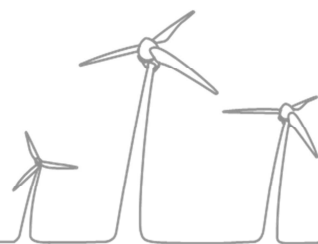


SVEVIND OY AB

SANDBACKA VINDKRAFTSPARK **MILJÖKONSEKVENSBESKRIVNING**

BILAGA 2. Bullermodelleringar



27.6.2014

ALT 1. N131 x 15 x HH144 (15 vindkraftverk)

Project:

Svevind Sandbacken

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Calculated:

15.4.2014 16:14/2.8.579

DECIBEL - Main Result

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1)

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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:

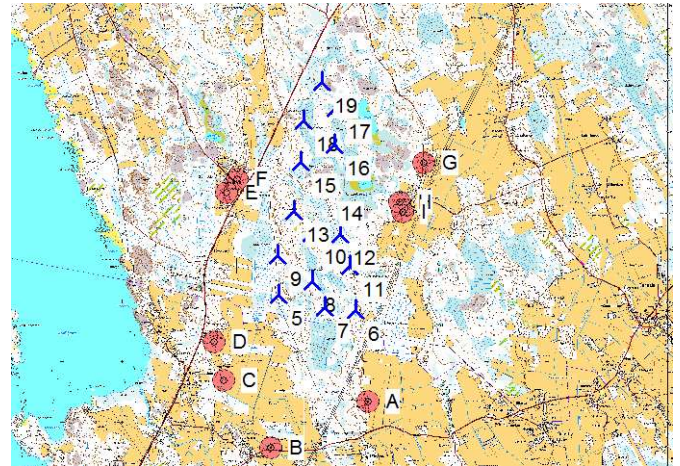
Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m 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)



New WTG

Scale 1:125 000
Noise sensitive area

WTGs

ETRS 89 Zone: 35				WTG type			Noise data					Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator	Name				
5	271 574	7 032 104	15,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
6	272 845	7 031 861	22,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
7	272 339	7 031 903	22,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
8	272 131	7 032 340	24,6	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
9	271 558	7 032 764	14,2	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
10	272 114	7 033 125	27,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
11	272 760	7 032 585	24,8	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
12	272 590	7 033 118	27,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
13	271 825	7 033 497	30,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
14	272 381	7 033 839	28,7	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
15	271 935	7 034 312	23,3	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
16	272 502	7 034 584	30,0	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
17	272 518	7 035 190	27,5	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
18	271 991	7 034 984	26,3	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h
19	272 287	7 035 624	26,6	NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104,5 dB(A) - R00	8,0	104,5	0 dB h

h) Generic octave distribution used

Calculation Results

Sound Level

Noise sensitive area		ETRS 89 Zone: 35				Demands	Sound Level	Demands fulfilled ?
No.	Name	East	North	Z	Imission height	Noise	From WTGs	Noise
				[m]	[m]	[dB(A)]	[dB(A)]	
	A Bostad (Munsolbacken)	273 053	7 030 347	15,1	1,5	40,0	31,3	Yes
	B Bostad (Jeppovägen 264)	271 454	7 029 590	10,0	1,5	40,0	27,4	Yes
	C Bostad (Vågaminnet)	270 675	7 030 693	8,9	1,5	40,0	30,6	Yes
	D Bostad (Solbackavägen)	270 505	7 031 325	15,0	1,5	40,0	32,5	Yes
	E Bostad (Gunilackvägen 90)	270 712	7 033 804	17,7	1,5	40,0	36,0	Yes
	F Bostad (Monåvägen 19)	270 899	7 034 022	20,6	1,5	40,0	36,9	Yes
	G Bostad (Harjuxvägen 336)	273 981	7 034 287	24,0	1,5	40,0	33,7	Yes
	H Bostad (Harjuxvägen 425)	273 583	7 033 632	28,4	1,5	40,0	36,6	Yes
	I Bostad (Harjuxvägen 430)	273 621	7 033 482	23,8	1,5	40,0	36,5	Yes

Distances (m)

WTG	A	B	C	D	E	F	G	H	I
5	2295	2515	1672	1322	1905	2033	3248	2522	2466
6	1527	2661	2463	2400	2884	2907	2677	1917	1796
7	1710	2475	2056	1922	2501	2561	2893	2129	2032
8	2194	2830	2197	1916	2038	2084	2685	1942	1876
9	2840	3173	2250	1782	1340	1420	2861	2202	2183
10	2930	3594	2824	2413	1557	1510	2198	1553	1547

To be continued on next page...

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**DECIBEL - Main Result****Calculation:** Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1)

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I
11	2255	3265	2814	2582	2382	2350	2094	1331	1242
12	2807	3704	3088	2748	1998	1917	1816	1117	1092
13	3379	3922	3029	2540	1154	1064	2295	1762	1795
14	3554	4346	3577	3135	1669	1493	1661	1219	1290
15	4117	4743	3830	3310	1324	1075	2045	1782	1878
16	4270	5100	4296	3820	1952	1698	1508	1439	1570
17	4869	5697	4857	4355	2276	1995	1719	1886	2032
18	4754	5417	4486	3947	1740	1455	2107	2087	2215
19	5329	6088	5185	4651	2406	2118	2157	2375	2522

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DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Bostad (Munsolbacken)

WTG		Wind speed: 8,0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
5	2 295	2 299	20,66	104,5	0,00	78,23	-	-	0,00	0,00	-	0,00	
6	1 527	1 534	25,69	104,5	0,00	74,72	-	-	0,00	0,00	-	0,00	
7	1 710	1 717	24,32	104,5	0,00	75,70	-	-	0,00	0,00	-	0,00	
8	2 194	2 199	21,22	104,5	0,00	77,85	-	-	0,00	0,00	-	0,00	
9	2 840	2 843	17,92	104,5	0,00	80,08	-	-	0,00	0,00	-	0,00	
10	2 930	2 934	17,51	104,5	0,00	80,35	-	-	0,00	0,00	-	0,00	
11	2 255	2 260	20,88	104,5	0,00	78,08	-	-	0,00	0,00	-	0,00	
12	2 807	2 812	18,06	104,5	0,00	79,98	-	-	0,00	0,00	-	0,00	
13	3 379	3 382	15,64	104,5	0,00	81,58	-	-	0,00	0,00	-	0,00	
14	3 554	3 557	14,97	104,5	0,00	82,02	-	-	0,00	0,00	-	0,00	
15	4 117	4 120	13,02	104,5	0,00	83,30	-	-	0,00	0,00	-	0,00	
16	4 270	4 273	12,54	104,5	0,00	83,61	-	-	0,00	0,00	-	0,00	
17	4 869	4 872	11,01	104,5	0,00	84,75	-	-	0,00	0,00	-	0,00	
18	4 754	4 756	11,28	104,5	0,00	84,55	-	-	0,00	0,00	-	0,00	
19	5 329	5 331	9,97	104,5	0,00	85,54	-	-	0,00	0,00	-	0,00	

Sum 31,26

- Data undefined due to calculation with octave data

Noise sensitive area: B Bostad (Jeppovägen 264)

WTG		Wind speed: 8,0 m/s											
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet	
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	
5	2 515	2 519	19,49	104,5	0,00	79,03	-	-	0,00	0,00	-	0,00	
6	2 661	2 666	18,76	104,5	0,00	79,52	-	-	0,00	0,00	-	0,00	
7	2 475	2 480	19,69	104,5	0,00	78,89	-	-	0,00	0,00	-	0,00	
8	2 830	2 834	17,96	104,5	0,00	80,05	-	-	0,00	0,00	-	0,00	
9	3 173	3 177	16,47	104,5	0,00	81,04	-	-	0,00	0,00	-	0,00	
10	3 594	3 597	14,82	104,5	0,00	82,12	-	-	0,00	0,00	-	0,00	
11	3 265	3 269	16,09	104,5	0,00	81,29	-	-	0,00	0,00	-	0,00	
12	3 704	3 707	14,42	104,5	0,00	82,38	-	-	0,00	0,00	-	0,00	
13	3 922	3 925	13,67	104,5	0,00	82,88	-	-	0,00	0,00	-	0,00	
14	4 346	4 349	12,30	104,5	0,00	83,77	-	-	0,00	0,00	-	0,00	
15	4 743	4 746	11,30	104,5	0,00	84,53	-	-	0,00	0,00	-	0,00	
16	5 100	5 102	10,48	104,5	0,00	85,16	-	-	0,00	0,00	-	0,00	
17	5 697	5 699	9,20	104,5	0,00	86,12	-	-	0,00	0,00	-	0,00	
18	5 417	5 420	9,78	104,5	0,00	85,68	-	-	0,00	0,00	-	0,00	
19	6 088	6 090	8,43	104,5	0,00	86,69	-	-	0,00	0,00	-	0,00	

Sum 27,42

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Calculated:

15.4.2014 16:14/2.8.579

DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: C Bostad (Vägaminnnet)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	1 672	1 679	24,59	104,5	0,00	75,50	-	-	0,00	0,00	-	0,00
6	2 463	2 468	19,75	104,5	0,00	78,85	-	-	0,00	0,00	-	0,00
7	2 056	2 062	22,04	104,5	0,00	77,29	-	-	0,00	0,00	-	0,00
8	2 197	2 203	21,21	104,5	0,00	77,86	-	-	0,00	0,00	-	0,00
9	2 250	2 255	20,91	104,5	0,00	78,06	-	-	0,00	0,00	-	0,00
10	2 824	2 829	17,99	104,5	0,00	80,03	-	-	0,00	0,00	-	0,00
11	2 814	2 818	18,03	104,5	0,00	80,00	-	-	0,00	0,00	-	0,00
12	3 088	3 092	16,82	104,5	0,00	80,81	-	-	0,00	0,00	-	0,00
13	3 029	3 033	17,07	104,5	0,00	80,64	-	-	0,00	0,00	-	0,00
14	3 577	3 580	14,89	104,5	0,00	82,08	-	-	0,00	0,00	-	0,00
15	3 830	3 833	13,98	104,5	0,00	82,67	-	-	0,00	0,00	-	0,00
16	4 296	4 299	12,46	104,5	0,00	83,67	-	-	0,00	0,00	-	0,00
17	4 857	4 860	11,03	104,5	0,00	84,73	-	-	0,00	0,00	-	0,00
18	4 486	4 489	11,94	104,5	0,00	84,04	-	-	0,00	0,00	-	0,00
19	5 185	5 187	10,28	104,5	0,00	85,30	-	-	0,00	0,00	-	0,00

Sum 30,55

- Data undefined due to calculation with octave data

Noise sensitive area: D Bostad (Solbackavägen)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	1 322	1 330	27,40	104,5	0,00	73,48	-	-	0,00	0,00	-	0,00
6	2 400	2 404	20,09	104,5	0,00	78,62	-	-	0,00	0,00	-	0,00
7	1 922	1 928	22,88	104,5	0,00	76,70	-	-	0,00	0,00	-	0,00
8	1 916	1 922	22,92	104,5	0,00	76,67	-	-	0,00	0,00	-	0,00
9	1 782	1 788	23,82	104,5	0,00	76,05	-	-	0,00	0,00	-	0,00
10	2 413	2 418	20,02	104,5	0,00	78,67	-	-	0,00	0,00	-	0,00
11	2 582	2 586	19,15	104,5	0,00	79,25	-	-	0,00	0,00	-	0,00
12	2 748	2 753	18,34	104,5	0,00	79,80	-	-	0,00	0,00	-	0,00
13	2 540	2 545	19,36	104,5	0,00	79,11	-	-	0,00	0,00	-	0,00
14	3 135	3 139	16,62	104,5	0,00	80,94	-	-	0,00	0,00	-	0,00
15	3 310	3 313	15,91	104,5	0,00	81,40	-	-	0,00	0,00	-	0,00
16	3 820	3 823	14,02	104,5	0,00	82,65	-	-	0,00	0,00	-	0,00
17	4 355	4 358	12,28	104,5	0,00	83,79	-	-	0,00	0,00	-	0,00
18	3 947	3 950	13,58	104,5	0,00	82,93	-	-	0,00	0,00	-	0,00
19	4 651	4 653	11,53	104,5	0,00	84,36	-	-	0,00	0,00	-	0,00

Sum 32,51

- Data undefined due to calculation with octave data

Noise sensitive area: E Bostad (Gunilackvägen 90)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	1 905	1 910	23,00	104,5	0,00	76,62	-	-	0,00	0,00	-	0,00
6	2 884	2 887	17,72	104,5	0,00	80,21	-	-	0,00	0,00	-	0,00
7	2 501	2 505	19,56	104,5	0,00	78,98	-	-	0,00	0,00	-	0,00
8	2 038	2 043	22,16	104,5	0,00	77,21	-	-	0,00	0,00	-	0,00
9	1 340	1 347	27,25	104,5	0,00	73,59	-	-	0,00	0,00	-	0,00
10	1 557	1 564	25,45	104,5	0,00	74,89	-	-	0,00	0,00	-	0,00
11	2 382	2 387	20,18	104,5	0,00	78,56	-	-	0,00	0,00	-	0,00
12	1 998	2 004	22,40	104,5	0,00	77,04	-	-	0,00	0,00	-	0,00
13	1 154	1 164	28,96	104,5	0,00	72,32	-	-	0,00	0,00	-	0,00
14	1 669	1 676	24,62	104,5	0,00	75,48	-	-	0,00	0,00	-	0,00
15	1 324	1 332	27,38	104,5	0,00	73,49	-	-	0,00	0,00	-	0,00
16	1 952	1 958	22,69	104,5	0,00	76,84	-	-	0,00	0,00	-	0,00
17	2 276	2 281	20,76	104,5	0,00	78,16	-	-	0,00	0,00	-	0,00
18	1 740	1 746	24,11	104,5	0,00	75,84	-	-	0,00	0,00	-	0,00
19	2 406	2 411	20,05	104,5	0,00	78,64	-	-	0,00	0,00	-	0,00

Sum 35,98

Project:

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DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: F Bostad (Monåvägen 19)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	2 033	2 037	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
6	2 907	2 910	17,61	104,5	0,00	80,28	-	-	0,00	0,00	-	0,00
7	2 561	2 565	19,26	104,5	0,00	79,18	-	-	0,00	0,00	-	0,00
8	2 084	2 089	21,87	104,5	0,00	77,40	-	-	0,00	0,00	-	0,00
9	1 420	1 426	26,56	104,5	0,00	74,08	-	-	0,00	0,00	-	0,00
10	1 510	1 517	25,82	104,5	0,00	74,62	-	-	0,00	0,00	-	0,00
11	2 350	2 355	20,35	104,5	0,00	78,44	-	-	0,00	0,00	-	0,00
12	1 917	1 922	22,92	104,5	0,00	76,68	-	-	0,00	0,00	-	0,00
13	1 064	1 075	29,88	104,5	0,00	71,63	-	-	0,00	0,00	-	0,00
14	1 493	1 500	25,96	104,5	0,00	74,52	-	-	0,00	0,00	-	0,00
15	1 075	1 085	29,78	104,5	0,00	71,71	-	-	0,00	0,00	-	0,00
16	1 698	1 705	24,41	104,5	0,00	75,63	-	-	0,00	0,00	-	0,00
17	1 995	2 001	22,42	104,5	0,00	77,02	-	-	0,00	0,00	-	0,00
18	1 455	1 462	26,27	104,5	0,00	74,30	-	-	0,00	0,00	-	0,00
19	2 118	2 124	21,67	104,5	0,00	77,54	-	-	0,00	0,00	-	0,00

Sum 36,94

- Data undefined due to calculation with octave data

Noise sensitive area: G Bostad (Harjuxvägen 336)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	3 248	3 251	16,16	104,5	0,00	81,24	-	-	0,00	0,00	-	0,00
6	2 677	2 681	18,68	104,5	0,00	79,57	-	-	0,00	0,00	-	0,00
7	2 893	2 897	17,68	104,5	0,00	80,24	-	-	0,00	0,00	-	0,00
8	2 685	2 688	18,65	104,5	0,00	79,59	-	-	0,00	0,00	-	0,00
9	2 861	2 864	17,83	104,5	0,00	80,14	-	-	0,00	0,00	-	0,00
10	2 198	2 203	21,20	104,5	0,00	77,86	-	-	0,00	0,00	-	0,00
11	2 094	2 099	21,82	104,5	0,00	77,44	-	-	0,00	0,00	-	0,00
12	1 816	1 822	23,58	104,5	0,00	76,21	-	-	0,00	0,00	-	0,00
13	2 295	2 300	20,66	104,5	0,00	78,23	-	-	0,00	0,00	-	0,00
14	1 661	1 667	24,68	104,5	0,00	75,44	-	-	0,00	0,00	-	0,00
15	2 045	2 050	22,11	104,5	0,00	77,24	-	-	0,00	0,00	-	0,00
16	1 508	1 515	25,84	104,5	0,00	74,61	-	-	0,00	0,00	-	0,00
17	1 719	1 725	24,26	104,5	0,00	75,73	-	-	0,00	0,00	-	0,00
18	2 107	2 112	21,74	104,5	0,00	77,50	-	-	0,00	0,00	-	0,00
19	2 157	2 162	21,44	104,5	0,00	77,70	-	-	0,00	0,00	-	0,00

Sum 33,68

- Data undefined due to calculation with octave data

Noise sensitive area: H Bostad (Harjuxvägen 425)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	2 522	2 526	19,46	104,5	0,00	79,05	-	-	0,00	0,00	-	0,00
6	1 917	1 922	22,92	104,5	0,00	76,68	-	-	0,00	0,00	-	0,00
7	2 129	2 133	21,61	104,5	0,00	77,58	-	-	0,00	0,00	-	0,00
8	1 942	1 947	22,76	104,5	0,00	76,79	-	-	0,00	0,00	-	0,00
9	2 202	2 205	21,19	104,5	0,00	77,87	-	-	0,00	0,00	-	0,00
10	1 553	1 559	25,49	104,5	0,00	74,86	-	-	0,00	0,00	-	0,00
11	1 331	1 338	27,33	104,5	0,00	73,53	-	-	0,00	0,00	-	0,00
12	1 117	1 126	29,35	104,5	0,00	72,03	-	-	0,00	0,00	-	0,00
13	1 762	1 768	23,96	104,5	0,00	75,95	-	-	0,00	0,00	-	0,00
14	1 219	1 227	28,35	104,5	0,00	72,78	-	-	0,00	0,00	-	0,00
15	1 782	1 787	23,83	104,5	0,00	76,04	-	-	0,00	0,00	-	0,00
16	1 439	1 447	26,40	104,5	0,00	74,21	-	-	0,00	0,00	-	0,00
17	1 886	1 891	23,12	104,5	0,00	76,54	-	-	0,00	0,00	-	0,00
18	2 087	2 092	21,86	104,5	0,00	77,41	-	-	0,00	0,00	-	0,00
19	2 375	2 379	20,22	104,5	0,00	78,53	-	-	0,00	0,00	-	0,00

Sum 36,61

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DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise sensitive area: I Bostad (Harjuxvägen 430)

WTG

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
5	2 466	2 469	19,75	104,5	0,00	78,85	-	-	0,00	0,00	-	0,00
6	1 796	1 801	23,73	104,5	0,00	76,11	-	-	0,00	0,00	-	0,00
7	2 032	2 037	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
8	1 876	1 881	23,19	104,5	0,00	76,49	-	-	0,00	0,00	-	0,00
9	2 183	2 187	21,30	104,5	0,00	77,80	-	-	0,00	0,00	-	0,00
10	1 547	1 554	25,53	104,5	0,00	74,83	-	-	0,00	0,00	-	0,00
11	1 242	1 250	28,13	104,5	0,00	72,94	-	-	0,00	0,00	-	0,00
12	1 092	1 102	29,60	104,5	0,00	71,84	-	-	0,00	0,00	-	0,00
13	1 795	1 801	23,73	104,5	0,00	76,11	-	-	0,00	0,00	-	0,00
14	1 290	1 298	27,69	104,5	0,00	73,27	-	-	0,00	0,00	-	0,00
15	1 878	1 884	23,17	104,5	0,00	76,50	-	-	0,00	0,00	-	0,00
16	1 570	1 577	25,36	104,5	0,00	74,96	-	-	0,00	0,00	-	0,00
17	2 032	2 038	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
18	2 215	2 220	21,11	104,5	0,00	77,93	-	-	0,00	0,00	-	0,00
19	2 522	2 526	19,45	104,5	0,00	79,05	-	-	0,00	0,00	-	0,00

Sum 36,55

- Data undefined due to calculation with octave data

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DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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 and Impulse tone penalty are added to WTG source noise

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

4,0 m 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	1,1	2,4	4,1	8,8	26,6	95,0

WTG: NORDEX N131/3000 3000 131.0 !O!

