

Project:  
Oremandsgaard

Description:  
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Calculated:  
24/02/2023 14.09/3.6.365

## DECIBEL - Main Result

Calculation: V136 4.5MW

Noise calculation model:  
Danish 2019

The calculation is based on "BEK nr 135 af 07/02/2019" 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.

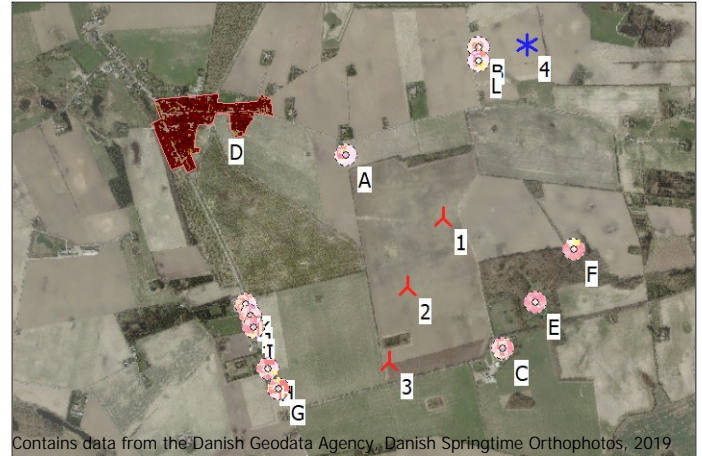
a) 39 db(A) at wind speed 8 m/s in residential areas.

b) 37 db(A) at wind speed 6 m/s in residential areas.

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 account for houses belonging to WTG owner

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



Contains data from the Danish Geodata Agency, Danish Springtime Orthophotos, 2019

Scale 1:40.000

▲ New WTG  
★ Existing WTG  
■ Noise sensitive area

## WTGs

	Easting	Northing	Z	Row data/Description	WTG type			Power, rated	Rotor diameter	Hub height	Noise data		First wind speed [m/s]	LwaRef [dB(A)]	Last wind speed [m/s]	LwaRef [dB(A)]
					Valid	Manufact.	Type-generator				Creator	Name				
				[m]				[kW]	[m]	[m]						
1	695.329	6.107.516	30,6	V136 4.5MW - 1	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4 - serrations - 82m hh - 2021-03	6,0	103,2	8,0	103,9
2	695.162	6.107.143	30,2	V136 4.5MW - 2	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4 - serrations - 82m hh - 2021-03	6,0	103,2	8,0	103,9
3	695.080	6.106.742	34,9	V136 4.5MW - 3	Yes	VESTAS	V136-4.5-4.500	4.500	136,0	82,0	USER	PO4 - serrations - 82m hh - 2021-03	6,0	103,2	8,0	103,9
4	695.733	6.108.453	40,1	570714700000008016: 15...	No	BONUS	-150/30	150	23,0	24,5	KST	Kildestøjsprojekt	6,0	95,7 f	8,0	96,9 f

f) From other hub height

## Calculation Results

### Sound level

Noise sensitive area		Demands				Sound level				Demands fulfilled ?			
No.	Name	Easting	Northing	Z	Immission height	Wind speed	Noise	Distance	From WTGs	Distance to noise demand	Noise	Distance	All
				[m]	[m]	[m/s]	[dB(A)]	[m]	[dB(A)]	[m]	[dB(A)]	[m]	Yes
A	Rekkendevej 24	694.802	6.107.828	36,1	1,5	6,0	42,0	600	38,9	200	Yes	Yes	Yes
A						8,0	44,0		39,4	270	Yes		Yes
B	Lygtevej 6	695.481	6.108.424	35,0	1,5	6,0	42,0		38,8	96	Yes		Yes
B						8,0	44,0		39,8	111	Yes		Yes
C	Oremandsgaard	695.680	6.106.840	36,5	1,5	6,0	42,0	600	40,5	104	Yes	Yes	Yes
C						8,0	44,0		41,0	189	Yes		Yes
D	Allerslev	694.402	6.108.014	31,3	1,5	6,0	37,0	600	34,2	274	Yes	Yes	Yes
D						8,0	39,0		34,8	392	Yes		Yes
E	Oremandsgaard Alle 1	695.842	6.107.088	36,8	1,5	6,0	42,0	600	39,4	181	Yes	Yes	Yes
E						8,0	44,0		40,0	265	Yes		Yes
F	Oremandsgaard Alle 3	696.032	6.107.381	35,7	1,5	6,0	42,0	600	37,5	307	Yes	Yes	Yes
F						8,0	44,0		38,1	377	Yes		Yes
G	Mønvej 162	694.497	6.106.579	32,6	1,5	6,0	42,0	600	38,3	217	Yes	Yes	Yes
G						8,0	44,0		38,9	280	Yes		Yes
H	Mønvej 160	694.438	6.106.680	32,8	1,5	6,0	42,0	600	38,0	248	Yes	Yes	Yes
H						8,0	44,0		38,6	313	Yes		Yes
I	Mønvej 156	694.355	6.106.895	32,6	1,5	6,0	42,0	600	37,4	315	Yes	Yes	Yes
I						8,0	44,0		38,0	390	Yes		Yes
J	Mønvej 154	694.335	6.106.952	32,2	1,5	6,0	42,0	600	37,2	338	Yes	Yes	Yes
J						8,0	44,0		37,8	415	Yes		Yes
K	Mønvej 152	694.301	6.107.016	31,4	1,5	6,0	42,0	600	36,8	378	Yes	Yes	Yes
K						8,0	44,0		37,4	457	Yes		Yes
L	Lygtevej 4	695.486	6.108.357	34,3	1,5	6,0	42,0		38,8	106	Yes		Yes
L						8,0	44,0		39,7	121	Yes		Yes

