

Project:

Anholt

Printed/Page

03-07-2009 14:53 / 1

Licensed user:

EMD International A/S
Niels Jernesvej 10
DK-9220 Aalborg Ø
+45 9635 4444

Calculated:

03-07-2009 14:15/2.7.309

DECIBEL - Main Result

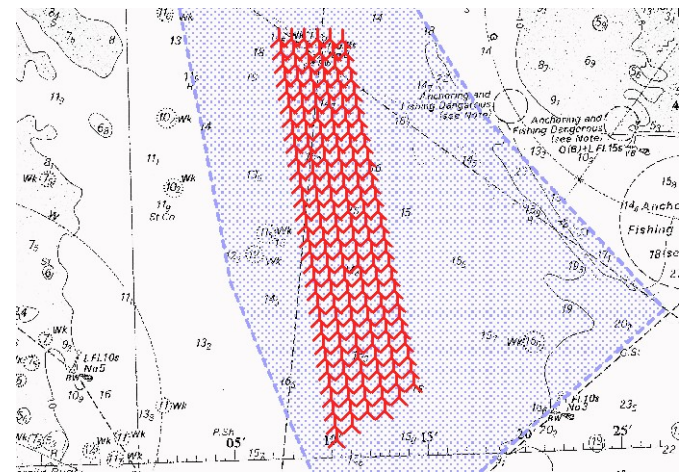
DANISH RULES FOR NOISE CALCULATION.

The calculation is based on the "Bekendtgørelse nr. 1518 af 14. dec 2006" from the Danish Environmental Agency.

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.

If a WTG has pure tones in the noise emission, a penalty of 5 dB is added.



Scale 1:400,000

New WTG

WTGs

UTM WGS84 Zone: 32				WTG type			Noise data										
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	First wind speed [m/s]	LwaRef [dB(A)]	Last wind speed [m/s]	LwaRef [dB(A)]	Pure tones	Octave data
UTM WGS84 Zone: 32																	
1	633,935	6,286,114	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
2	633,253	6,286,125	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
3	632,572	6,286,136	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
4	631,891	6,286,147	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
5	631,210	6,286,158	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
6	630,529	6,286,169	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
7	634,078	6,285,413	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
8	633,389	6,285,423	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
9	632,700	6,285,432	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
10	632,011	6,285,442	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
11	631,322	6,285,451	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
12	630,632	6,285,461	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
13	634,222	6,284,712	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
14	633,525	6,284,720	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
15	632,828	6,284,728	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
16	632,130	6,284,736	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
17	631,433	6,284,744	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
18	630,735	6,284,752	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
19	634,366	6,284,011	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
20	633,661	6,284,017	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
21	632,955	6,284,024	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
22	632,250	6,284,031	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
23	631,544	6,284,037	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
24	630,839	6,284,044	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
25	634,510	6,283,309	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
26	633,797	6,283,315	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
27	633,083	6,283,320	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
28	632,369	6,283,325	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
29	631,656	6,283,331	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
30	630,942	6,283,336	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
31	634,654	6,282,608	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
32	633,932	6,282,612	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
33	633,211	6,282,616	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
34	632,489	6,282,620	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
35	631,767	6,282,623	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
36	631,045	6,282,627	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
37	634,798	6,281,907	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
38	634,068	6,281,909	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
39	633,338	6,281,912	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
40	632,608	6,281,914	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
41	631,878	6,281,916	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
42	631,148	6,281,919	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
43	634,942	6,281,206	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
44	634,204	6,281,207	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
45	633,466	6,281,208	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
46	632,728	6,281,209	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)	6.0	105.0	8.0	107.0	No	Yes
47	631,990	6,281,209	0.0 Siemens SWT-2.3-93 2300 92.6 IOI hu...Yes	Yes	Siemens	SWT-2.3-93-2,300	2,300	92.6	80.0	EMD	Level 0 -- SIEMENS Octave bands 107.0/104.8 dB(A)						

Project:

Anholt

Printed/Page

03-07-2009 14:53 / 6

Licensed user:

EMD International A/S
Niels Jernesvej 10
DK-9220 Aalborg Ø
+45 9635 4444

Calculated:

03-07-2009 14:15/2.7.309

DECIBEL - Assumptions for noise calculation

Noise calculation model:

Danish 2007

Wind speed:

6.0 m/s - 8.0 m/s, step 2.0 m/s

Terrain reduction:

3 dB(A) Offshore

Meteorological coefficient, C0:

0.0 dB

Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

Pure tones:

Pure tone penalty are added to demand: 5.0 m/s

Height above ground level, when no value in NSA object:

1.5 m Don't allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0.0 dB(A)

Octave data required

Air absorption

63	125	250	500	1,000	2,000	4,000	8,000
[db/km]	[db/km]	[db/km]	[db/km]	[db/km]	[db/km]	[db/km]	[db/km]
0.1	0.4	1.0	2.0	3.6	8.8	29.0	104.5

WTG: Siemens SWT-2.3-93 2300 92.6 !O!