Noise: Level 0 - calculated - 104.5 dB(A) - R00

Source	Source/Date	Creator	Edited
NORDEX	3.12.2013	EMD	20.12.2013 13:04
F008_245_A03_R00	21.11.2013		

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	144,0	8,0	104,5	No	Generic data	86,1	93,1	96,5	99,1	98,9	96,0	91,2

NSA: Bostad (Munsolbacken)-A

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Jeppovägen 264)-B

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Vägaminnet)-C

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Solbackavägen)-D

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

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Calculated:

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DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

NSA: Bostad (Gunilackvägen 90)-E

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Monåvägen 19)-F

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 336)-G

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 425)-H

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 430)-I

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

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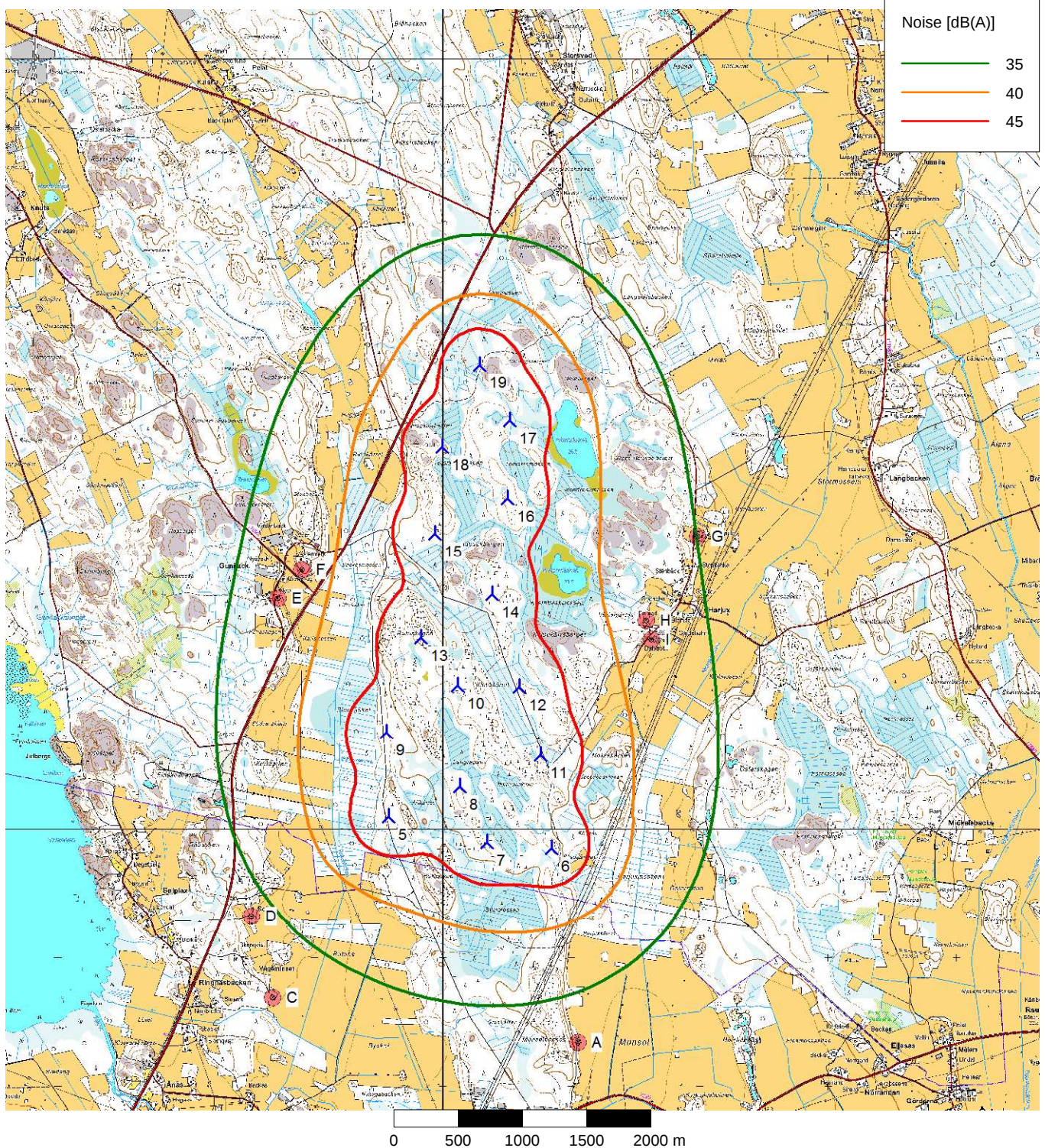
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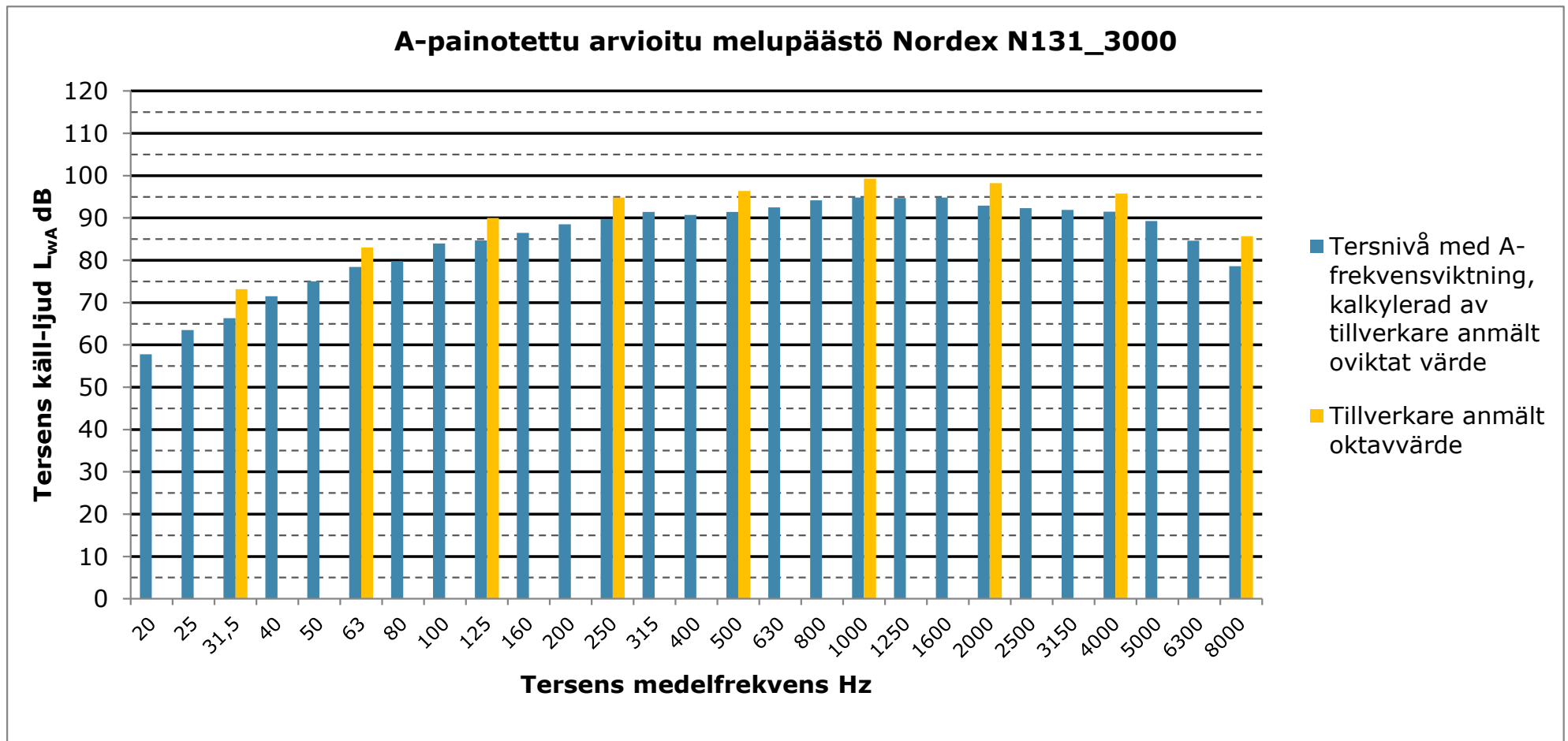
DECIBEL - Map 8,0 m/s
Calculation: Sandbacka N131-3000 x 15 x HH144_2014 (Nykarleby, ALT 1) **Noise calculation model:** ISO 9613-2 General 8,0 m/s


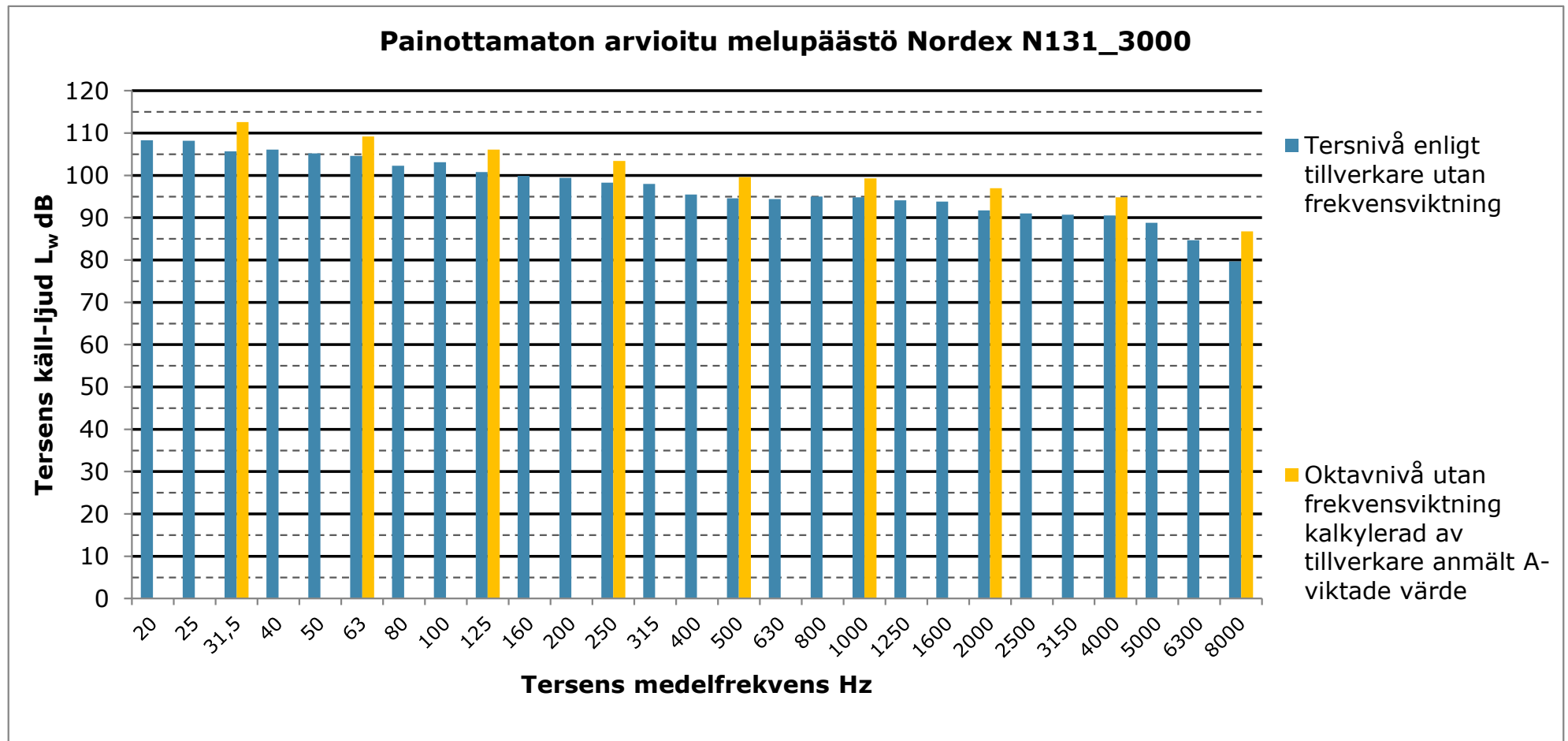
New WTG

Noise sensitive area

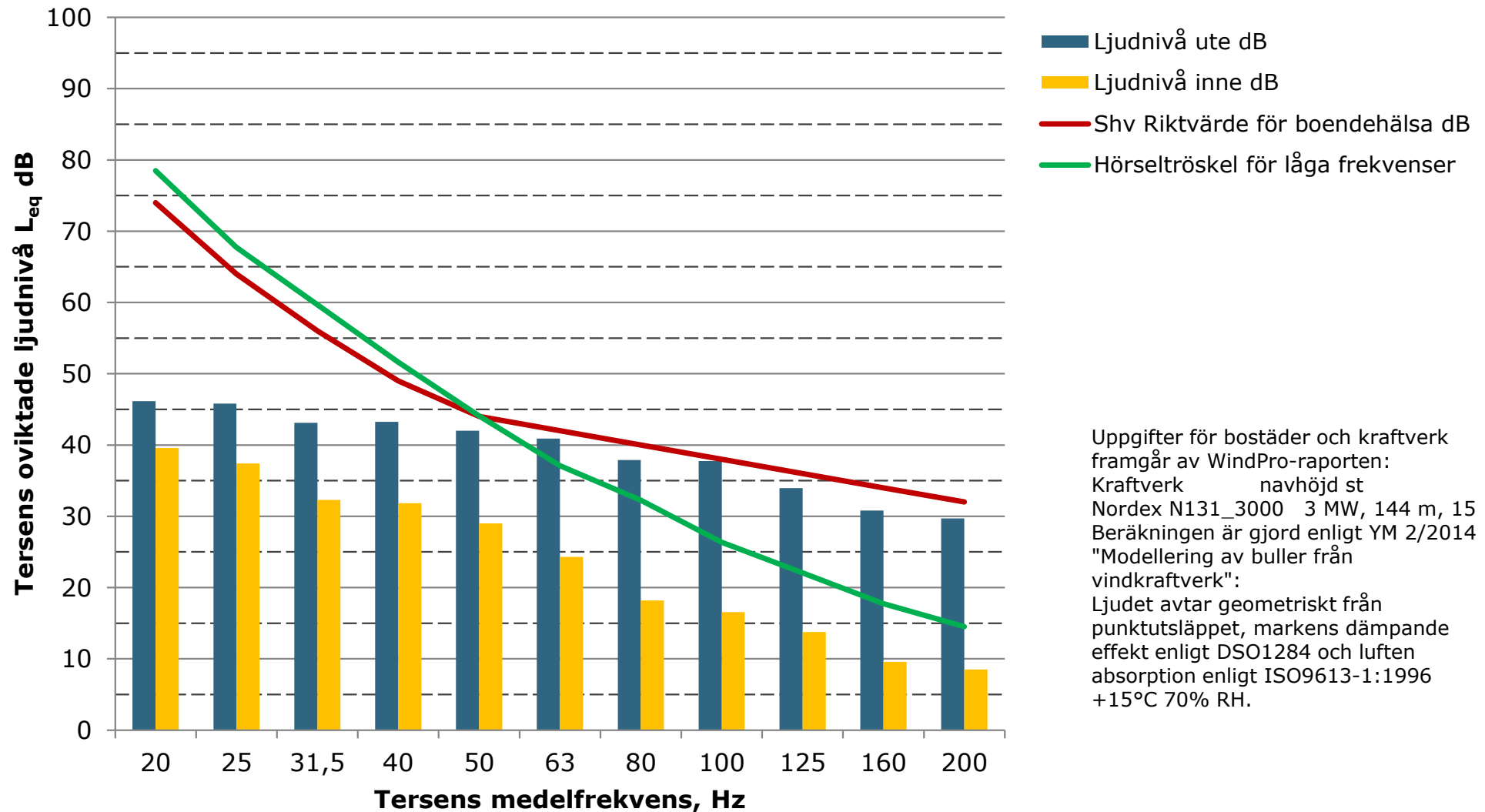
Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s

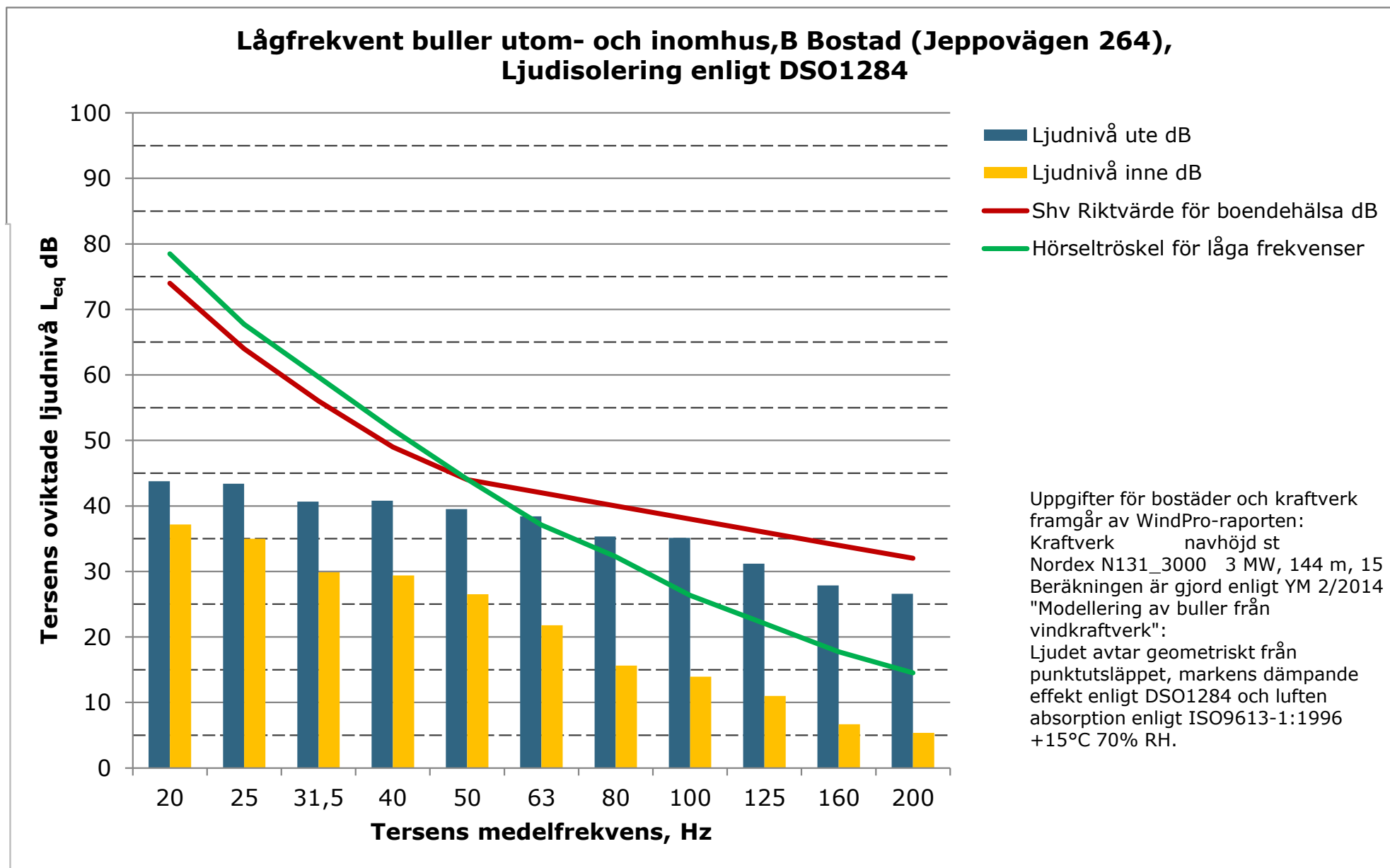
Height above sea level from active line object



