6932	6758	6506	6822	6577	6663	9108	12567	13192	6857	6812	6628	7538
70	4868	5536	3606	4272	3680	3089	3491	3103	3110	4953	8706	9409	4785	4749	4768	4047
71	6234	7000	4715	5542	4868	4166	4505	4151	4098	4791	7820	8453	6171	6138	6155	4869
72	6883	7714	5251	6144	5439	4694	5000	4659	4596	4707	7288	7885	6832	6801	6817	5149
73	4570	5431	3062	3862	3195	2525	2892	2522	2489	4219	8147	8877	4516	4485	4501	3391
74	4839	5770	3203	4081	3377	2650	2982	2630	2575	3899	7736	8462	4799	4770	4784	3383
75	7965	8868	6212	7177	6443	5660	5861	5603	5530	4865	6567	7100	7928	7899	7914	5547
76	7287	8438	5290	6386	5612	4791	4746	4690	4601	3053	5172	5811	7297	7276	7285	3872
77	7199	8171	5388	6382	5636	4841	5010	4777	4701	4097	6359	6952	7173	7146	7159	4714
78	7502	8485	5670	6676	5926	5126	5269	5058	4980	4177	6172	6747	7478	7451	7464	4858
79	7756	8908	5751	6853	6079	5258	5186	5155	5066	3305	4906	5509	7767	7747	7755	4206
80	9966	11124	7931	9053	8275	7458	7273	7350	7258	4903	4049	4420	9980	9961	9969	5995
81	10219	11364	8193	9310	8533	7714	7547	7608	7517	5185	4163	4494	10230	10210	10218	6277
82	11182	12281	9190	10288	9515	8694	8580	8594	8504	6236	4716	4906	11185	11163	11172	7337
83	10949	12059	8949	10051	9278	8457	8331	8355	8265	5984	4567	4789	10953	10932	10941	7082
84	10704	11825	8696	9803	9029	8208	8069	8105	8015	5719	4420	4678	10711	10690	10699	6814
85	10461	11594	8444	9556	8780	7960	7808	7856	7765	5453	4286	4580	10470	10449	10458	6546
86	9383	10547	7347	8469	7691	6873	6697	6765	6674	4389	4107	4560	9398	9378	9386	5458
87	8695	9849	6675	7787	7011	6191	6063	6086	5995	3913	4434	4959	8707	8687	8695	4926
88	11559	12813	9442	10611	9831	9035	8624	8911	8806	5655	2960	3021	11596	11580	11585	7050
89	13980	15366	11812	13007	12250	11520	10805	11376	11195	7318	2834	2011	14054	14046	14046	8956
90	14010	15385	11843	13038	12277	11540	10848	11397	11228	7387	2940	2143	14080	14072	14072	9013
91	14184	15565	12016	13211	12453	11719	11014	11576	11400	7534	3056	2233	14256	14248	14248	9169
92	14210	15581	12043	13238	12476	11737	11053	11594	11430	7599	3158	2359	14279	14270	14271	9222
93	14390	15767	12223	13418	12658	11922	11225	11779	11608	7754	3281	2459	14461	14453	14453	9385
94	16833	18192	14669	15863	15098	14351	13686	14211	14059	10226	5732	4881	16899	16890	16891	11855
95	15622	16978	13458	14652	13886	13137	12482	12997	12849	9043	4591	3766	15687	15677	15679	10662
96	15921	17277	13756	14950	14185	13436	12779	13296	13147	9334	4869	4036	15986	15976	15977	10956
97	16204	17562	14040	15234	14469	13720	13061	13580	13431	9612	5135	4295	16270	16260	16261	11235
98	16531	17889	14366	15560	14795	14048	13386	13907	13757	9930	5444	4598	16597	16587	16588	11557

Project:
Vesterhav (19105)