Noise: Level 0 - - SIEMENS Octave bands 107,0/104,8 dB(A)

Source Source/Date Creator Edited

SIEMENS 12-07-2007 EMD 22-08-2007 14:38

Noise reduction available. Please contact Siemens for further information.

Status	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
				63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	6.0	105.0	No	From nearest other wind speed							
From Windcat	8.0	107.0	No	84.3	93.3	100.0	100.6	97.0	93.0	88.2	83.4
				86.3	95.3	102.0	102.6	99.0	95.0	90.2	85.4

Project:

Anholt

Printed/Page

03-07-2009 14:53 / 7

Licensed user:

EMD International A/S

Niels Jernesvej 10

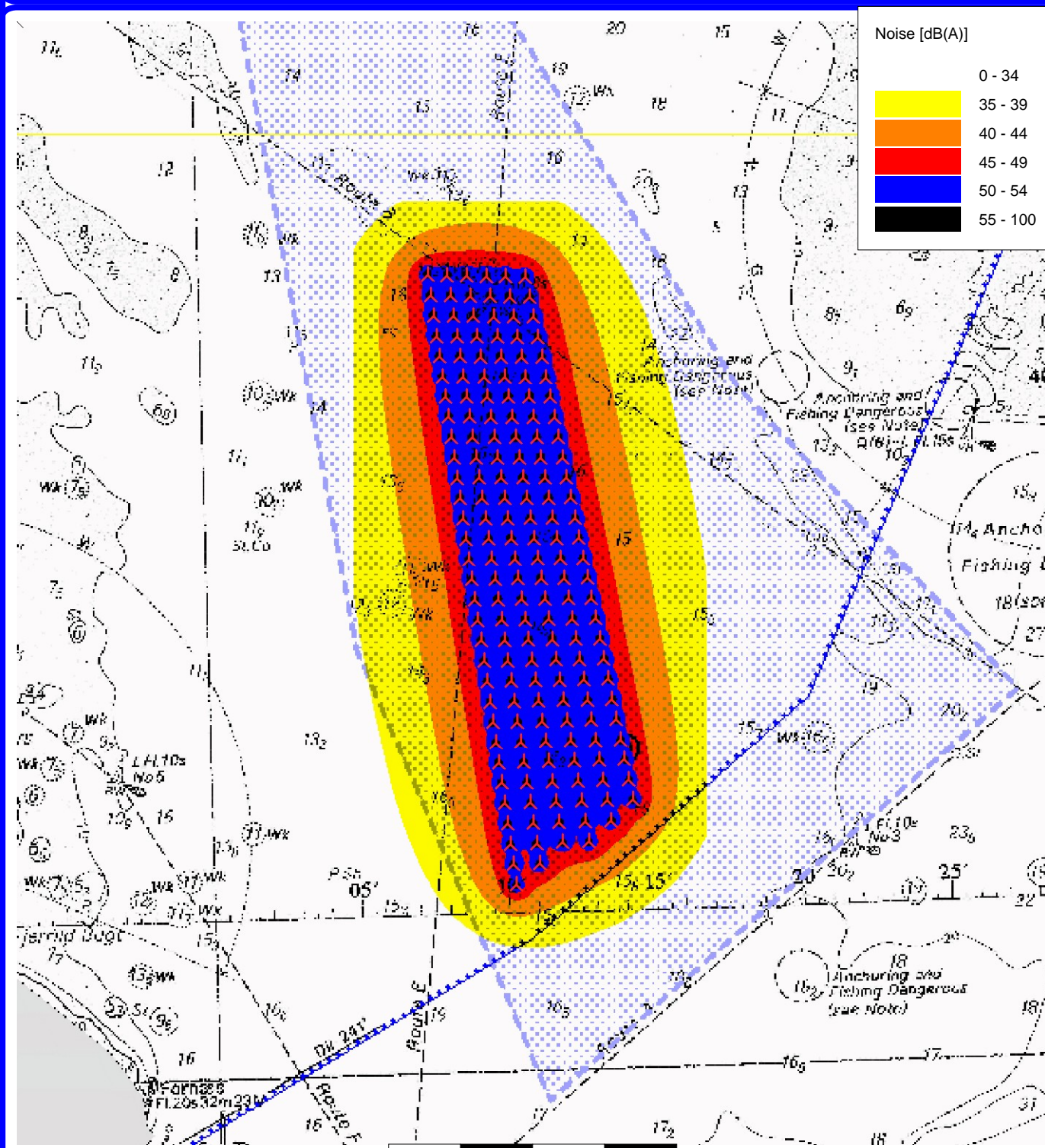
DK-9220 Aalborg Ø

+45 9635 4444

Calculated:

03-07-2009 14:15/2.7.309

DECIBEL - Map8.0 m/s



0 2.5 5 7.5 10km

Map: WindPRO map , Print scale 1:200,000, Map center UTM WGS 84 Zone: 32 East: 634,103 North: 6,275,543

Noise calculation model: Danish 2007. Wind speed: 8.0 m/s

▲ New WTG