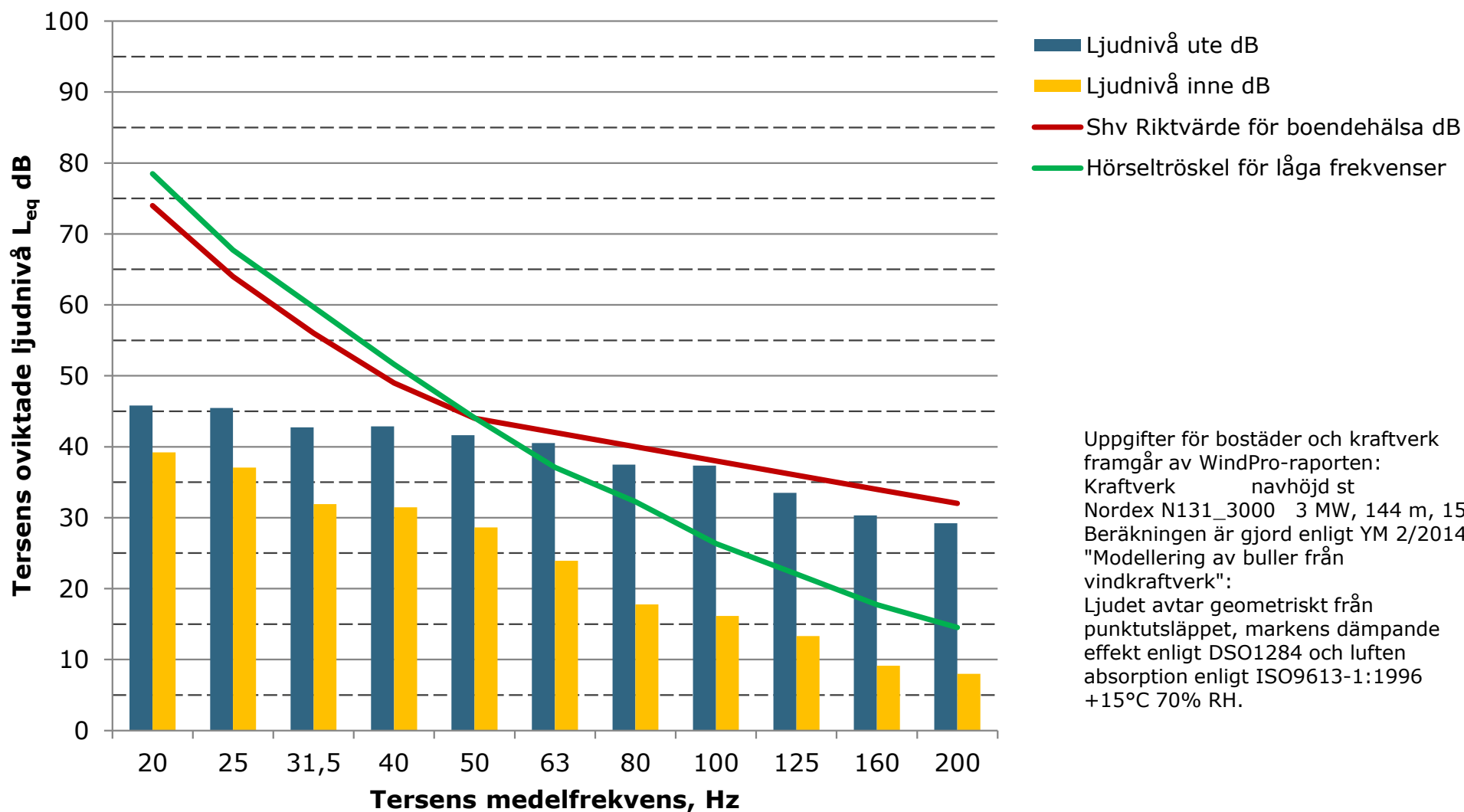


Lågfrekvent buller utom- och inomhus, A Bostad (Munsolbacken), Ljudisolering enligt DSO1284

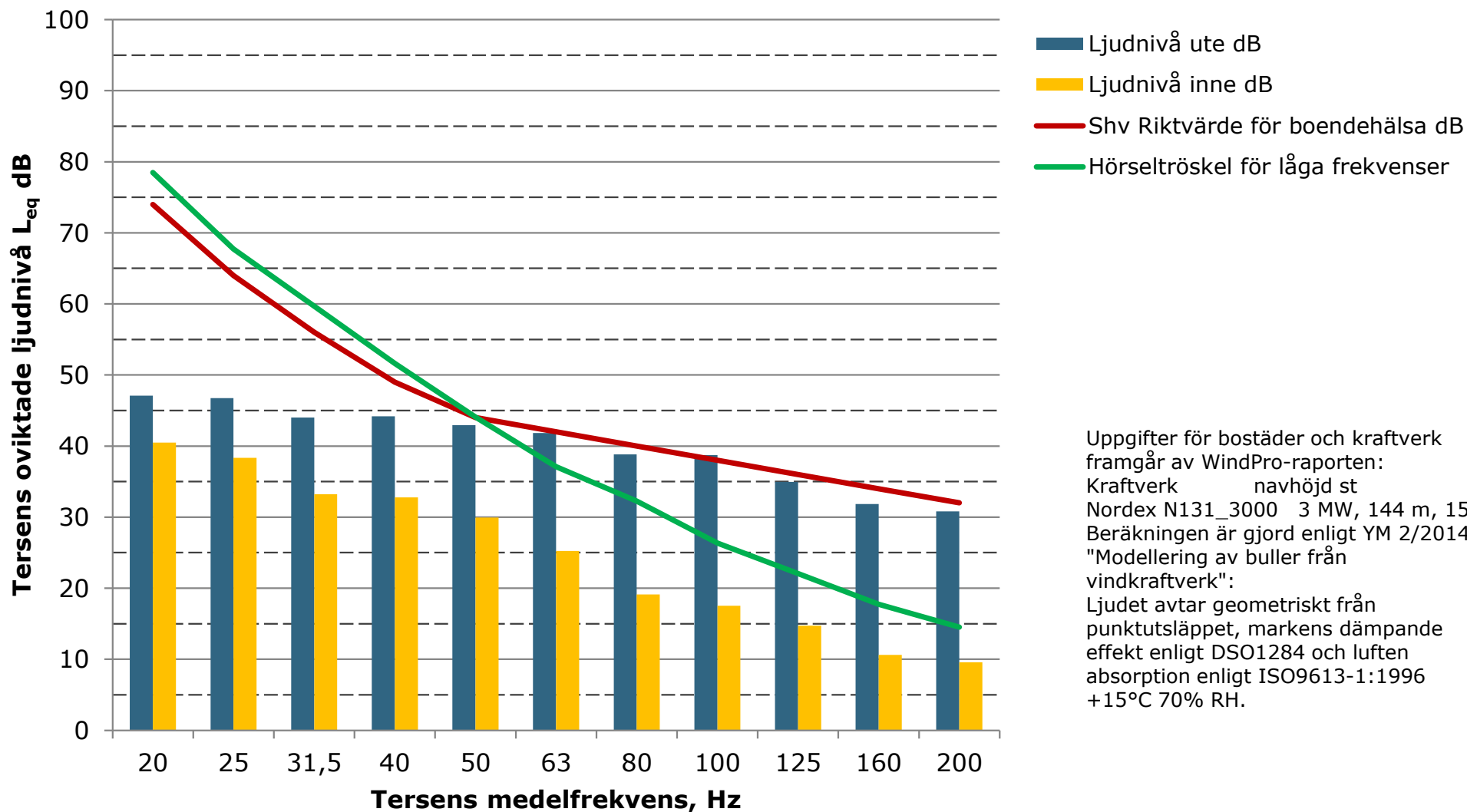




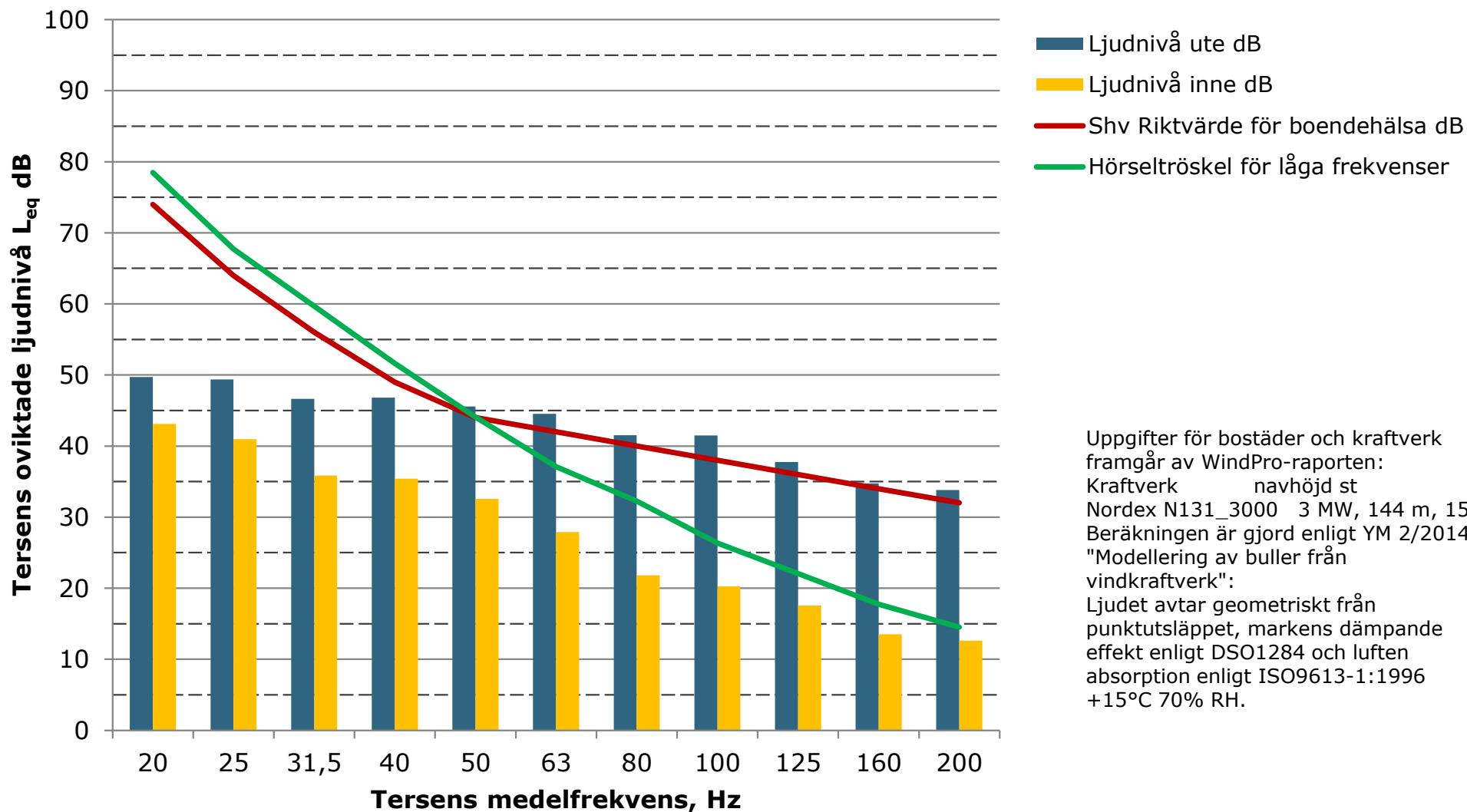
Lågfrekvent buller utom- och inomhus, C Bostad (Vägaminnet), Ljudisolering enligt DSO1284



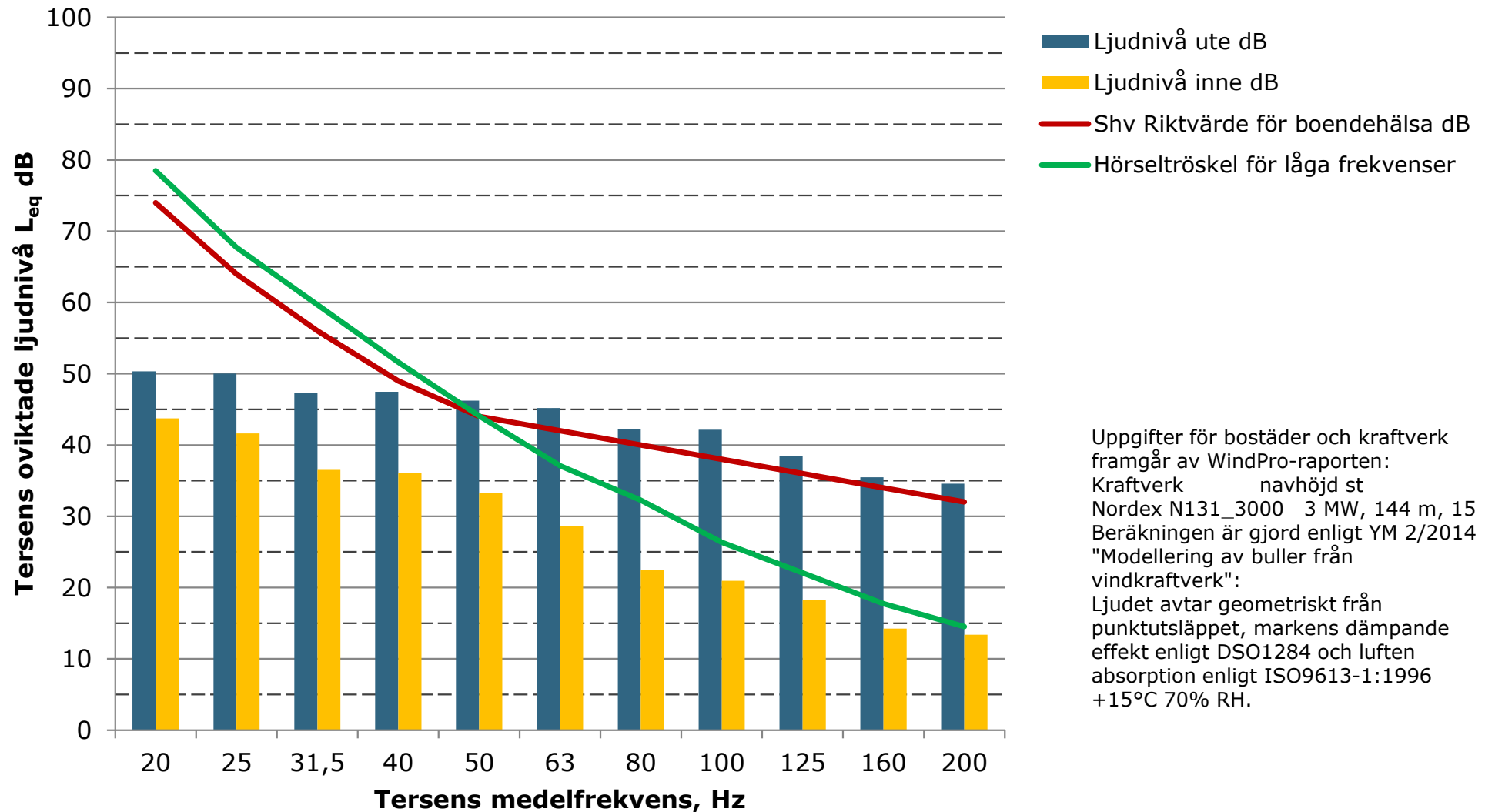
Lågfrekvent buller utom- och inomhus, D Bostad (Solbackavägen), Ljudisolering enligt DSO1284



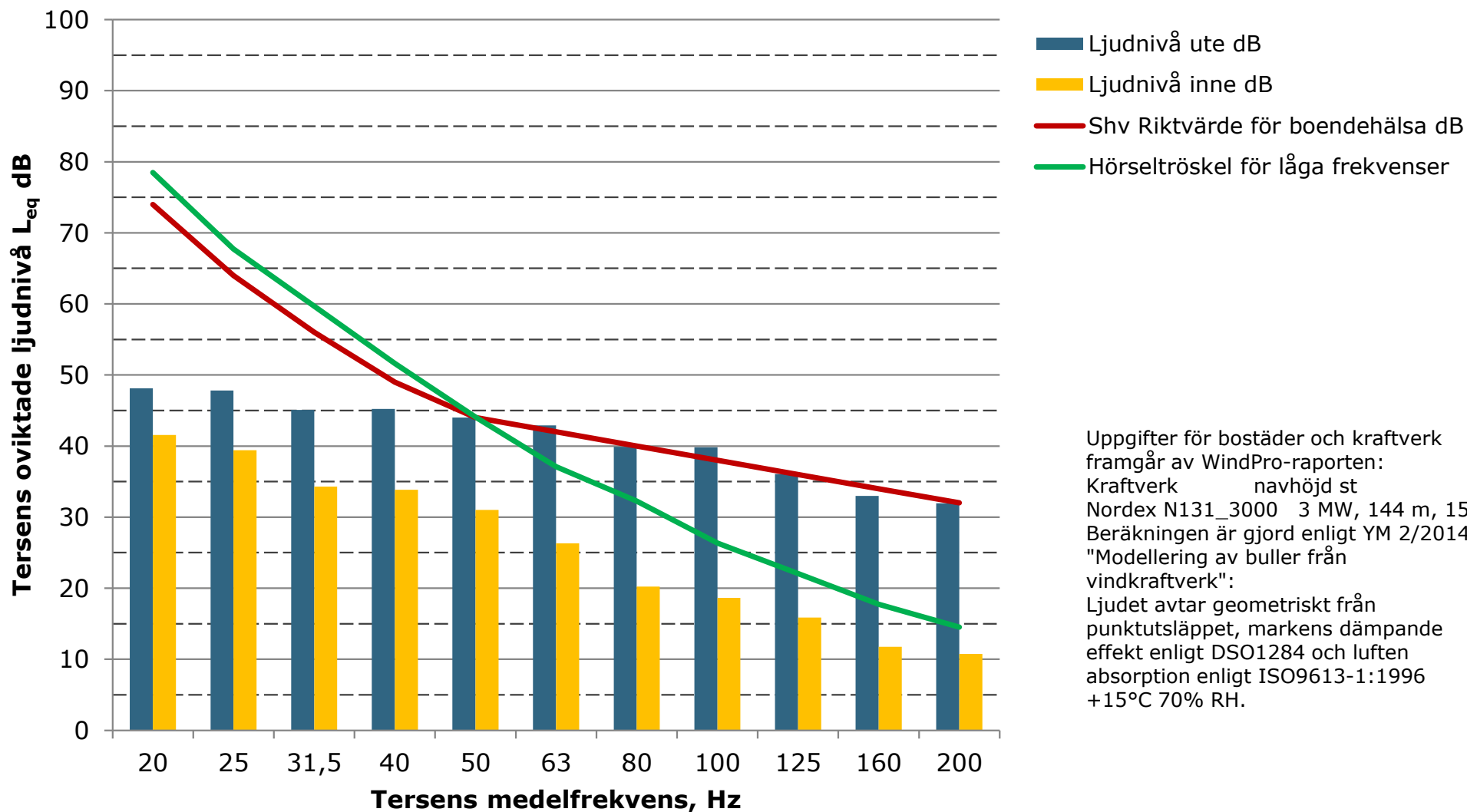
Lågfrekvent buller utom- och inomhus, E Bostad (Gunilackvägen, Ljudisolering enligt DSO1284



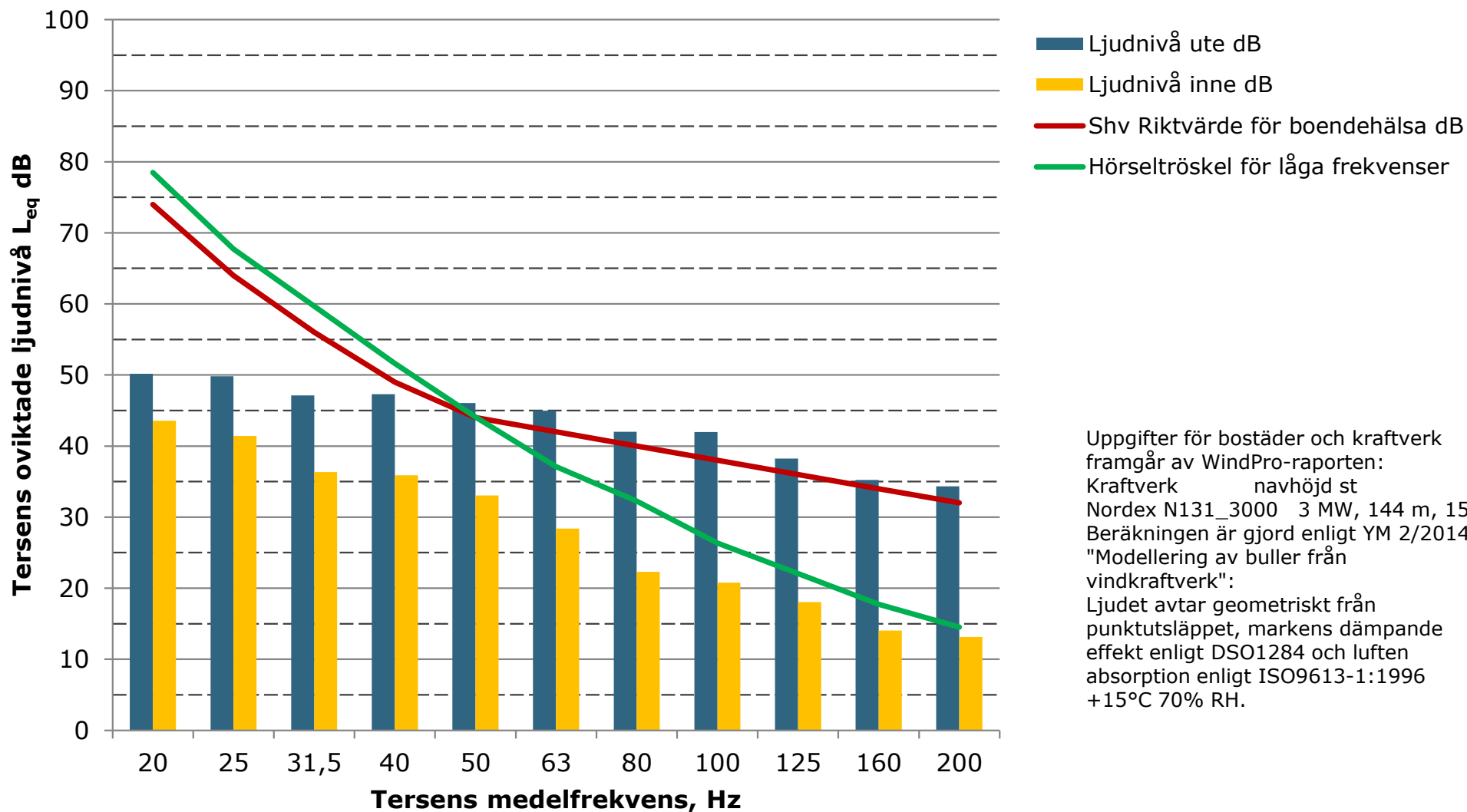
Lågfrekvent buller utom- och inomhus, F Bostad (Monåvägen 19), Ljudisolering enligt DSO1284