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## DECIBEL - Main Result

Calculation: V136 4.5MW

Distances (m)

NSA	WTG			
	1	2	3	4
A	612	774	1121	1121
B	920	1320	1729	253
C	762	601	608	1615
D	1052	1155	1429	1389
E	668	682	836	1370
F	716	902	1146	1113
G	1253	872	605	2245
H	1222	859	645	2196
I	1156	844	741	2080
J	1143	848	774	2051
K	1144	870	826	2029
L	855	1256	1665	264

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## DECI BEL - Assumptions for noise calculation

Calculation: V136 4.5MW

Noise calculation model:

Danish 2019

Wind speed (in 10 m height):

6,0 m/s - 8,0 m/s, step 2,0 m/s

Terrain reduction:

-1.5 dB(A) Onshore

-3 dB(A) Offshore

Meteorological coefficient, CO:

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 tones penalty is added to total noise impact at receptors

Noise sensitive area

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

Uncertainty margin:

0,0 dB; Uncertainty margin in model has priority

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

0,0 dB(A)

Octave data required

Frequency dependent 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]
0,11	0,38	1,02	2,00	3,60	8,80	29,00	104,50

All coordinates are in

UTM (north)-ETRS89 Zone: 32

WTG: VESTAS V136-4.5 4500 136.0 !O!

Noise: PO4 - serrations - 82m hh - 2021-03

Source Source/Date Creator Edited

Vestas 31/03/2021 USER 16/12/2021 16.52

DMS no.: 0101-0973\_01

Issued by: VPS V136-4.5 MW

Date 2021-03-31

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
From Windcat	82,0	6,0	103,2	No	82,6	90,8	96,1	98,3	97,6	93,8	87,1	77,3
From Windcat	82,0	8,0	103,9	No	83,0	91,2	96,4	98,9	98,4	95,0	88,7	79,5

WTG: BONUS 150-30 23.0 !O!

Noise: Kildestøjsprojekt

Source Source/Date Creator Edited

Grontmij-EMD 05/06/2014 KST 08/10/2015 10.38

Støjtal baseret på " Støjkatolog over ældre vindmøller i Danmark" , juni 2014.

Usikkerhedstillæg baseret på standard afvigelse:

6 m/s: Tillæg 2,0dB

8 m/s: Tillæg 1,4dB

Tillæg er inkluderet i støjtallene

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
From other hub height	24,5	6,0	95,7	No	75,3	81,4	86,7	91,1	89,7	87,4	83,7	74,9
From other hub height	24,5	8,0	96,9	No	76,6	82,7	87,9	92,4	90,9	88,6	84,9	75,6

Noise sensitive area: A Rekkendevej 24

Predefined calculation standard: Open land

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

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## DECIBEL - Assumptions for noise calculation

Calculation: V136 4.5MW

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: B Lygtevej 6

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

No distance demand  
Pure tone penalty: 0 dB

Noise sensitive area: C Oremandsgaard

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: D Allerslev

Predefined calculation standard: Residential areas  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
37,0 dB(A) 39,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: E Oremandsgaard Alle 1

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: F Oremandsgaard Alle 3

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

Project:  
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## DECI BEL - Assumptions for noise calculation

Calculation: V136 4.5MW

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: G Mønvej 162

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: H Mønvej 160

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: I Mønvej 156

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: J Mønvej 154

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600  
Pure tone penalty: 0 dB

Noise sensitive area: K Mønvej 152

Predefined calculation standard: Open land  
Immission height(a.g.l.): Use standard value from calculation model  
Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]  
42,0 dB(A) 44,0 dB(A)