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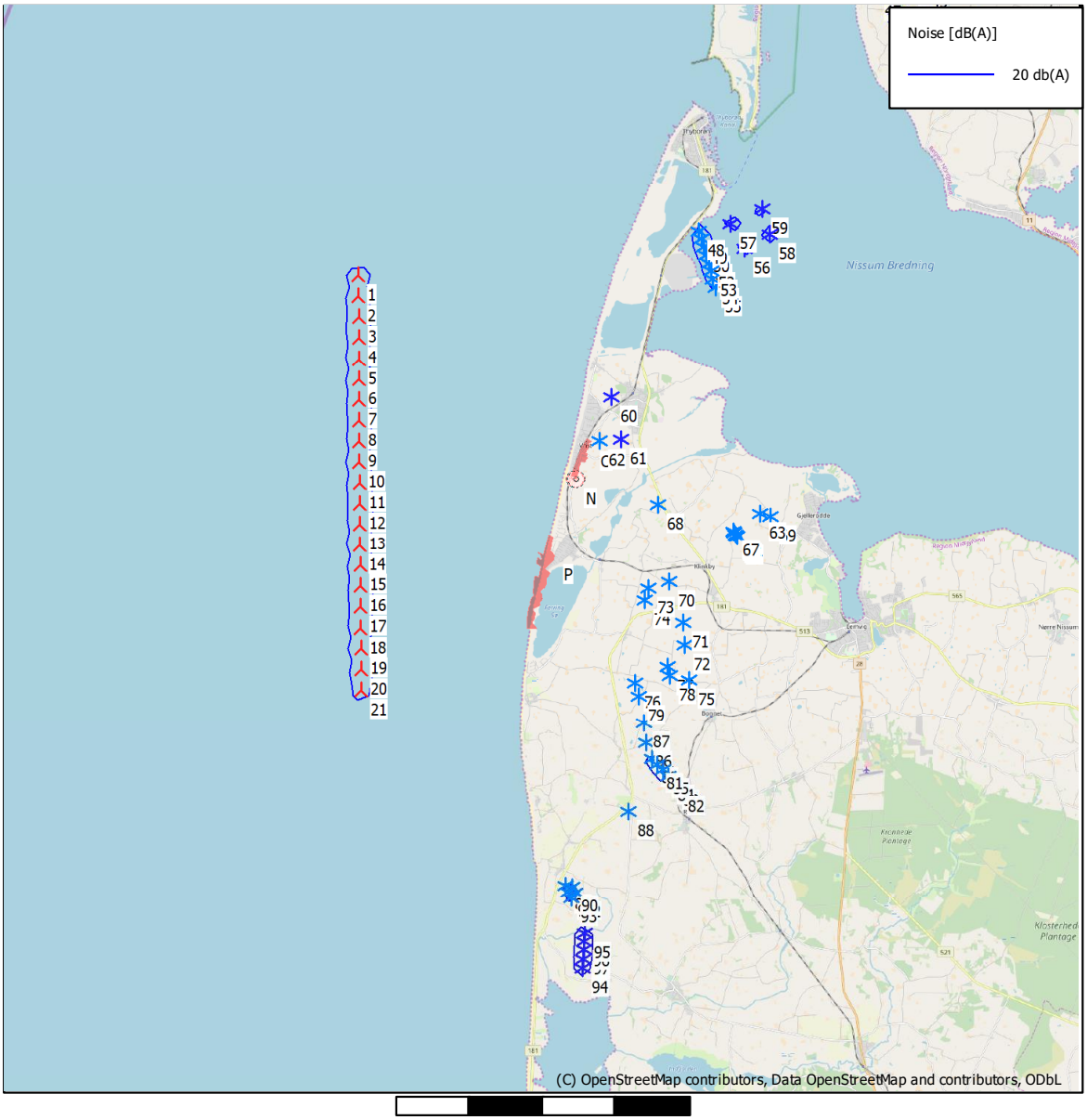
DECIBEL - Map 6,0 m/s Regular dwellings

Calculation: VN Vesterhav nord LF measured + VS measured r1



Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG Existing WTG Noise sensitive area

Noise calculation model: Danish low frequency 2019. Wind speed: 6,0 m/s Regular dwellings
Height above sea level: 0,0 m

Project:
Vesterhav (19105)