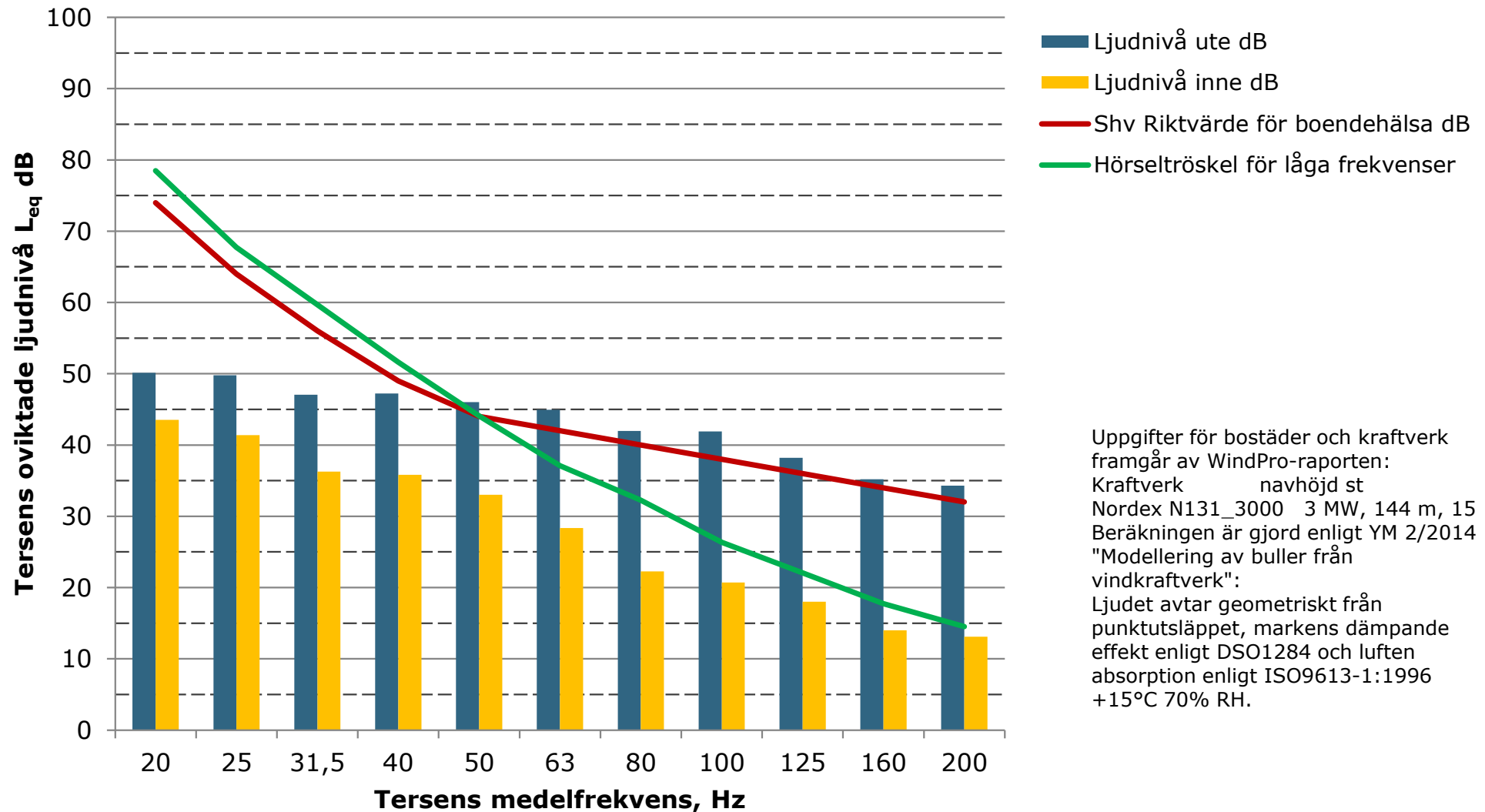
Lågfrekvent buller utom- och inomhus, G Bostad (Harjuxvägen 336), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, H Bostad (Harjuxvägen 425), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, I Bostad (Harjuxvägen 430), Ljudisolering enligt DSO1284



27.6.2014

ALT 2. N131 x 4 x HH144 (4 vindkraftverk)

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Calculated:

15.4.2014 16:16/2.8.579

DECIBEL - Main Result

Calculation: Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2)

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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:

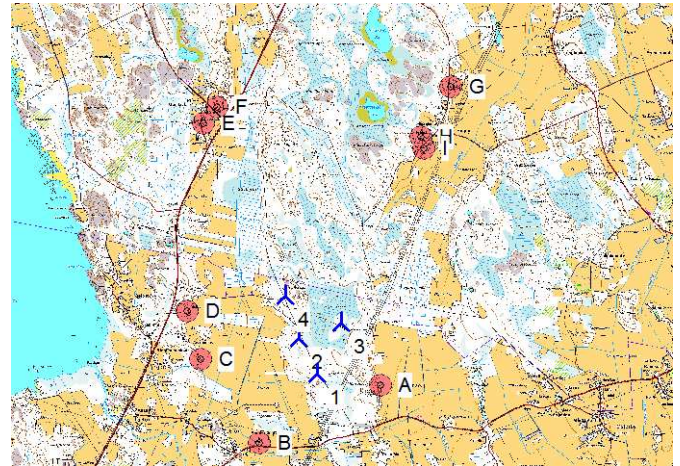
Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m 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)



Scale 1:100 000

New WTG

Noise sensitive area

WTGs

ETRS 89 Zone: 35				WTG type			Noise data				Wind speed	LwA,ref	Pure tones
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator Name	[m/s]	[dB(A)]	
1 272 217	7 030 506	17,5	NORDEX N131/3000 3000 1...Yes	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	8,0	104,5	0 dB h
2 271 975	7 030 974	20,0	NORDEX N131/3000 3000 1...Yes	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	8,0	104,5	0 dB h
3 272 536	7 031 182	18,9	NORDEX N131/3000 3000 1...Yes	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	8,0	104,5	0 dB h
4 271 790	7 031 536	17,0	NORDEX N131/3000 3000 1...Yes	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	8,0	104,5	0 dB h

h) Generic octave distribution used

Calculation Results

Sound Level

Noise sensitive area			ETRS 89 Zone: 35			Demands			Sound Level		Demands fulfilled ?	
No.	Name		East	North	Z	Imission height	Noise	From WTGs	Noise		Noise	
					[m]	[m]	[dB(A)]	[dB(A)]				
	A Bostad (Munsolbacken)		273 053	7 030 347	15,1	1,5	40,0	35,8		Yes		
	B Bostad (Jeppovägen 264)		271 454	7 029 590	10,0	1,5	40,0	31,8		Yes		
	C Bostad (Vägaminnet)		270 675	7 030 693	8,9	1,5	40,0	31,9		Yes		
	D Bostad (Solbackavägen)		270 505	7 031 325	15,0	1,5	40,0	31,2		Yes		
	E Bostad (Gunilackvägen 90)		270 712	7 033 804	17,7	1,5	40,0	23,2		Yes		
	F Bostad (Monåvägen 19)		270 899	7 034 022	20,6	1,5	40,0	22,7		Yes		
	G Bostad (Harjuxvägen 336)		273 981	7 034 287	24,0	1,5	40,0	20,5		Yes		
	H Bostad (Harjuxvägen 425)		273 583	7 033 632	28,4	1,5	40,0	23,5		Yes		
	I Bostad (Harjuxvägen 430)		273 621	7 033 482	23,8	1,5	40,0	24,0		Yes		

Distances (m)

WTG				
NSA	1	2	3	4
A	850	1246	981	1733
B	1191	1478	1924	1973
C	1552	1329	1923	1397
D	1897	1511	2035	1302
E	3623	3097	3192	2509
F	3753	3231	3277	2640
G	4170	3871	3423	3515
H	3409	3105	2663	2756
I	3288	2998	2541	2670

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DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Bostad (Munsolbacken)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	850	862	32,39	104,5	0,00	69,71	-	-	0,00	0,00	-	0,00
2	1 246	1 254	28,09	104,5	0,00	72,97	-	-	0,00	0,00	-	0,00
3	981	992	30,81	104,5	0,00	70,93	-	-	0,00	0,00	-	0,00
4	1 733	1 739	24,16	104,5	0,00	75,81	-	-	0,00	0,00	-	0,00
Sum	35,84											

- Data undefined due to calculation with octave data

Noise sensitive area: B Bostad (Jeppovägen 264)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 191	1 201	28,60	104,5	0,00	72,59	-	-	0,00	0,00	-	0,00
2	1 478	1 485	26,08	104,5	0,00	74,44	-	-	0,00	0,00	-	0,00
3	1 924	1 929	22,87	104,5	0,00	76,71	-	-	0,00	0,00	-	0,00
4	1 973	1 979	22,56	104,5	0,00	76,93	-	-	0,00	0,00	-	0,00
Sum	31,77											

- Data undefined due to calculation with octave data

Noise sensitive area: C Bostad (Vägaminnnet)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 552	1 559	25,49	104,5	0,00	74,86	-	-	0,00	0,00	-	0,00
2	1 329	1 338	27,33	104,5	0,00	73,53	-	-	0,00	0,00	-	0,00
3	1 923	1 929	22,88	104,5	0,00	76,71	-	-	0,00	0,00	-	0,00
4	1 397	1 405	26,75	104,5	0,00	73,95	-	-	0,00	0,00	-	0,00
Sum	31,94											

- Data undefined due to calculation with octave data

Noise sensitive area: D Bostad (Solbackavägen)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 897	1 903	23,05	104,5	0,00	76,59	-	-	0,00	0,00	-	0,00
2	1 511	1 518	25,82	104,5	0,00	74,63	-	-	0,00	0,00	-	0,00
3	2 035	2 041	22,17	104,5	0,00	77,20	-	-	0,00	0,00	-	0,00
4	1 302	1 310	27,58	104,5	0,00	73,34	-	-	0,00	0,00	-	0,00
Sum	31,21											

- Data undefined due to calculation with octave data

Project:

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Calculated:

15.4.2014 16:16/2.8.579

DECIBEL - Detailed results**Calculation:** Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2) **Noise calculation model:** ISO 9613-2 General 8,0 m/s**Noise sensitive area: E Bostad (Gunilackvägen 90)**

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 623	3 626	14,72	104,5	0,00	82,19	-	-	0,00	0,00	-	0,00
2	3 097	3 101	16,79	104,5	0,00	80,83	-	-	0,00	0,00	-	0,00
3	3 192	3 195	16,39	104,5	0,00	81,09	-	-	0,00	0,00	-	0,00
4	2 509	2 513	19,52	104,5	0,00	79,01	-	-	0,00	0,00	-	0,00

Sum 23,23

- Data undefined due to calculation with octave data

Noise sensitive area: F Bostad (Monåvägen 19)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 753	3 756	14,25	104,5	0,00	82,49	-	-	0,00	0,00	-	0,00
2	3 231	3 234	16,23	104,5	0,00	81,20	-	-	0,00	0,00	-	0,00
3	3 277	3 280	16,05	104,5	0,00	81,32	-	-	0,00	0,00	-	0,00
4	2 640	2 643	18,87	104,5	0,00	79,44	-	-	0,00	0,00	-	0,00

Sum 22,69

- Data undefined due to calculation with octave data

Noise sensitive area: G Bostad (Harjuxvägen 336)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	4 170	4 172	12,86	104,5	0,00	83,41	-	-	0,00	0,00	-	0,00
2	3 871	3 874	13,84	104,5	0,00	82,76	-	-	0,00	0,00	-	0,00
3	3 423	3 426	15,47	104,5	0,00	81,70	-	-	0,00	0,00	-	0,00
4	3 515	3 518	15,12	104,5	0,00	81,93	-	-	0,00	0,00	-	0,00

Sum 20,46

- Data undefined due to calculation with octave data

Noise sensitive area: H Bostad (Harjuxvägen 425)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 409	3 412	15,52	104,5	0,00	81,66	-	-	0,00	0,00	-	0,00
2	3 105	3 108	16,76	104,5	0,00	80,85	-	-	0,00	0,00	-	0,00
3	2 663	2 666	18,76	104,5	0,00	79,52	-	-	0,00	0,00	-	0,00
4	2 756	2 760	18,31	104,5	0,00	79,82	-	-	0,00	0,00	-	0,00

Sum 23,54

- Data undefined due to calculation with octave data

Noise sensitive area: I Bostad (Harjuxvägen 430)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 288	3 291	16,00	104,5	0,00	81,35	-	-	0,00	0,00	-	0,00
2	2 998	3 001	17,21	104,5	0,00	80,55	-	-	0,00	0,00	-	0,00
3	2 541	2 545	19,36	104,5	0,00	79,11	-	-	0,00	0,00	-	0,00
4	2 670	2 673	18,72	104,5	0,00	79,54	-	-	0,00	0,00	-	0,00

Sum 24,03

- Data undefined due to calculation with octave data

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Calculated:

15.4.2014 16:16/2.8.579



DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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 and Impulse tone penalty are added to WTG source noise

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

4,0 m 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	1,1	2,4	4,1	8,8	26,6	95,0

WTG: NORDEX N131/3000 3000 131.0 !O!

Noise: Level 0 - calculated - 104.5 dB(A) - R00

Source Source/Date Creator Edited

NORDEX 3.12.2013 EMD 20.12.2013 13:04

F008_245_A03_R00, 21.11.2013

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	144,0	8,0	104,5	No	Generic data 86,1	93,1	96,5	99,1	98,9	96,0	91,2	81,7

NSA: Bostad (Munsolbacken)-A

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Jeppovägen 264)-B

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Vägaminnet)-C

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Solbackavägen)-D

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

Project:

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Calculated:

15.4.2014 16:16/2.8.579



DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

NSA: Bostad (Gunilackvägen 90)-E

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Monåvägen 19)-F

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 336)-G

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 425)-H

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 430)-I

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

Project:

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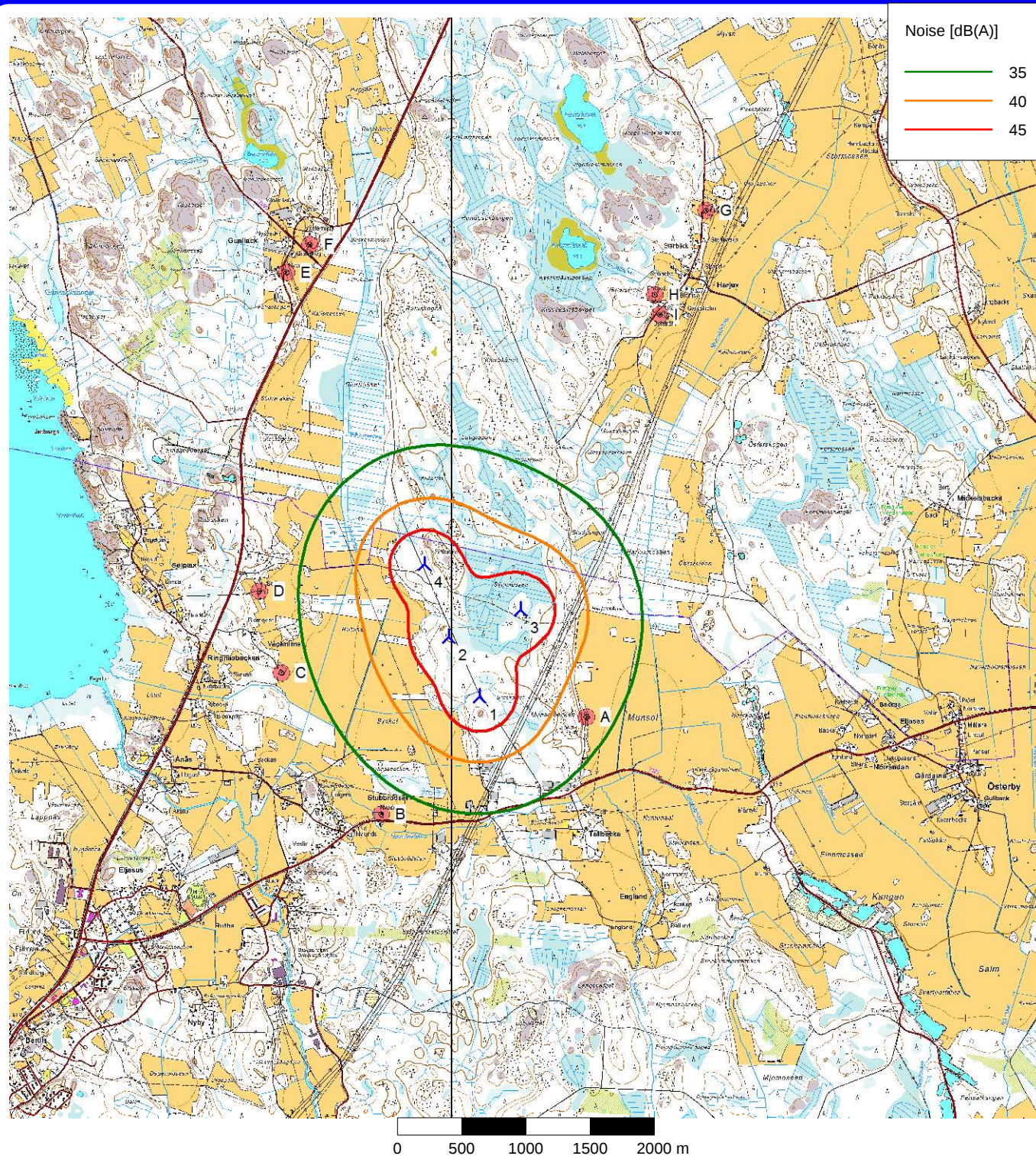
FI-00601 Helsinki