Distance demand: 600

Project:

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## DECIBEL - Assumptions for noise calculation

Calculation: V136 4.5MW

Pure tone penalty: 0 dB

Noise sensitive area: L Lygtevej 4

Predefined calculation standard: Open land

Immission height(a.g.l.): Use standard value from calculation model

Uncertainty margin: Use default value from calculation model

Noise demand:

6,0 [m/s] 8,0 [m/s]

42,0 dB(A) 44,0 dB(A)

No distance demand

Pure tone penalty: 0 dB



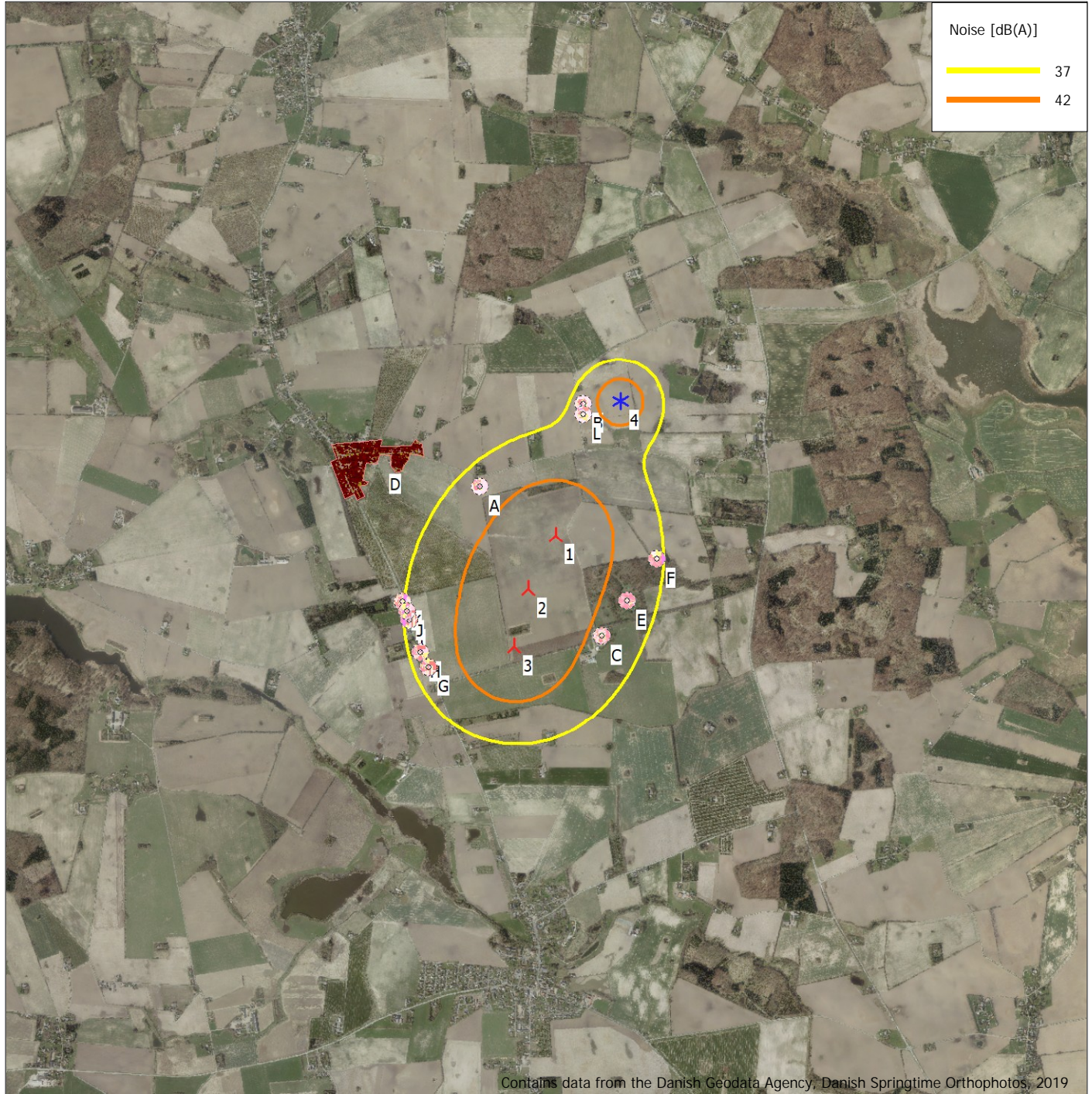
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## DECIBEL - Map 6,0 m/s

Calculation: V136 4.5MW



Contains data from the Danish Geodata Agency, Danish Springtime Orthophotos, 2019