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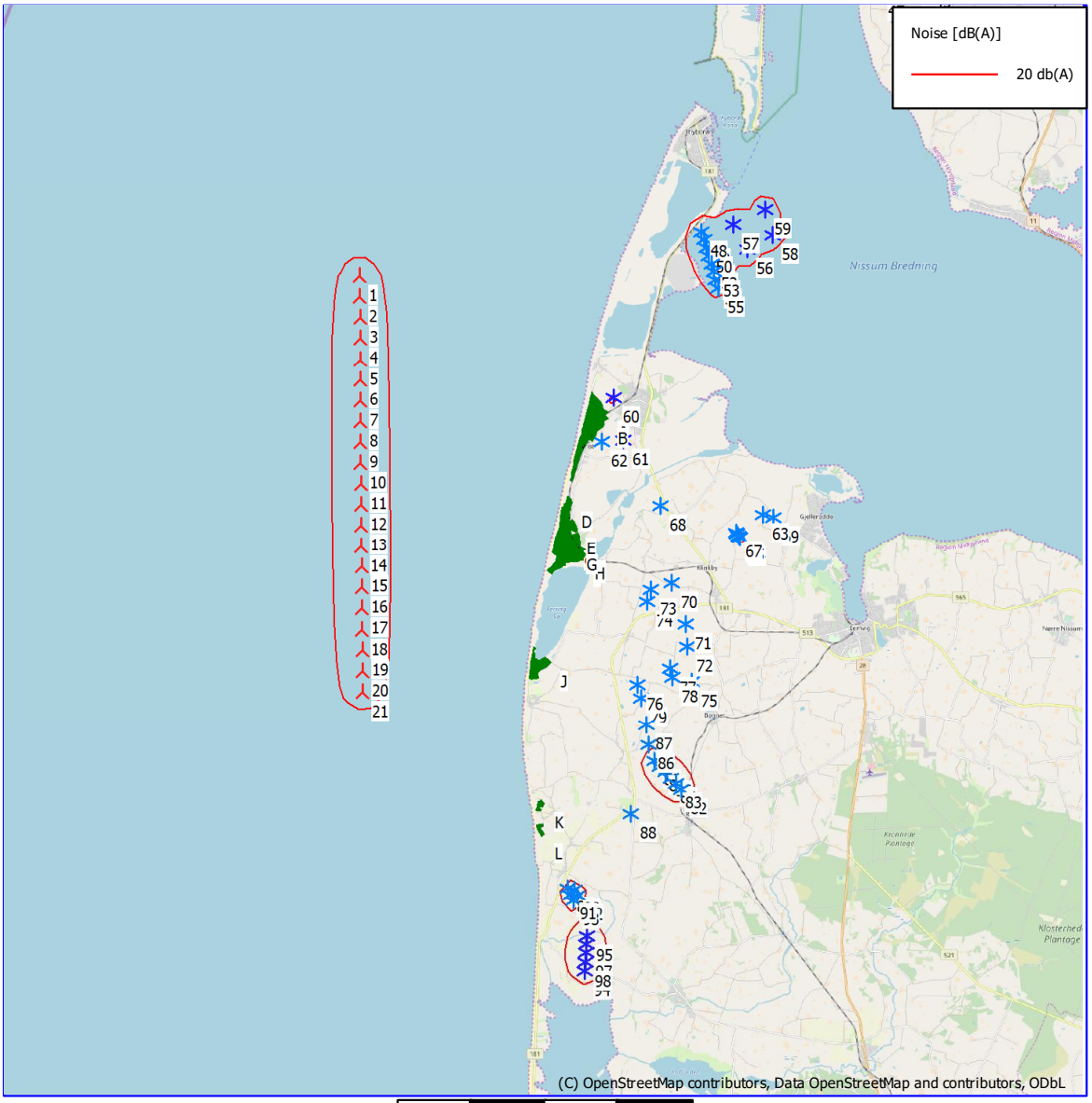
DECIBEL - Map 6,0 m/s Cottage zones

Calculation: VN Vesterhav nord LF measured + VS measured r1



Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG Existing WTG Noise sensitive area

Noise calculation model: Danish low frequency 2019. Wind speed: 6,0 m/s Cottage zones
Height above sea level: 0,0 m