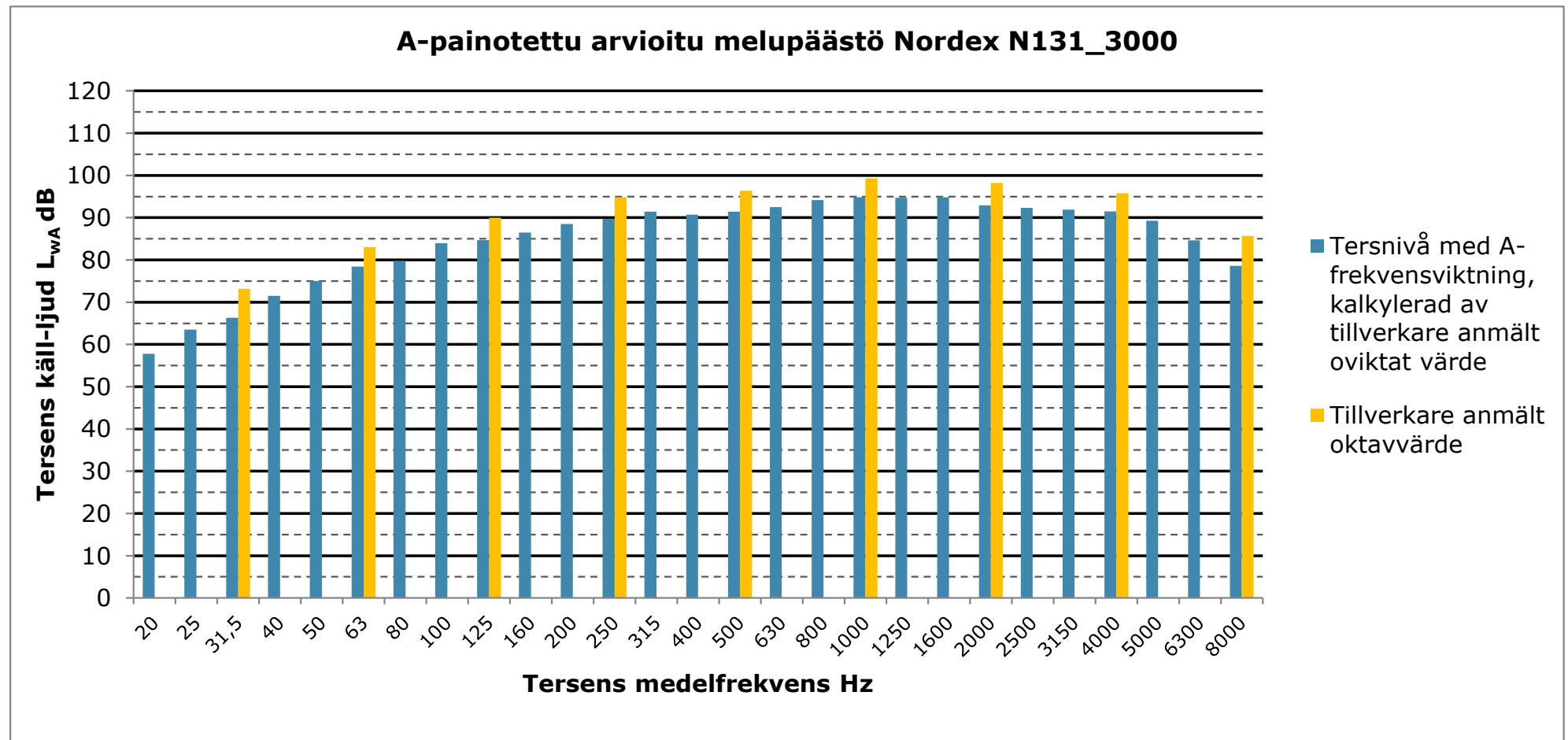
+358104095666

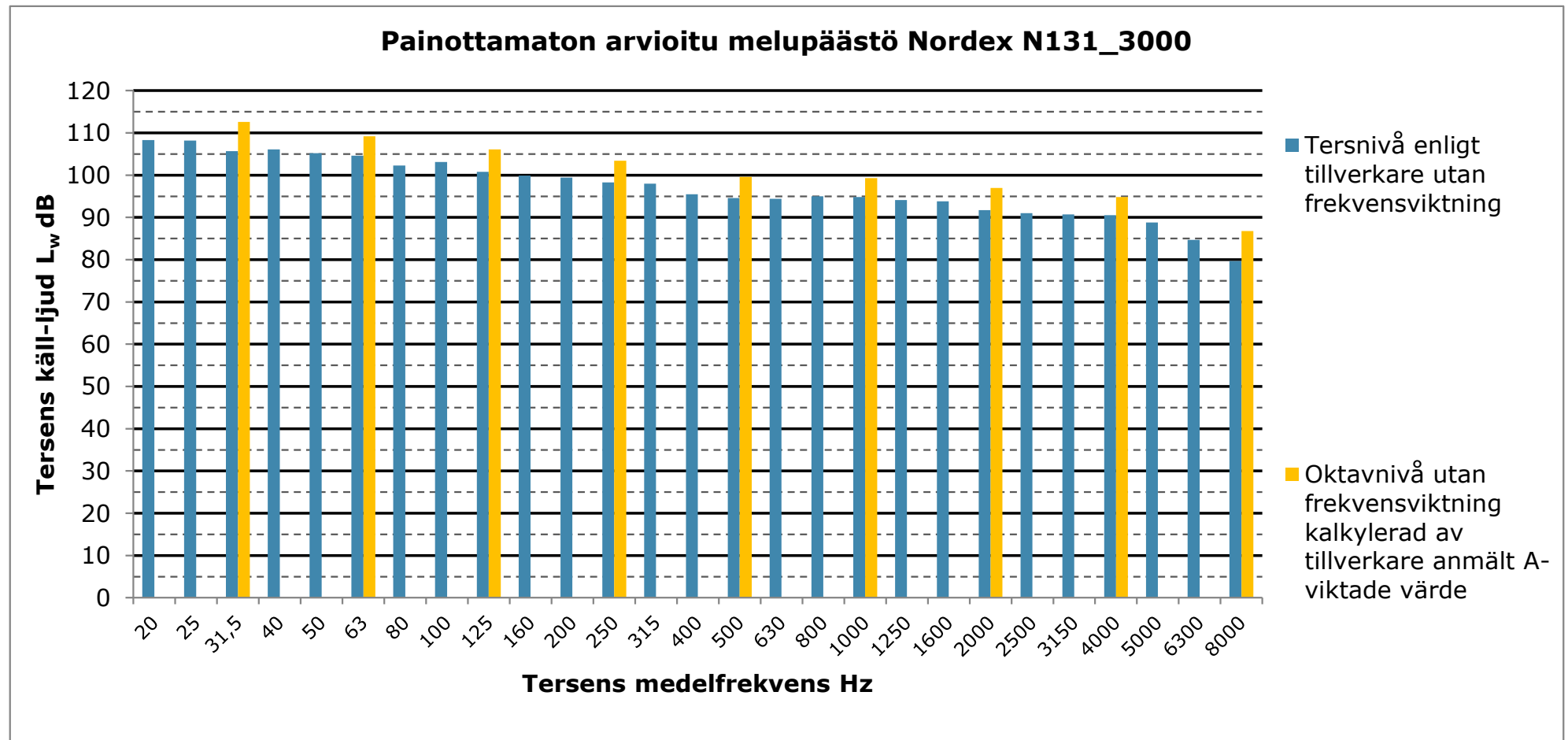
Hans Vadback / hans.vadback@fcg.fi

Calculated:

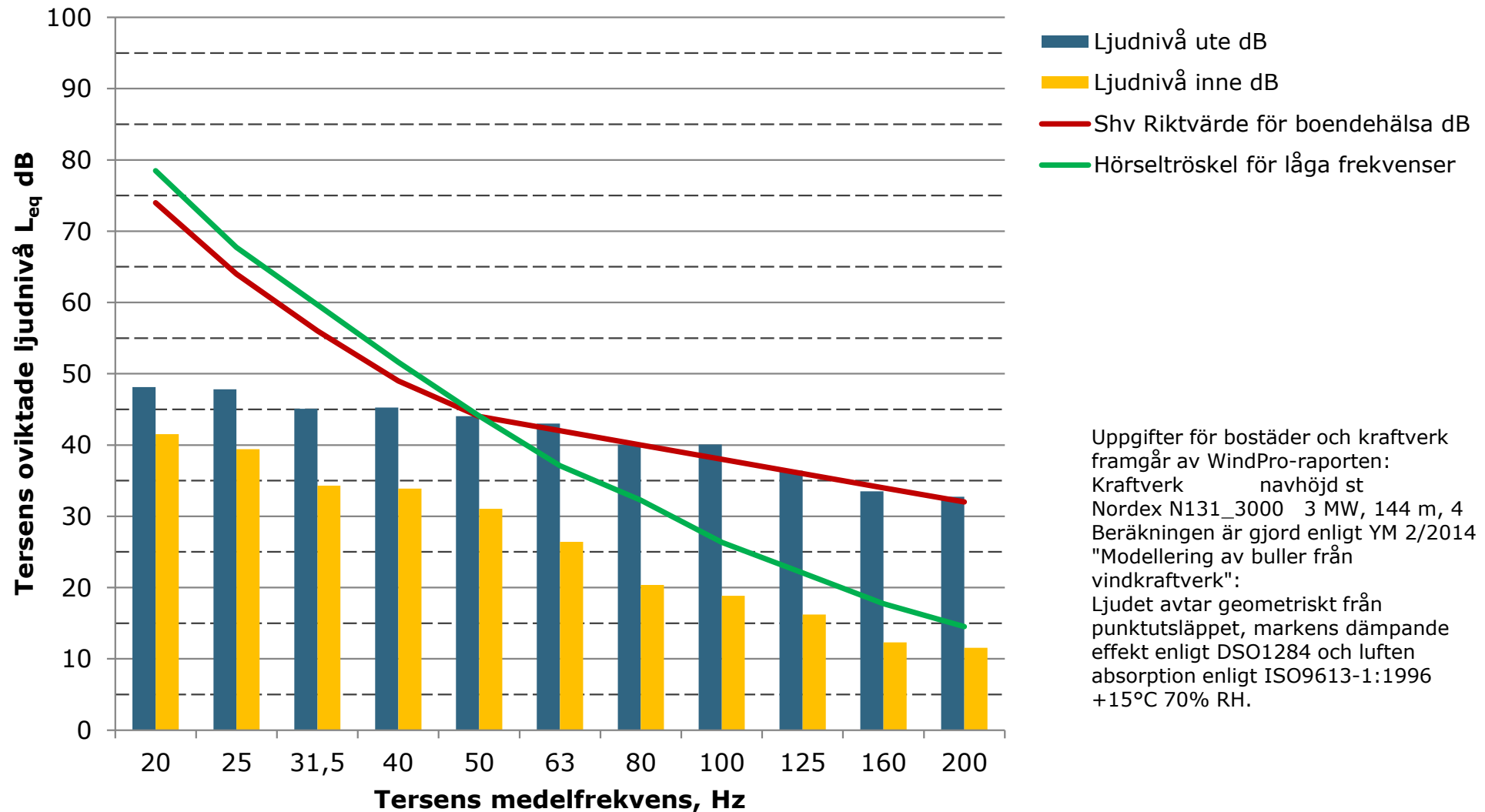
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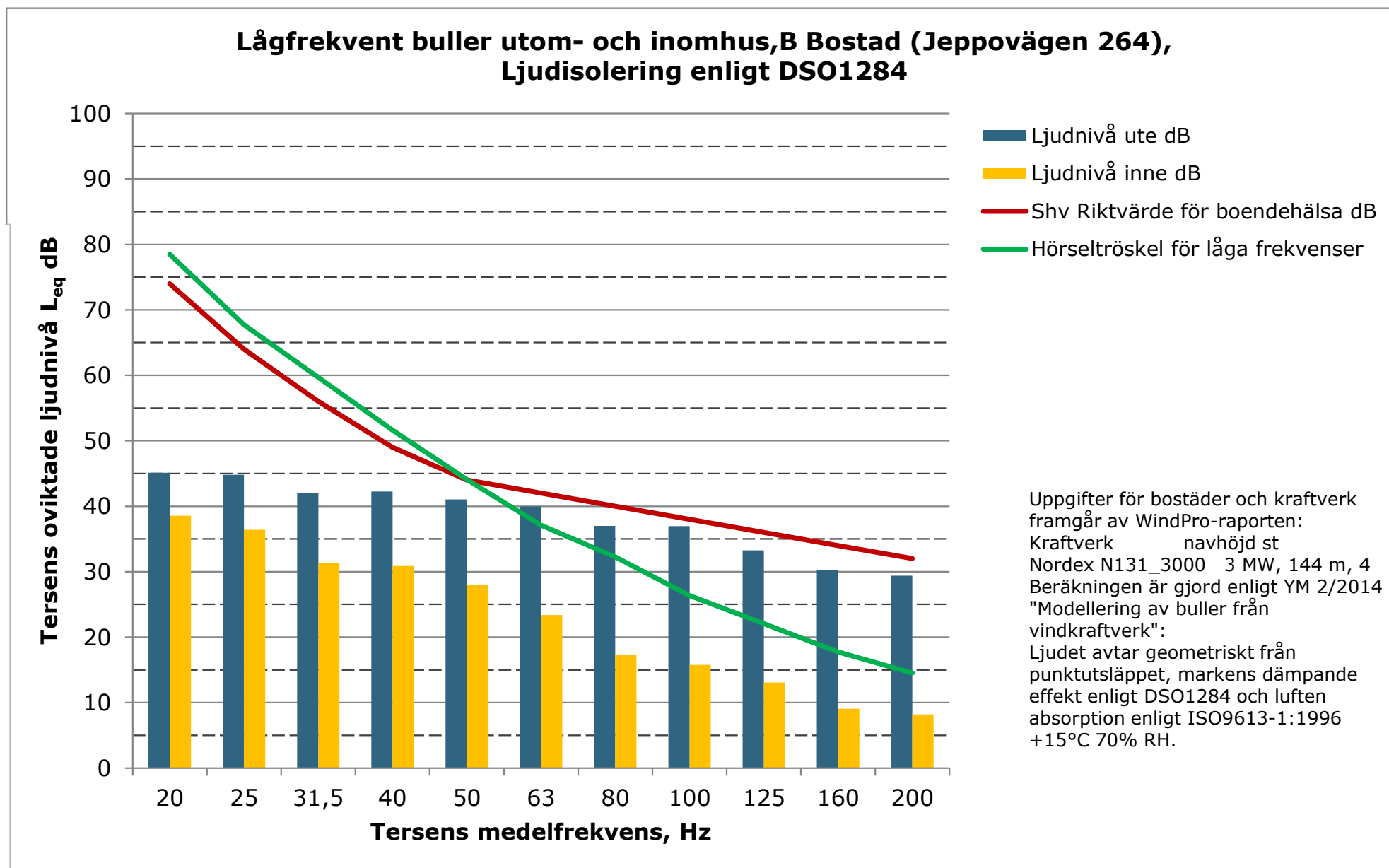
DECIBEL - Map 8,0 m/s
Calculation: Sandbacka N131-3000 x 4 x HH144_2014 (Vörå, ALT 2) **Noise calculation model:** ISO 9613-2 General 8,0 m/s




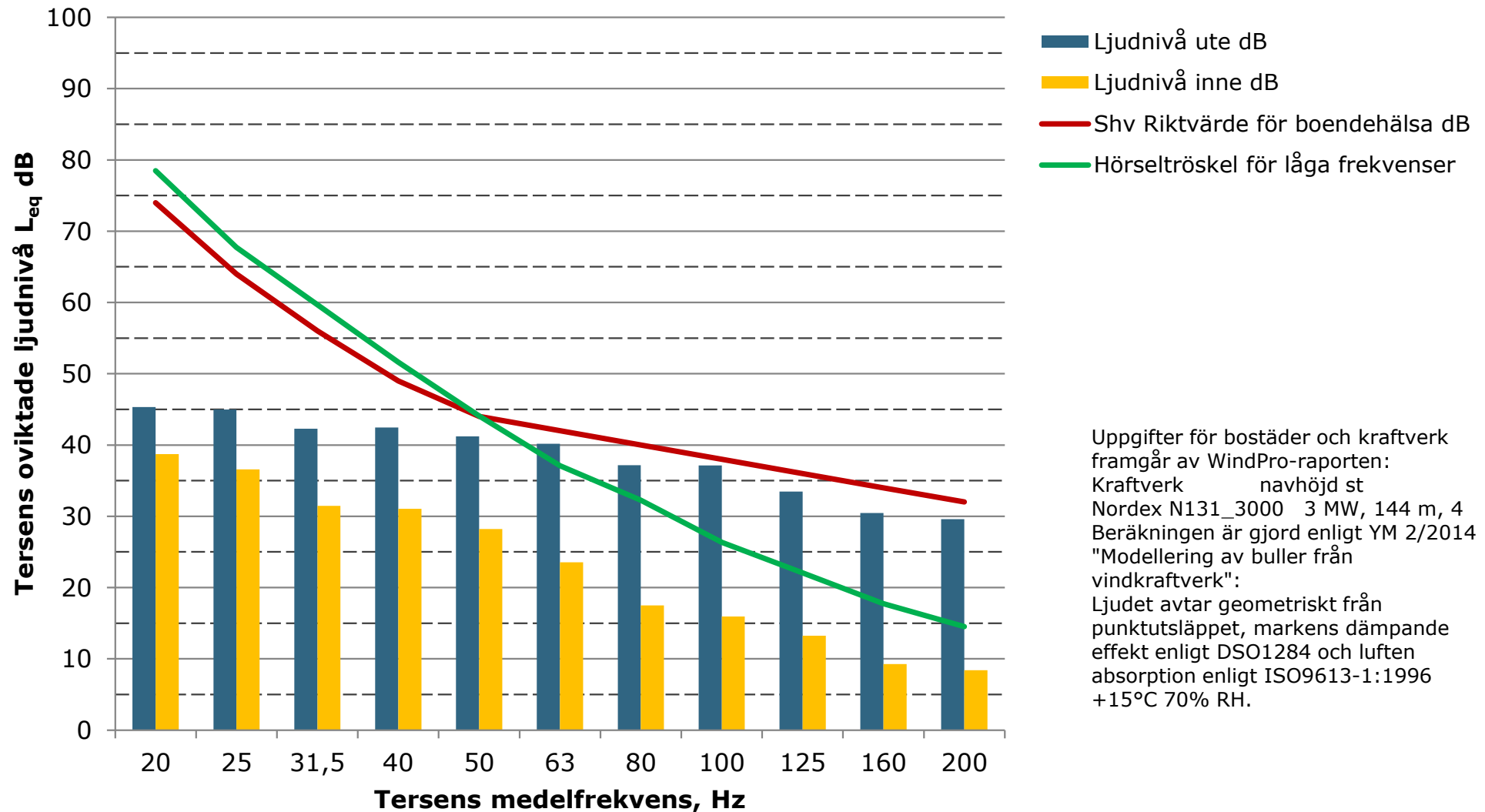


Lågfrekvent buller utom- och inomhus, A Bostad (Munsolbacken), Ljudisolering enligt DSO1284

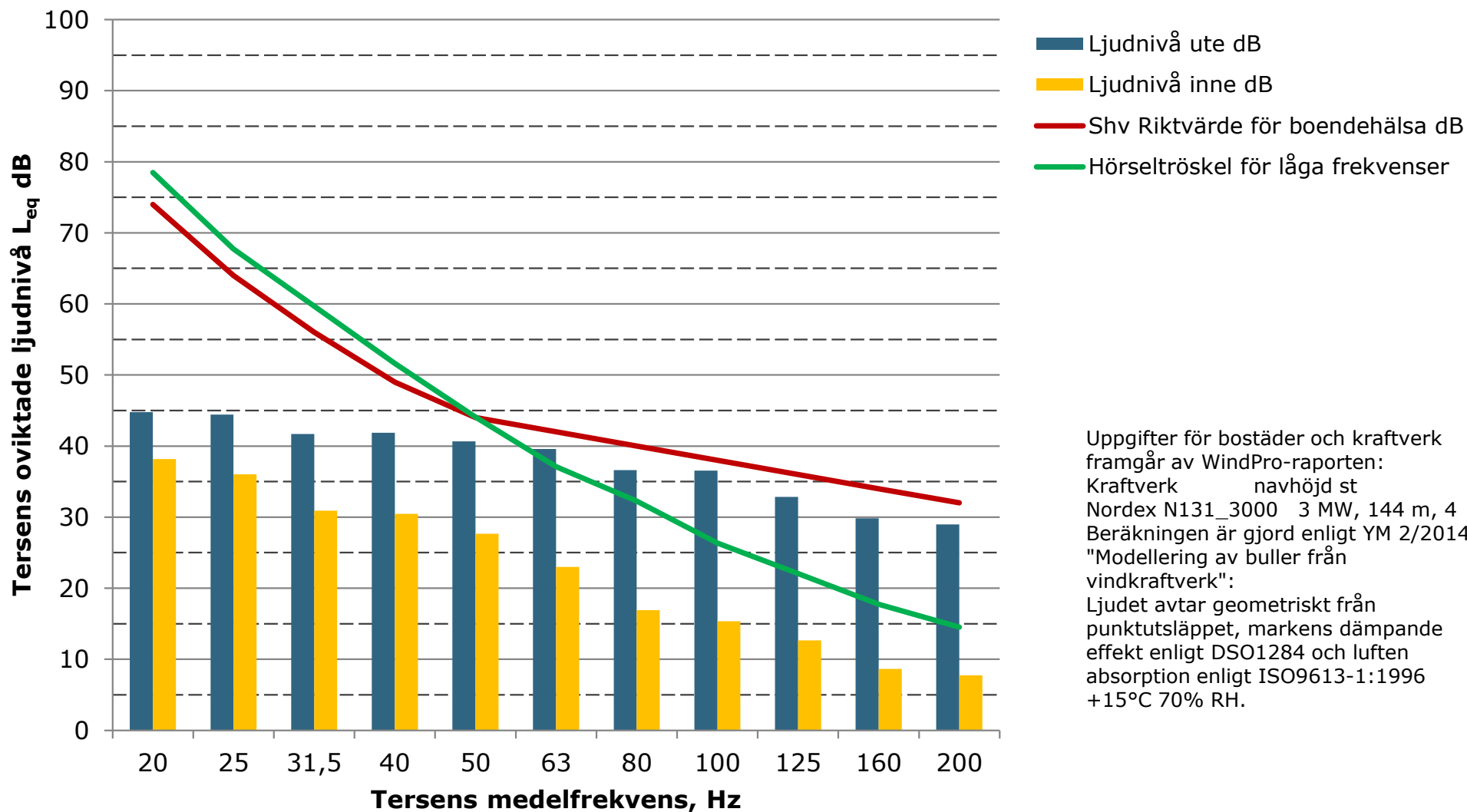




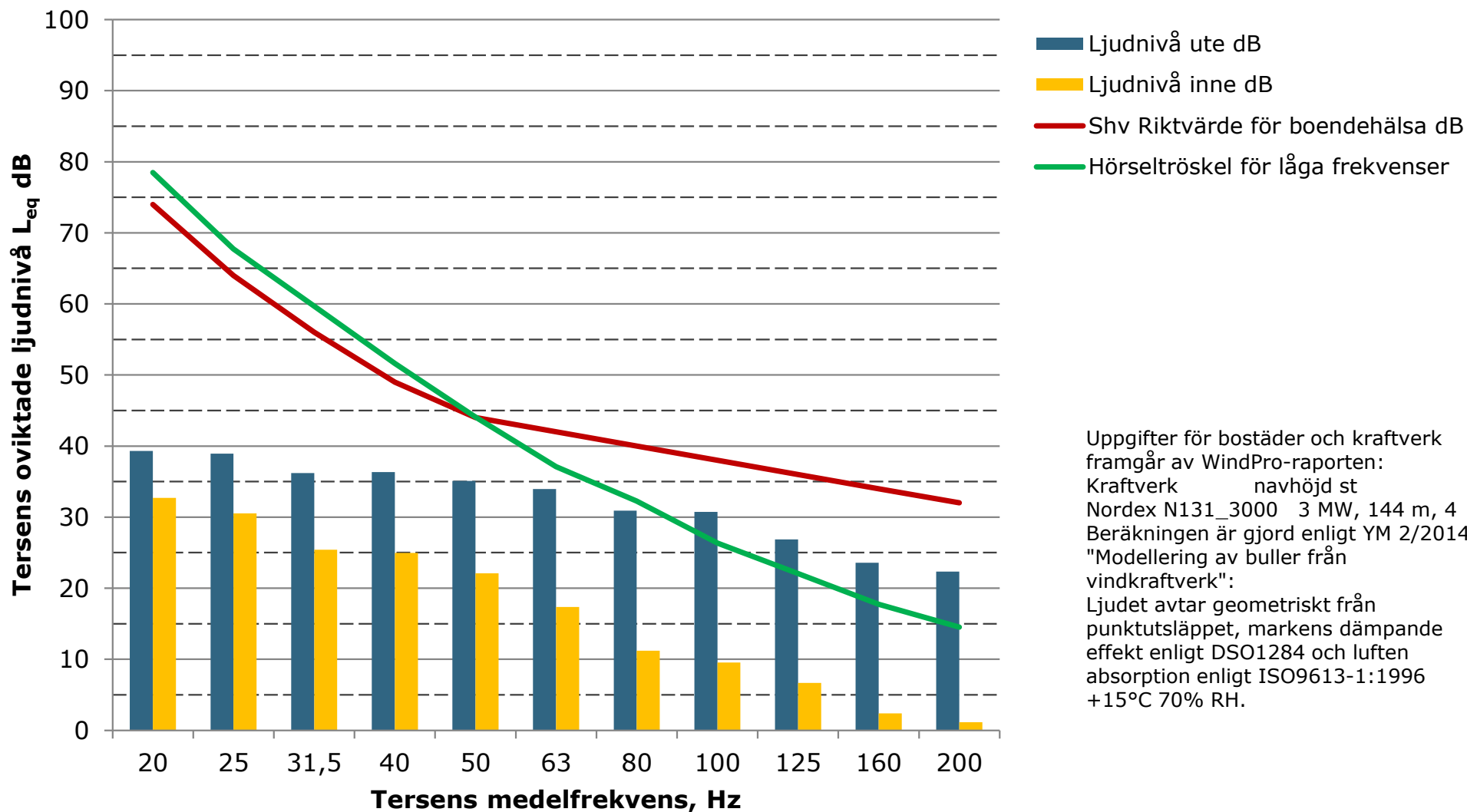
Lågfrekvent buller utom- och inomhus, C Bostad (Vägaminnet), Ljudisolering enligt DSO1284