0 500 1000 1500 2000 m

Map: Danish Orthophoto Mosaic, Print scale 1:40.000, Map center UTM (north)-ETRS89 Zone: 32 East: 695.406 North: 6.107.598

1 New WTG

\* Existing WTG

■ Noise sensitive area

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



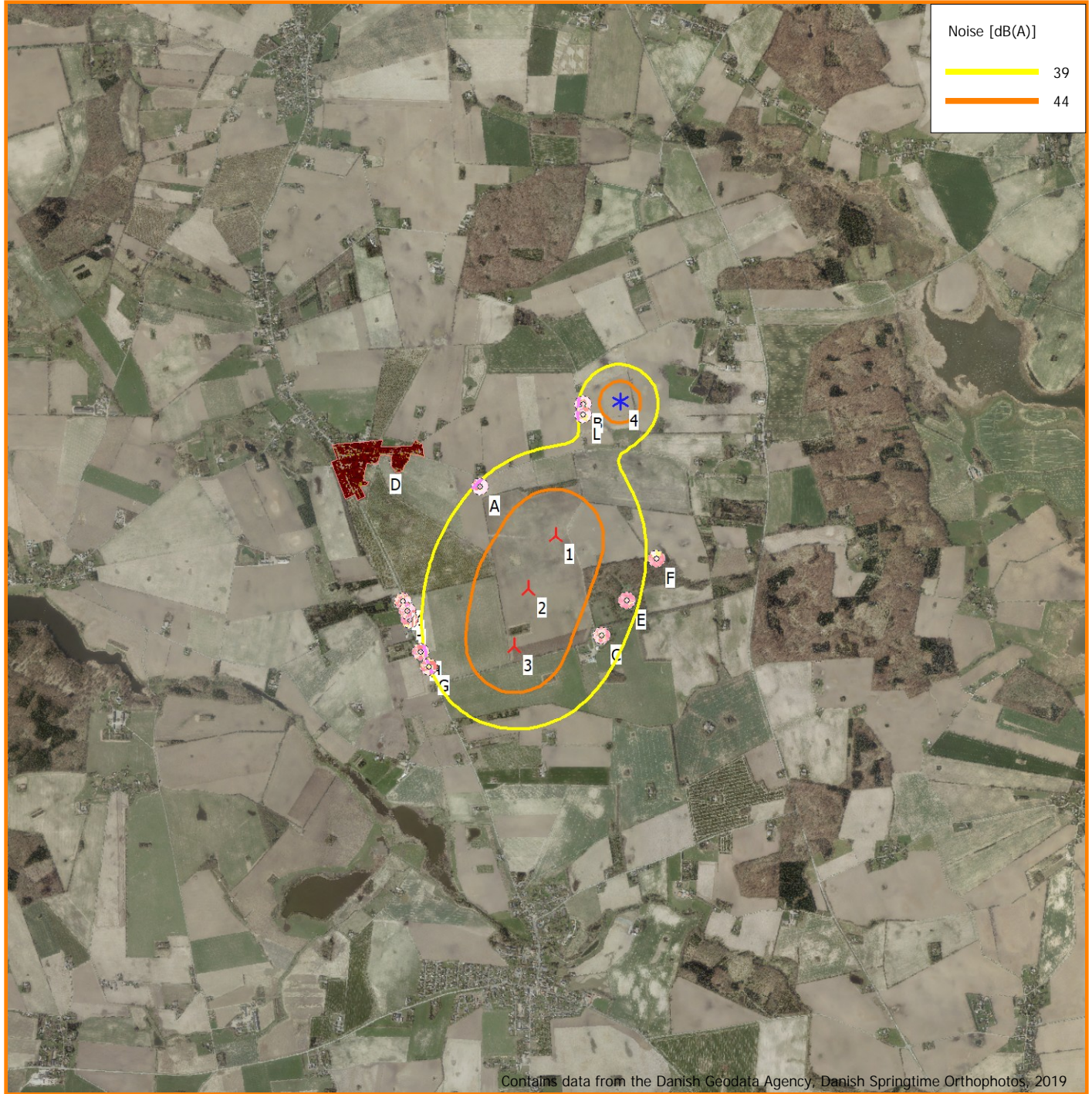
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## DECIBEL - Map 8,0 m/s

Calculation: V136 4.5MW



Contains data from the Danish Geodata Agency, Danish Springtime Orthophotos, 2019

0 500 1000 1500 2000 m

Map: Danish Orthophoto Mosaic, Print scale 1:40.000, Map center UTM (north)-ETRS89 Zone: 32 East: 695.406 North: 6.107.598

▲ New WTG

★ Existing WTG

■ Noise sensitive area

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