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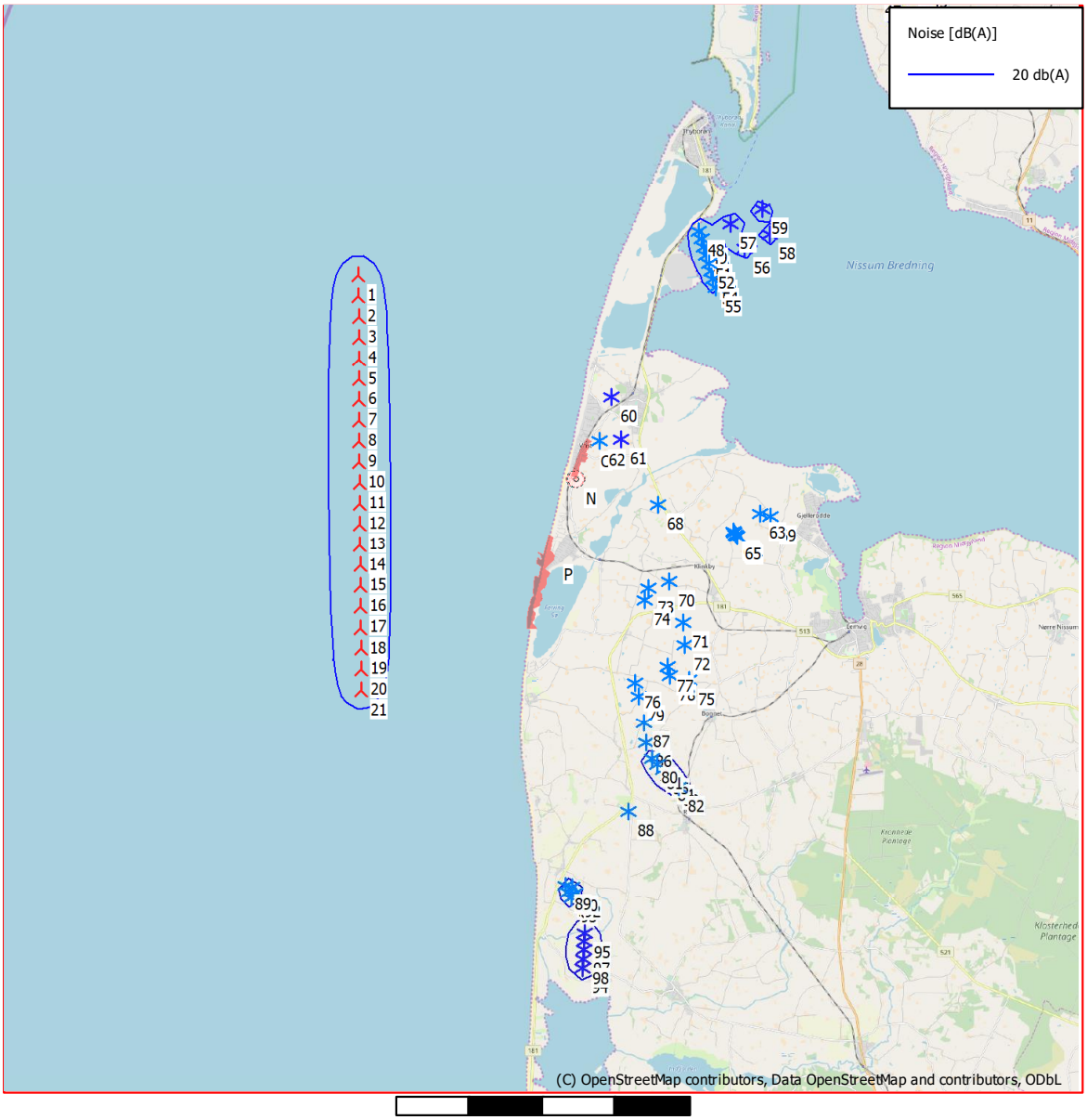
DECIBEL - Map 8,0 m/s Regular dwellings

Calculation: VN Vesterhav nord LF measured + VS measured r1



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG Existing WTG Noise sensitive area

Noise calculation model: Danish low frequency 2019. Wind speed: 8,0 m/s Regular dwellings
Height above sea level: 0,0 m