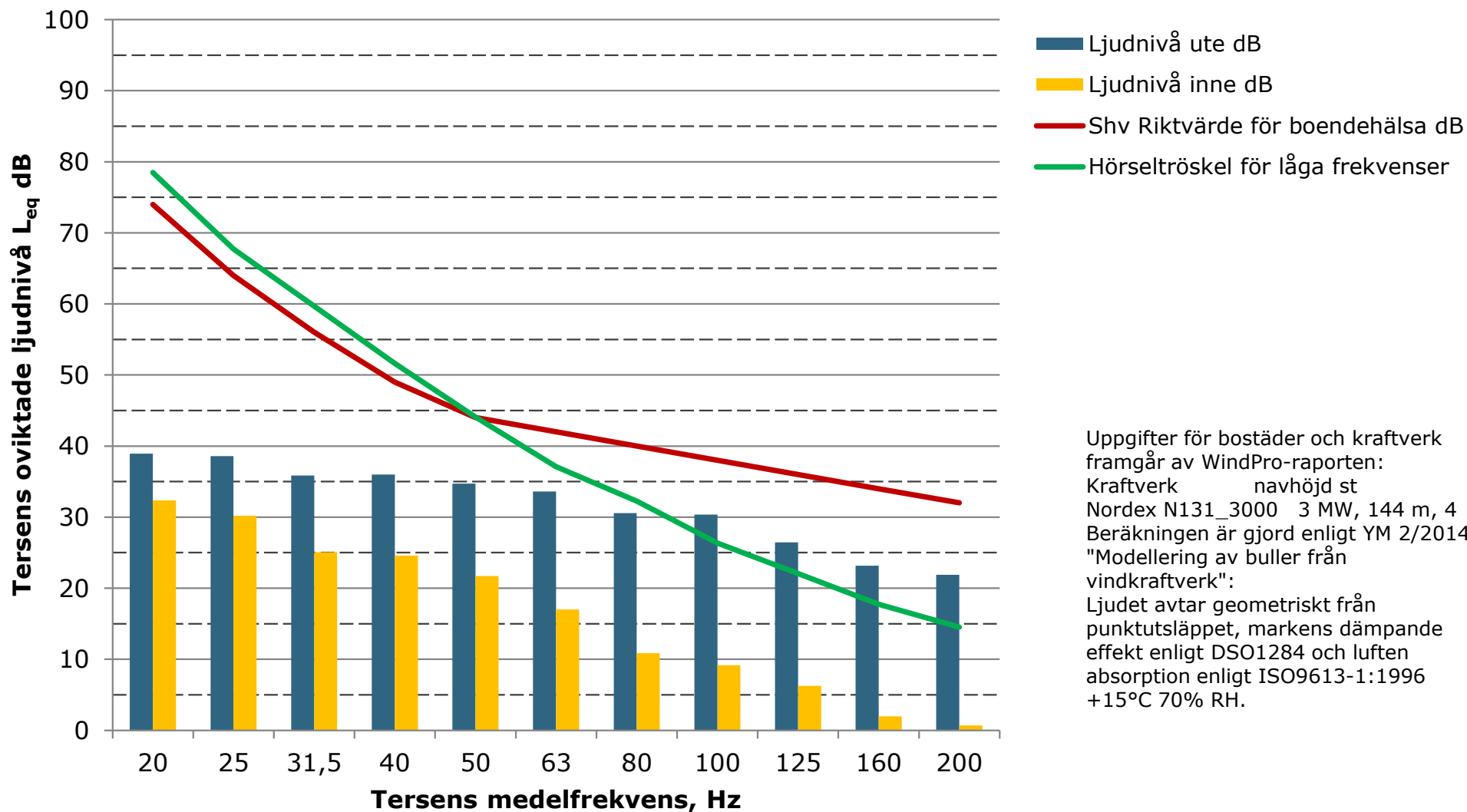
Lågfrekvent buller utom- och inomhus, D Bostad (Solbackavägen), Ljudisolering enligt DSO1284



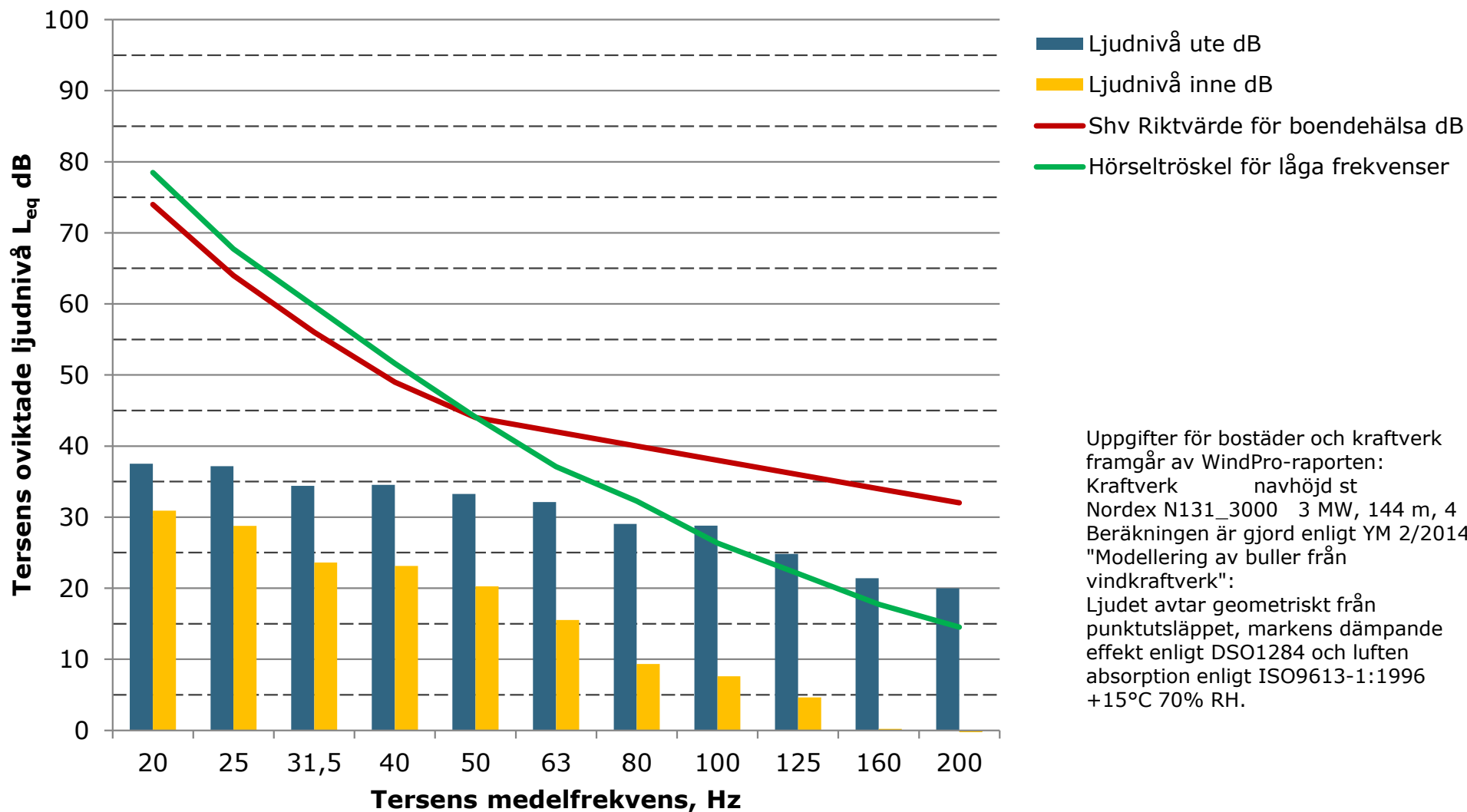
Lågfrekvent buller utom- och inomhus, E Bostad (Gunilackvägen, Ljudisolering enligt DSO1284



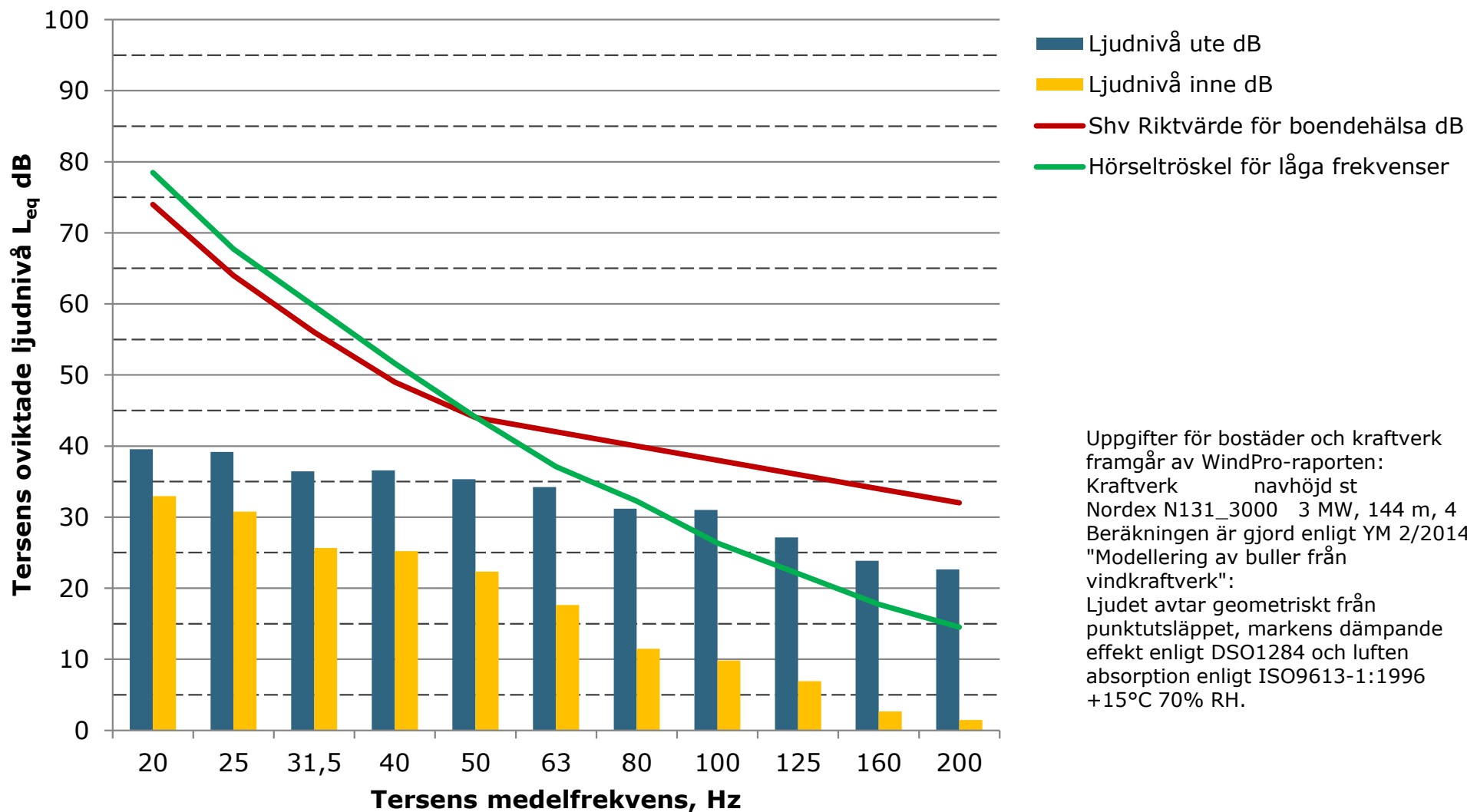
Lågfrekvent buller utom- och inomhus, F Bostad (Monåvägen 19), Ljudisolering enligt DSO1284



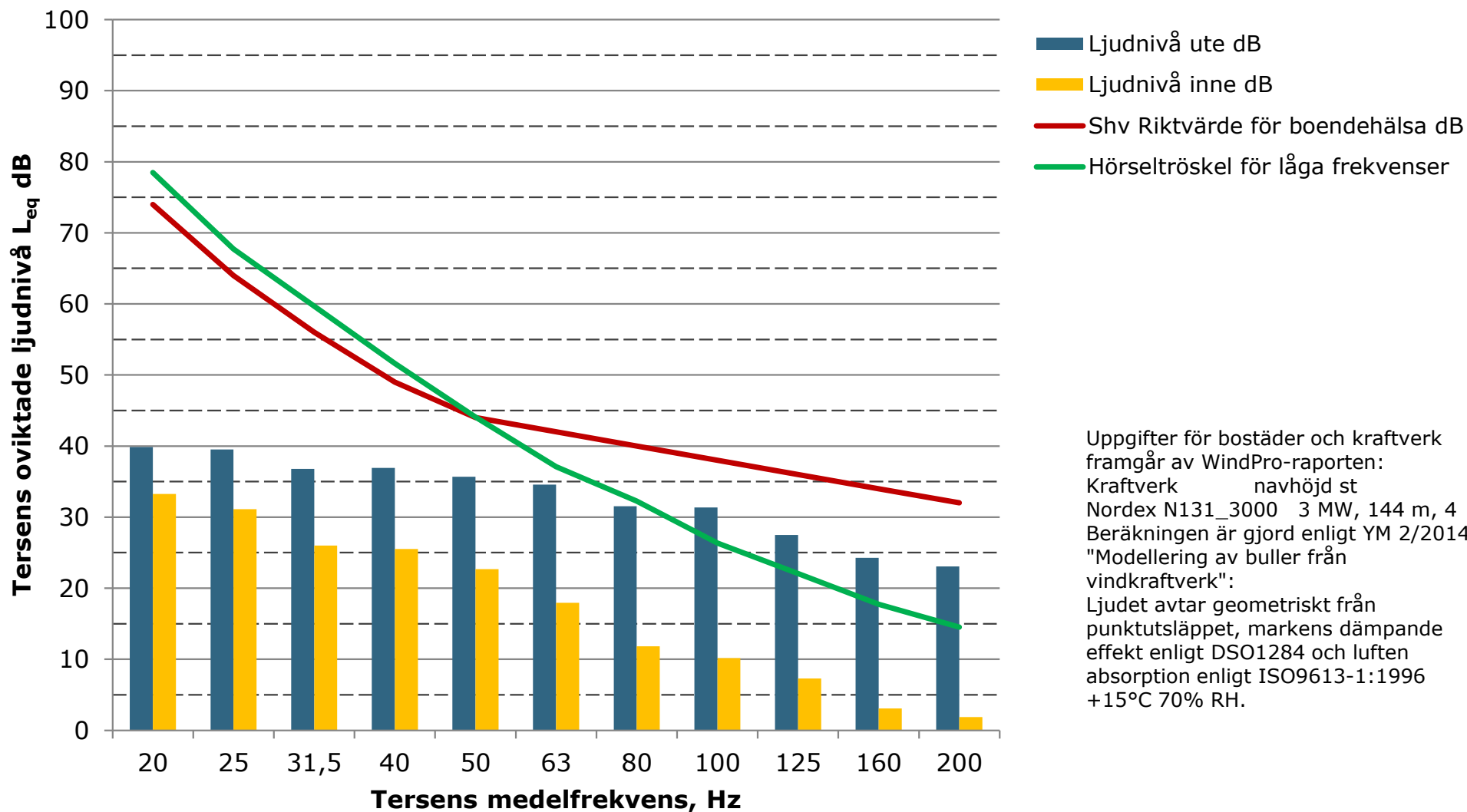
Lågfrekvent buller utom- och inomhus, G Bostad (Harjuxvägen 336), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, H Bostad (Harjuxvägen 425), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, I Bostad (Harjuxvägen 430), Ljudisolering enligt DSO1284



27.6.2014

ALT 3. N131 x 19 x HH144 (19 vindkraftverk)

Project:

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Calculated:

15.4.2014 14:34/2.8.579

DECIBEL - Main Result

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3)

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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:

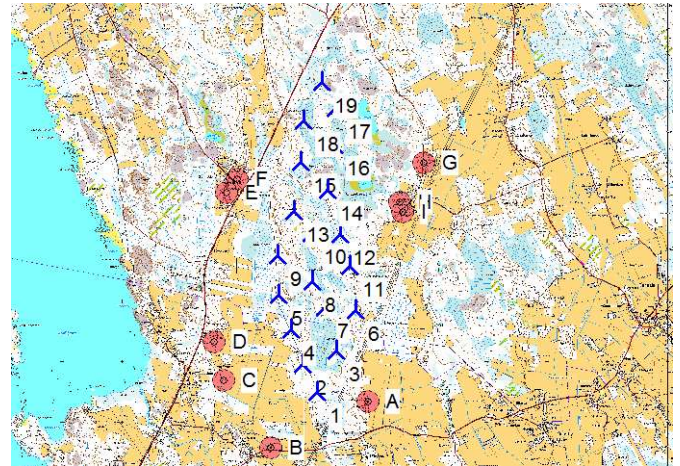
Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m 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)



Scale 1:125 000

New WTG

Noise sensitive area

WTGs

ETRS 89 Zone: 35				WTG type			Noise data							
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones
		[m]												
1	272 217	7 030 506	17,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
2	271 975	7 030 974	20,0 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
3	272 536	7 031 182	18,9 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
4	271 790	7 031 536	17,0 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
5	271 574	7 032 104	15,4 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
6	272 845	7 031 861	22,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
7	272 339	7 031 903	22,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
8	272 131	7 032 340	24,6 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
9	271 558	7 032 764	14,2 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
10	272 114	7 033 125	27,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
11	272 760	7 032 585	24,8 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
12	272 590	7 033 118	27,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
13	271 825	7 033 497	30,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
14	272 381	7 033 839	28,7 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
15	271 935	7 034 312	23,3 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
16	272 502	7 034 584	30,0 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
17	272 518	7 035 190	27,5 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
18	271 991	7 034 984	26,3 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h
19	272 287	7 035 624	26,6 NORDEX N131/3000 3000 1...	Yes	NORDEX	N131/3000-3 000	3 000	131,0	144,0	EMD	Level 0 - calculated - 104.5 dB(A) - R00	8,0	104,5	0 dB h

h) Generic octave distribution used

Calculation Results

Sound Level

Noise sensitive area			ETRS 89 Zone: 35			Demands		Sound Level	Demands fulfilled ?	
No.	Name		East	North	Z	Imission height	Noise	From WTGs	Noise	
					[m]	[m]	[dB(A)]	[dB(A)]		
	A Bostad (Munsolbacken)		273 053	7 030 347	15,1	1,5	40,0	37,1	Yes	
	B Bostad (Jeppovägen 264)		271 454	7 029 590	10,0	1,5	40,0	33,1	Yes	
	C Bostad (Vägaminnet)		270 675	7 030 693	8,9	1,5	40,0	34,3	Yes	
	D Bostad (Solbackavägen)		270 505	7 031 325	15,0	1,5	40,0	34,9	Yes	
	E Bostad (Gunilackvägen 90)		270 712	7 033 804	17,7	1,5	40,0	36,2	Yes	
	F Bostad (Monåvägen 19)		270 899	7 034 022	20,6	1,5	40,0	37,1	Yes	
	G Bostad (Harjuxvägen 336)		273 981	7 034 287	24,0	1,5	40,0	33,9	Yes	
	H Bostad (Harjuxvägen 425)		273 583	7 033 632	28,4	1,5	40,0	36,8	Yes	
	I Bostad (Harjuxvägen 430)		273 621	7 033 482	23,8	1,5	40,0	36,8	Yes	

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15.4.2014 14:34/2.8.579

**DECIBEL - Main Result****Calculation:** Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3)**Distances (m)**

WTG	A	B	C	D	E	F	G	H	I
1	850	1191	1552	1897	3623	3753	4170	3409	3288
2	1246	1478	1329	1511	3097	3231	3871	3105	2998
3	981	1924	1923	2035	3192	3277	3423	2663	2541
4	1733	1973	1397	1302	2509	2640	3515	2756	2670
5	2295	2515	1672	1322	1905	2032	3248	2522	2466
6	1527	2661	2463	2400	2884	2907	2677	1917	1796
7	1710	2475	2056	1922	2501	2561	2893	2129	2032
8	2194	2830	2197	1916	2038	2084	2685	1942	1876
9	2840	3173	2250	1782	1340	1420	2861	2202	2183
10	2930	3594	2824	2413	1557	1510	2198	1553	1547
11	2255	3265	2814	2582	2382	2350	2094	1331	1242
12	2807	3704	3088	2748	1998	1917	1816	1117	1092
13	3379	3922	3029	2540	1154	1064	2295	1762	1795
14	3554	4346	3577	3135	1669	1493	1661	1219	1290
15	4117	4743	3830	3310	1324	1075	2045	1782	1878
16	4270	5100	4296	3820	1952	1698	1508	1439	1570
17	4869	5697	4857	4355	2276	1995	1719	1886	2032
18	4754	5417	4486	3947	1740	1455	2107	2087	2215
19	5329	6088	5185	4651	2406	2118	2157	2375	2522

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DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Bostad (Munsolbacken)

WTG			Wind speed: 8,0 m/s									
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	850	862	32,39	104,5	0,00	69,71	-	-	0,00	0,00	-	0,00
2	1 246	1 254	28,09	104,5	0,00	72,97	-	-	0,00	0,00	-	0,00
3	981	992	30,81	104,5	0,00	70,93	-	-	0,00	0,00	-	0,00
4	1 733	1 739	24,16	104,5	0,00	75,81	-	-	0,00	0,00	-	0,00
5	2 295	2 299	20,66	104,5	0,00	78,23	-	-	0,00	0,00	-	0,00
6	1 527	1 534	25,69	104,5	0,00	74,72	-	-	0,00	0,00	-	0,00
7	1 710	1 717	24,32	104,5	0,00	75,70	-	-	0,00	0,00	-	0,00
8	2 194	2 199	21,22	104,5	0,00	77,85	-	-	0,00	0,00	-	0,00
9	2 840	2 843	17,92	104,5	0,00	80,08	-	-	0,00	0,00	-	0,00
10	2 930	2 934	17,51	104,5	0,00	80,35	-	-	0,00	0,00	-	0,00
11	2 255	2 260	20,88	104,5	0,00	78,08	-	-	0,00	0,00	-	0,00
12	2 807	2 812	18,06	104,5	0,00	79,98	-	-	0,00	0,00	-	0,00
13	3 379	3 382	15,64	104,5	0,00	81,58	-	-	0,00	0,00	-	0,00
14	3 554	3 557	14,97	104,5	0,00	82,02	-	-	0,00	0,00	-	0,00
15	4 117	4 120	13,02	104,5	0,00	83,30	-	-	0,00	0,00	-	0,00
16	4 270	4 273	12,54	104,5	0,00	83,61	-	-	0,00	0,00	-	0,00
17	4 869	4 872	11,01	104,5	0,00	84,75	-	-	0,00	0,00	-	0,00
18	4 754	4 756	11,28	104,5	0,00	84,55	-	-	0,00	0,00	-	0,00
19	5 329	5 331	9,97	104,5	0,00	85,54	-	-	0,00	0,00	-	0,00

Sum 37,14

- Data undefined due to calculation with octave data

Noise sensitive area: B Bostad (Jeppovägen 264)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 191	1 201	28,60	104,5	0,00	72,59	-	-	0,00	0,00	-	0,00
2	1 478	1 485	26,08	104,5	0,00	74,44	-	-	0,00	0,00	-	0,00
3	1 924	1 929	22,87	104,5	0,00	76,71	-	-	0,00	0,00	-	0,00
4	1 973	1 979	22,56	104,5	0,00	76,93	-	-	0,00	0,00	-	0,00
5	2 515	2 519	19,49	104,5	0,00	79,03	-	-	0,00	0,00	-	0,00
6	2 661	2 666	18,76	104,5	0,00	79,52	-	-	0,00	0,00	-	0,00
7	2 475	2 480	19,69	104,5	0,00	78,89	-	-	0,00	0,00	-	0,00
8	2 830	2 834	17,96	104,5	0,00	80,05	-	-	0,00	0,00	-	0,00
9	3 173	3 177	16,47	104,5	0,00	81,04	-	-	0,00	0,00	-	0,00
10	3 594	3 597	14,82	104,5	0,00	82,12	-	-	0,00	0,00	-	0,00
11	3 265	3 269	16,09	104,5	0,00	81,29	-	-	0,00	0,00	-	0,00
12	3 704	3 707	14,42	104,5	0,00	82,38	-	-	0,00	0,00	-	0,00
13	3 922	3 925	13,67	104,5	0,00	82,88	-	-	0,00	0,00	-	0,00
14	4 346	4 349	12,30	104,5	0,00	83,77	-	-	0,00	0,00	-	0,00

To be continued on next page...

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15.4.2014 14:34/2.8.579

DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
15	4 743	4 746	11,30	104,5	0,00	84,53	-	-	0,00	0,00	-	0,00
16	5 100	5 102	10,48	104,5	0,00	85,16	-	-	0,00	0,00	-	0,00
17	5 697	5 699	9,20	104,5	0,00	86,12	-	-	0,00	0,00	-	0,00
18	5 417	5 420	9,78	104,5	0,00	85,68	-	-	0,00	0,00	-	0,00
19	6 088	6 090	8,43	104,5	0,00	86,69	-	-	0,00	0,00	-	0,00
Sum	33,13											

- Data undefined due to calculation with octave data

Noise sensitive area: C Bostad (Vägamminnet)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 552	1 559	25,49	104,5	0,00	74,86	-	-	0,00	0,00	-	0,00
2	1 329	1 338	27,33	104,5	0,00	73,53	-	-	0,00	0,00	-	0,00
3	1 923	1 929	22,88	104,5	0,00	76,71	-	-	0,00	0,00	-	0,00
4	1 397	1 405	26,75	104,5	0,00	73,95	-	-	0,00	0,00	-	0,00
5	1 672	1 679	24,59	104,5	0,00	75,50	-	-	0,00	0,00	-	0,00
6	2 463	2 468	19,75	104,5	0,00	78,85	-	-	0,00	0,00	-	0,00
7	2 056	2 062	22,04	104,5	0,00	77,29	-	-	0,00	0,00	-	0,00
8	2 197	2 203	21,21	104,5	0,00	77,86	-	-	0,00	0,00	-	0,00
9	2 250	2 255	20,91	104,5	0,00	78,06	-	-	0,00	0,00	-	0,00
10	2 824	2 829	17,99	104,5	0,00	80,03	-	-	0,00	0,00	-	0,00
11	2 814	2 818	18,03	104,5	0,00	80,00	-	-	0,00	0,00	-	0,00
12	3 088	3 092	16,82	104,5	0,00	80,81	-	-	0,00	0,00	-	0,00
13	3 029	3 033	17,07	104,5	0,00	80,64	-	-	0,00	0,00	-	0,00
14	3 577	3 580	14,89	104,5	0,00	82,08	-	-	0,00	0,00	-	0,00
15	3 830	3 833	13,98	104,5	0,00	82,67	-	-	0,00	0,00	-	0,00
16	4 296	4 299	12,46	104,5	0,00	83,67	-	-	0,00	0,00	-	0,00
17	4 857	4 860	11,03	104,5	0,00	84,73	-	-	0,00	0,00	-	0,00
18	4 486	4 489	11,94	104,5	0,00	84,04	-	-	0,00	0,00	-	0,00
19	5 185	5 187	10,28	104,5	0,00	85,30	-	-	0,00	0,00	-	0,00
Sum	34,31											

- Data undefined due to calculation with octave data

Noise sensitive area: D Bostad (Solbackavägen)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 897	1 903	23,05	104,5	0,00	76,59	-	-	0,00	0,00	-	0,00
2	1 511	1 518	25,82	104,5	0,00	74,63	-	-	0,00	0,00	-	0,00
3	2 035	2 041	22,17	104,5	0,00	77,20	-	-	0,00	0,00	-	0,00
4	1 302	1 310	27,58	104,5	0,00	73,34	-	-	0,00	0,00	-	0,00
5	1 322	1 330	27,40	104,5	0,00	73,48	-	-	0,00	0,00	-	0,00
6	2 400	2 404	20,09	104,5	0,00	78,62	-	-	0,00	0,00	-	0,00
7	1 922	1 928	22,88	104,5	0,00	76,70	-	-	0,00	0,00	-	0,00
8	1 916	1 922	22,92	104,5	0,00	76,67	-	-	0,00	0,00	-	0,00
9	1 782	1 788	23,82	104,5	0,00	76,05	-	-	0,00	0,00	-	0,00
10	2 413	2 418	20,02	104,5	0,00	78,67	-	-	0,00	0,00	-	0,00
11	2 582	2 586	19,15	104,5	0,00	79,25	-	-	0,00	0,00	-	0,00
12	2 748	2 753	18,34	104,5	0,00	79,80	-	-	0,00	0,00	-	0,00
13	2 540	2 545	19,36	104,5	0,00	79,11	-	-	0,00	0,00	-	0,00
14	3 135	3 139	16,62	104,5	0,00	80,94	-	-	0,00	0,00	-	0,00
15	3 310	3 313	15,91	104,5	0,00	81,40	-	-	0,00	0,00	-	0,00
16	3 820	3 823	14,02	104,5	0,00	82,65	-	-	0,00	0,00	-	0,00
17	4 355	4 358	12,28	104,5	0,00	83,79	-	-	0,00	0,00	-	0,00
18	3 947	3 950	13,58	104,5	0,00	82,93	-	-	0,00	0,00	-	0,00
19	4 651	4 653	11,53	104,5	0,00	84,36	-	-	0,00	0,00	-	0,00
Sum	34,92											

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Calculated:

15.4.2014 14:34/2.8.579

DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: E Bostad (Gunilackvägen 90)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 623	3 626	14,72	104,5	0,00	82,19	-	-	0,00	0,00	-	0,00
2	3 097	3 101	16,79	104,5	0,00	80,83	-	-	0,00	0,00	-	0,00
3	3 192	3 195	16,39	104,5	0,00	81,09	-	-	0,00	0,00	-	0,00
4	2 509	2 513	19,52	104,5	0,00	79,01	-	-	0,00	0,00	-	0,00
5	1 905	1 910	23,00	104,5	0,00	76,62	-	-	0,00	0,00	-	0,00
6	2 884	2 887	17,72	104,5	0,00	80,21	-	-	0,00	0,00	-	0,00
7	2 501	2 505	19,56	104,5	0,00	78,98	-	-	0,00	0,00	-	0,00
8	2 038	2 043	22,16	104,5	0,00	77,21	-	-	0,00	0,00	-	0,00
9	1 340	1 347	27,25	104,5	0,00	73,59	-	-	0,00	0,00	-	0,00
10	1 557	1 564	25,45	104,5	0,00	74,89	-	-	0,00	0,00	-	0,00
11	2 382	2 387	20,18	104,5	0,00	78,56	-	-	0,00	0,00	-	0,00
12	1 998	2 004	22,40	104,5	0,00	77,04	-	-	0,00	0,00	-	0,00
13	1 154	1 164	28,96	104,5	0,00	72,32	-	-	0,00	0,00	-	0,00
14	1 669	1 676	24,62	104,5	0,00	75,48	-	-	0,00	0,00	-	0,00
15	1 324	1 332	27,38	104,5	0,00	73,49	-	-	0,00	0,00	-	0,00
16	1 952	1 958	22,69	104,5	0,00	76,84	-	-	0,00	0,00	-	0,00
17	2 276	2 281	20,76	104,5	0,00	78,16	-	-	0,00	0,00	-	0,00
18	1 740	1 746	24,11	104,5	0,00	75,84	-	-	0,00	0,00	-	0,00
19	2 406	2 411	20,05	104,5	0,00	78,64	-	-	0,00	0,00	-	0,00

Sum 36,20

- Data undefined due to calculation with octave data

Noise sensitive area: F Bostad (Monåvägen 19)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 753	3 756	14,25	104,5	0,00	82,49	-	-	0,00	0,00	-	0,00
2	3 231	3 234	16,23	104,5	0,00	81,20	-	-	0,00	0,00	-	0,00
3	3 277	3 280	16,05	104,5	0,00	81,32	-	-	0,00	0,00	-	0,00
4	2 640	2 643	18,87	104,5	0,00	79,44	-	-	0,00	0,00	-	0,00
5	2 032	2 037	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
6	2 907	2 910	17,61	104,5	0,00	80,28	-	-	0,00	0,00	-	0,00
7	2 561	2 565	19,26	104,5	0,00	79,18	-	-	0,00	0,00	-	0,00
8	2 084	2 089	21,87	104,5	0,00	77,40	-	-	0,00	0,00	-	0,00
9	1 420	1 426	26,56	104,5	0,00	74,08	-	-	0,00	0,00	-	0,00
10	1 510	1 517	25,82	104,5	0,00	74,62	-	-	0,00	0,00	-	0,00
11	2 350	2 355	20,35	104,5	0,00	78,44	-	-	0,00	0,00	-	0,00
12	1 917	1 922	22,92	104,5	0,00	76,68	-	-	0,00	0,00	-	0,00
13	1 064	1 075	29,88	104,5	0,00	71,63	-	-	0,00	0,00	-	0,00
14	1 493	1 500	25,96	104,5	0,00	74,52	-	-	0,00	0,00	-	0,00
15	1 075	1 085	29,78	104,5	0,00	71,71	-	-	0,00	0,00	-	0,00
16	1 698	1 705	24,41	104,5	0,00	75,63	-	-	0,00	0,00	-	0,00
17	1 995	2 001	22,42	104,5	0,00	77,02	-	-	0,00	0,00	-	0,00
18	1 455	1 462	26,27	104,5	0,00	74,30	-	-	0,00	0,00	-	0,00
19	2 118	2 124	21,67	104,5	0,00	77,54	-	-	0,00	0,00	-	0,00

Sum 37,10

- Data undefined due to calculation with octave data

Noise sensitive area: G Bostad (Harjuxvägen 336)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	4 170	4 172	12,86	104,5	0,00	83,41	-	-	0,00	0,00	-	0,00
2	3 871	3 874	13,84	104,5	0,00	82,76	-	-	0,00	0,00	-	0,00
3	3 423	3 426	15,47	104,5	0,00	81,70	-	-	0,00	0,00	-	0,00
4	3 515	3 518	15,12	104,5	0,00	81,93	-	-	0,00	0,00	-	0,00
5	3 248	3 251	16,16	104,5	0,00	81,24	-	-	0,00	0,00	-	0,00
6	2 677	2 681	18,68	104,5	0,00	79,57	-	-	0,00	0,00	-	0,00
7	2 893	2 897	17,68	104,5	0,00	80,24	-	-	0,00	0,00	-	0,00

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Calculated:

15.4.2014 14:34/2.8.579

DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
8	2 685	2 688	18,65	104,5	0,00	79,59	-	-	0,00	0,00	-	0,00
9	2 861	2 864	17,83	104,5	0,00	80,14	-	-	0,00	0,00	-	0,00
10	2 198	2 203	21,20	104,5	0,00	77,86	-	-	0,00	0,00	-	0,00
11	2 094	2 099	21,82	104,5	0,00	77,44	-	-	0,00	0,00	-	0,00
12	1 816	1 822	23,58	104,5	0,00	76,21	-	-	0,00	0,00	-	0,00
13	2 295	2 300	20,66	104,5	0,00	78,23	-	-	0,00	0,00	-	0,00
14	1 661	1 667	24,68	104,5	0,00	75,44	-	-	0,00	0,00	-	0,00
15	2 045	2 050	22,11	104,5	0,00	77,24	-	-	0,00	0,00	-	0,00
16	1 508	1 515	25,84	104,5	0,00	74,61	-	-	0,00	0,00	-	0,00
17	1 719	1 725	24,26	104,5	0,00	75,73	-	-	0,00	0,00	-	0,00
18	2 107	2 112	21,74	104,5	0,00	77,50	-	-	0,00	0,00	-	0,00
19	2 157	2 162	21,44	104,5	0,00	77,70	-	-	0,00	0,00	-	0,00

Sum 33,88

- Data undefined due to calculation with octave data

Noise sensitive area: H Bostad (Harjuxvägen 425)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 409	3 412	15,52	104,5	0,00	81,66	-	-	0,00	0,00	-	0,00
2	3 105	3 108	16,76	104,5	0,00	80,85	-	-	0,00	0,00	-	0,00
3	2 663	2 666	18,76	104,5	0,00	79,52	-	-	0,00	0,00	-	0,00
4	2 756	2 760	18,31	104,5	0,00	79,82	-	-	0,00	0,00	-	0,00
5	2 522	2 526	19,45	104,5	0,00	79,05	-	-	0,00	0,00	-	0,00
6	1 917	1 922	22,92	104,5	0,00	76,68	-	-	0,00	0,00	-	0,00
7	2 129	2 133	21,61	104,5	0,00	77,58	-	-	0,00	0,00	-	0,00
8	1 942	1 947	22,76	104,5	0,00	76,79	-	-	0,00	0,00	-	0,00
9	2 202	2 205	21,19	104,5	0,00	77,87	-	-	0,00	0,00	-	0,00
10	1 553	1 559	25,49	104,5	0,00	74,86	-	-	0,00	0,00	-	0,00
11	1 331	1 338	27,33	104,5	0,00	73,53	-	-	0,00	0,00	-	0,00
12	1 117	1 126	29,35	104,5	0,00	72,03	-	-	0,00	0,00	-	0,00
13	1 762	1 768	23,96	104,5	0,00	75,95	-	-	0,00	0,00	-	0,00
14	1 219	1 227	28,35	104,5	0,00	72,78	-	-	0,00	0,00	-	0,00
15	1 782	1 787	23,83	104,5	0,00	76,04	-	-	0,00	0,00	-	0,00
16	1 439	1 447	26,40	104,5	0,00	74,21	-	-	0,00	0,00	-	0,00
17	1 886	1 891	23,12	104,5	0,00	76,54	-	-	0,00	0,00	-	0,00
18	2 087	2 092	21,86	104,5	0,00	77,41	-	-	0,00	0,00	-	0,00
19	2 375	2 379	20,22	104,5	0,00	78,53	-	-	0,00	0,00	-	0,00

Sum 36,82

- Data undefined due to calculation with octave data

Noise sensitive area: I Bostad (Harjuxvägen 430)

WTG		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 288	3 291	16,00	104,5	0,00	81,35	-	-	0,00	0,00	-	0,00
2	2 998	3 001	17,21	104,5	0,00	80,55	-	-	0,00	0,00	-	0,00
3	2 541	2 545	19,36	104,5	0,00	79,11	-	-	0,00	0,00	-	0,00
4	2 670	2 673	18,72	104,5	0,00	79,54	-	-	0,00	0,00	-	0,00
5	2 466	2 469	19,74	104,5	0,00	78,85	-	-	0,00	0,00	-	0,00
6	1 796	1 801	23,73	104,5	0,00	76,11	-	-	0,00	0,00	-	0,00
7	2 032	2 037	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
8	1 876	1 881	23,19	104,5	0,00	76,49	-	-	0,00	0,00	-	0,00
9	2 183	2 187	21,30	104,5	0,00	77,80	-	-	0,00	0,00	-	0,00
10	1 547	1 554	25,53	104,5	0,00	74,83	-	-	0,00	0,00	-	0,00
11	1 242	1 250	28,13	104,5	0,00	72,94	-	-	0,00	0,00	-	0,00
12	1 092	1 102	29,60	104,5	0,00	71,84	-	-	0,00	0,00	-	0,00
13	1 795	1 801	23,73	104,5	0,00	76,11	-	-	0,00	0,00	-	0,00
14	1 290	1 298	27,69	104,5	0,00	73,27	-	-	0,00	0,00	-	0,00

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15.4.2014 14:34/2.8.579

DECIBEL - Detailed results

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

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WTG

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
15	1 878	1 884	23,17	104,5	0,00	76,50	-	-	0,00	0,00	-	0,00
16	1 570	1 577	25,36	104,5	0,00	74,96	-	-	0,00	0,00	-	0,00
17	2 032	2 038	22,19	104,5	0,00	77,18	-	-	0,00	0,00	-	0,00
18	2 215	2 220	21,11	104,5	0,00	77,93	-	-	0,00	0,00	-	0,00
19	2 522	2 526	19,45	104,5	0,00	79,05	-	-	0,00	0,00	-	0,00

Sum 36,78

- Data undefined due to calculation with octave data

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DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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 and Impulse tone penalty are added to WTG source noise

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

4,0 m 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	1,1	2,4	4,1	8,8	26,6	95,0

WTG: NORDEX N131/3000 3000 131.0 !O!