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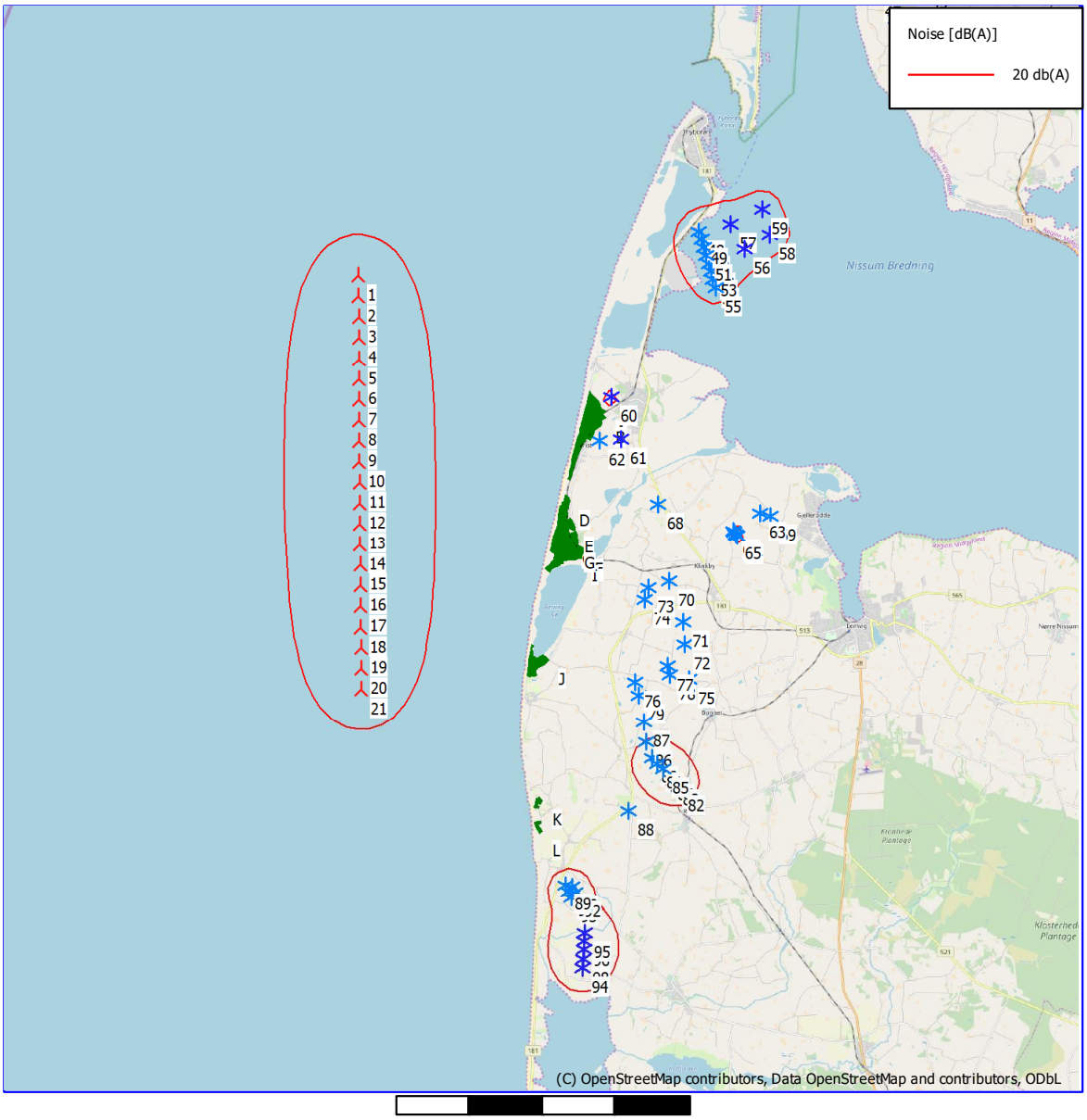
DECIBEL - Map 8,0 m/s Cottage zones

Calculation: VN Vesterhav nord LF measured + VS measured r1



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:200.000, Map center UTM (north)-ETRS89 Zone: 32 East: 446.647,0 North: 6.270.414,8

New WTG Existing WTG Noise sensitive area

Noise calculation model: Danish low frequency 2019. Wind speed: 8,0 m/s Cottage zones
Height above sea level: 0,0 m