Noise: Level 0 - calculated - 104.5 dB(A) - R00

Source	Source/Date	Creator	Edited
NORDEX	3.12.2013	EMD	20.12.2013 13:04
F008_245_A03_R00,	21.11.2013		

Status	Hub height [m]	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	144,0	8,0	104,5	No	Generic data 86,1	93,1	96,5	99,1	98,9	96,0	91,2	81,7

NSA: Bostad (Munsolbacken)-A

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Jeppovägen 264)-B

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Vägaminnet)-C

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Solbackavägen)-D

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

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15.4.2014 14:34/2.8.579



DECIBEL - Assumptions for noise calculation

Calculation: Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

NSA: Bostad (Gunilackvägen 90)-E

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Monåvägen 19)-F

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 336)-G

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 425)-H

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Bostad (Harjuxvägen 430)-I

Predefined calculation standard:

Imission height(a.g.l.): 1,5 m

Noise demand: 40,0 dB(A)

Distance demand:

Project:

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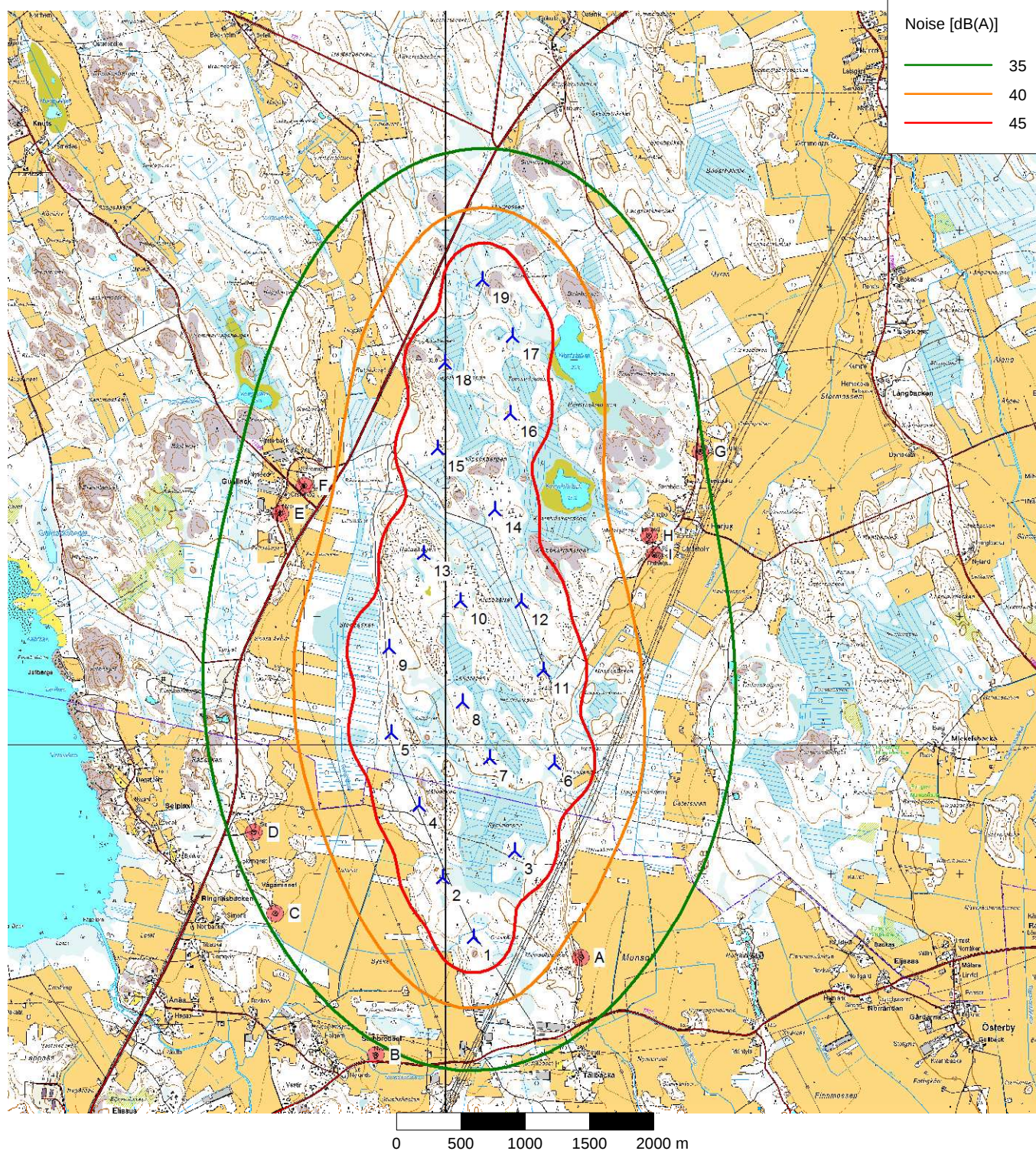
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Calculated:

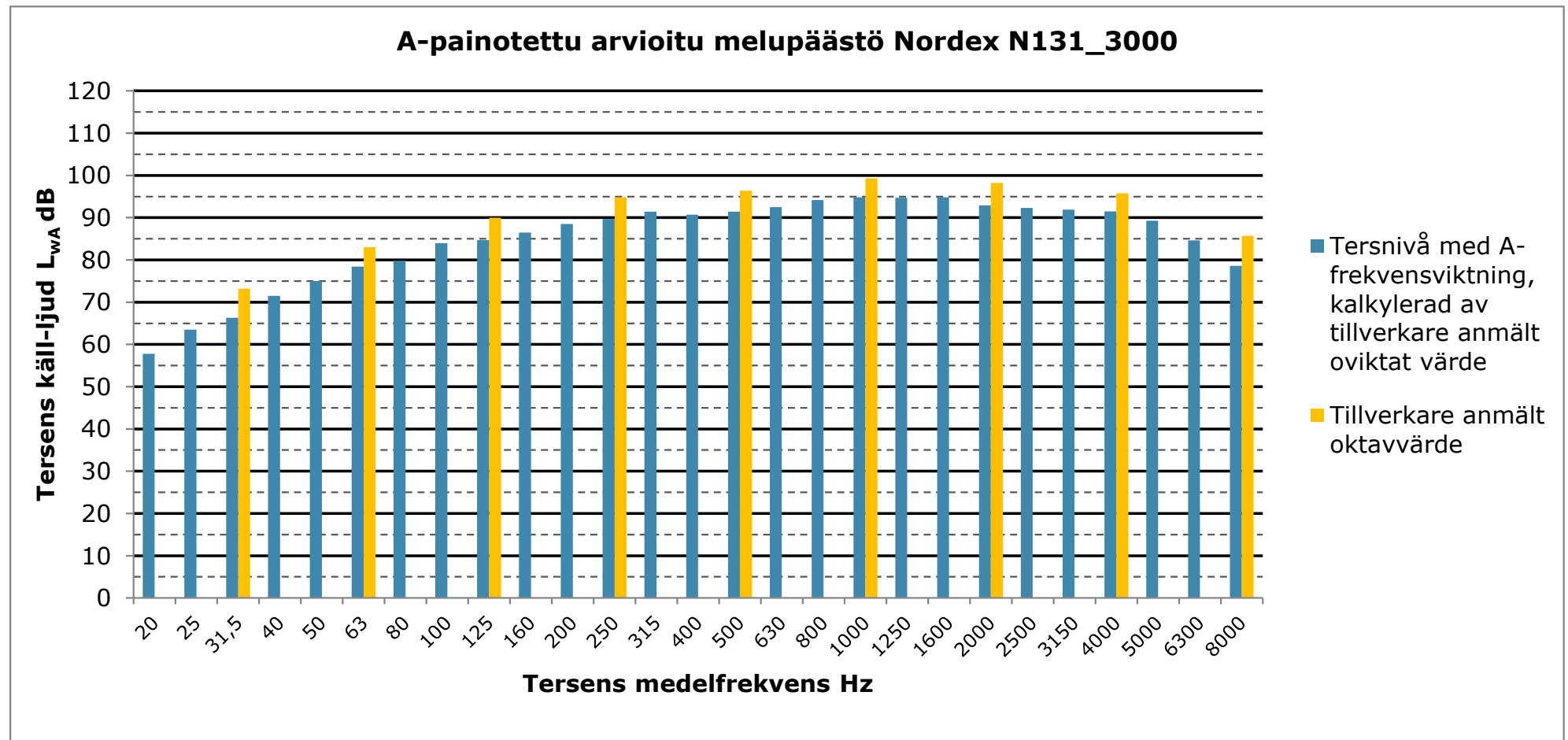
15.4.2014 14:34/2.8.579

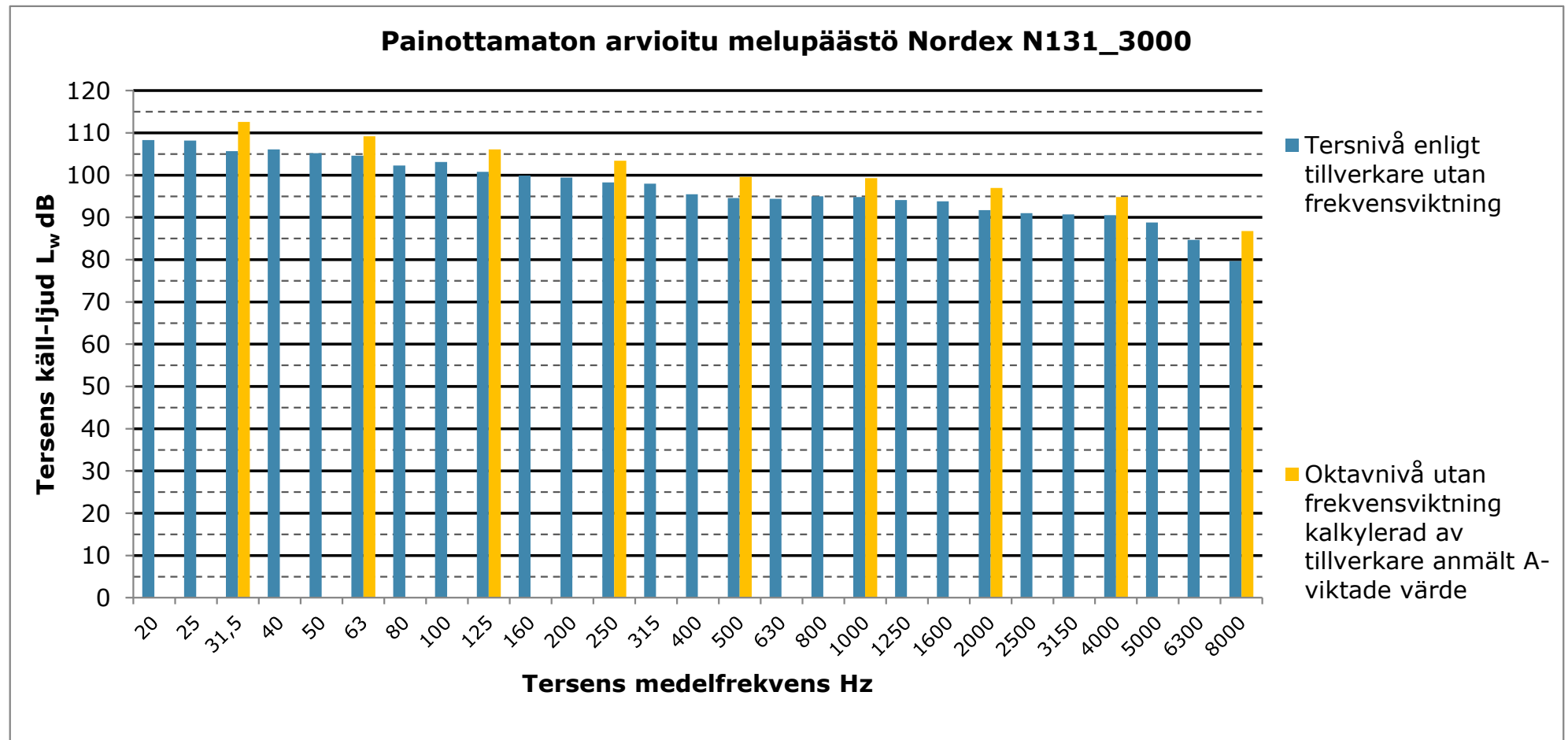
DECIBEL - Map 8,0 m/s**Calculation:** Sandbacka N131-3000 x 19 x HH144_2014 (ALT 3) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

New WTG

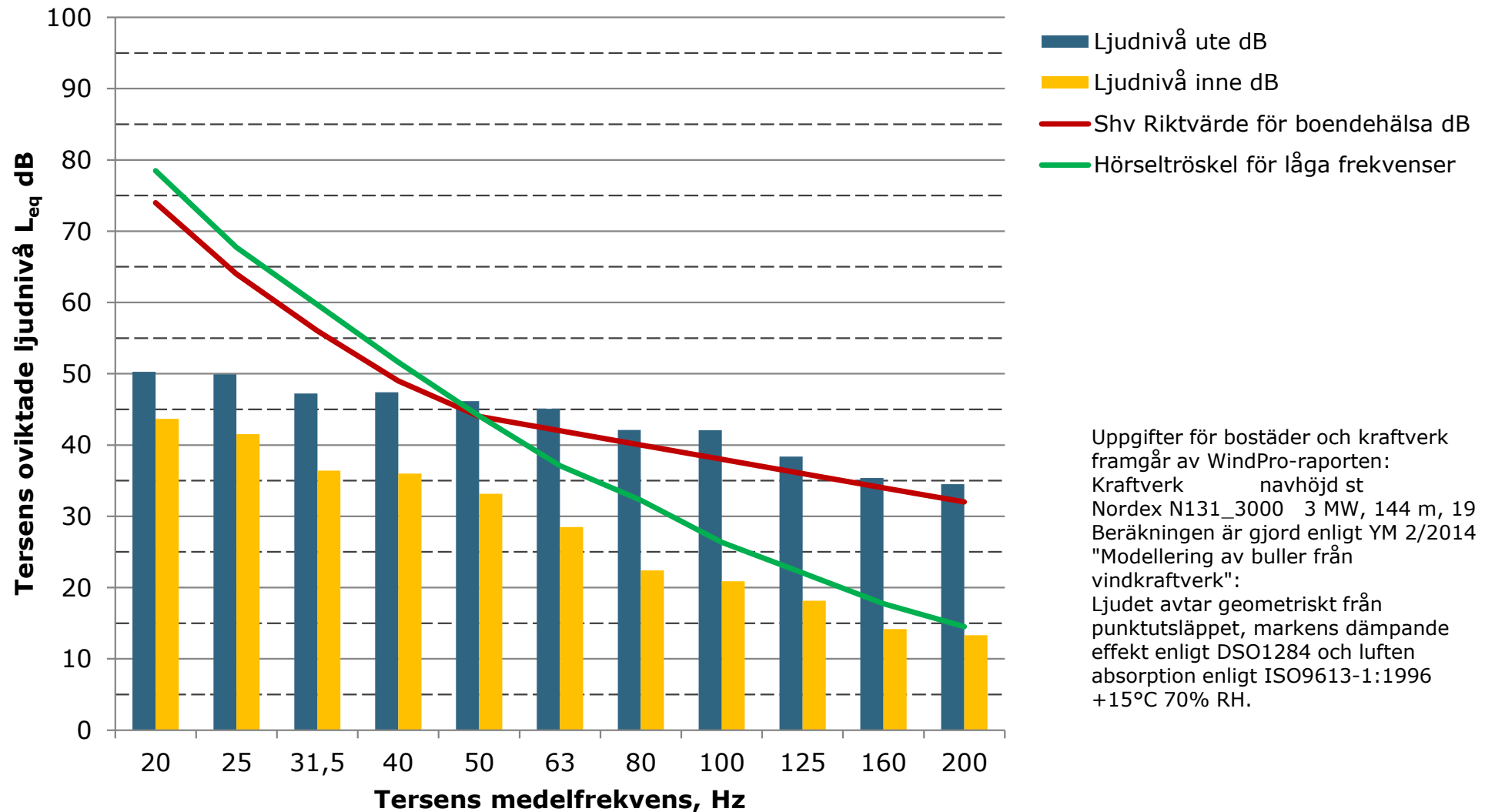
Noise sensitive area

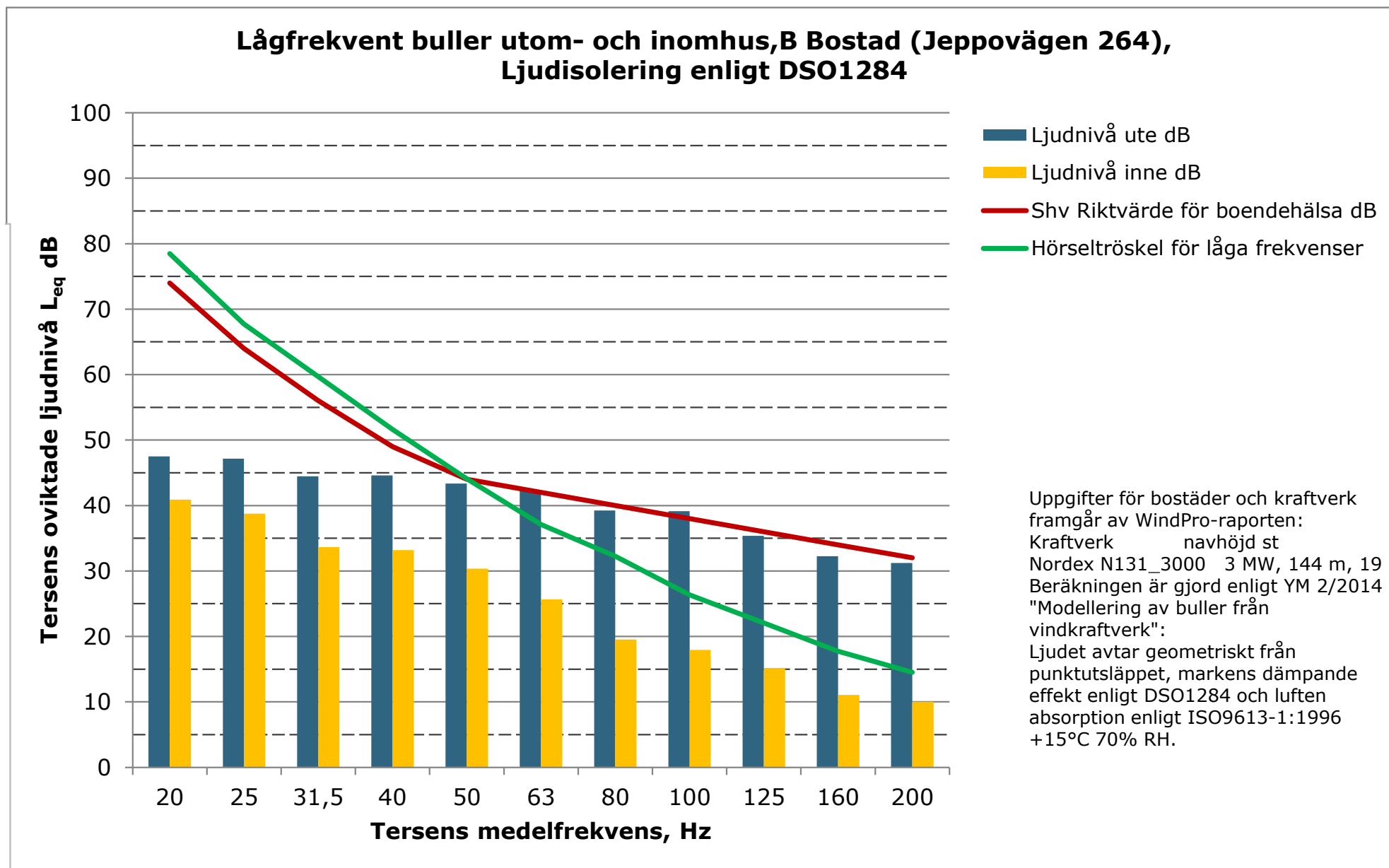
 Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
 Height above sea level from active line object



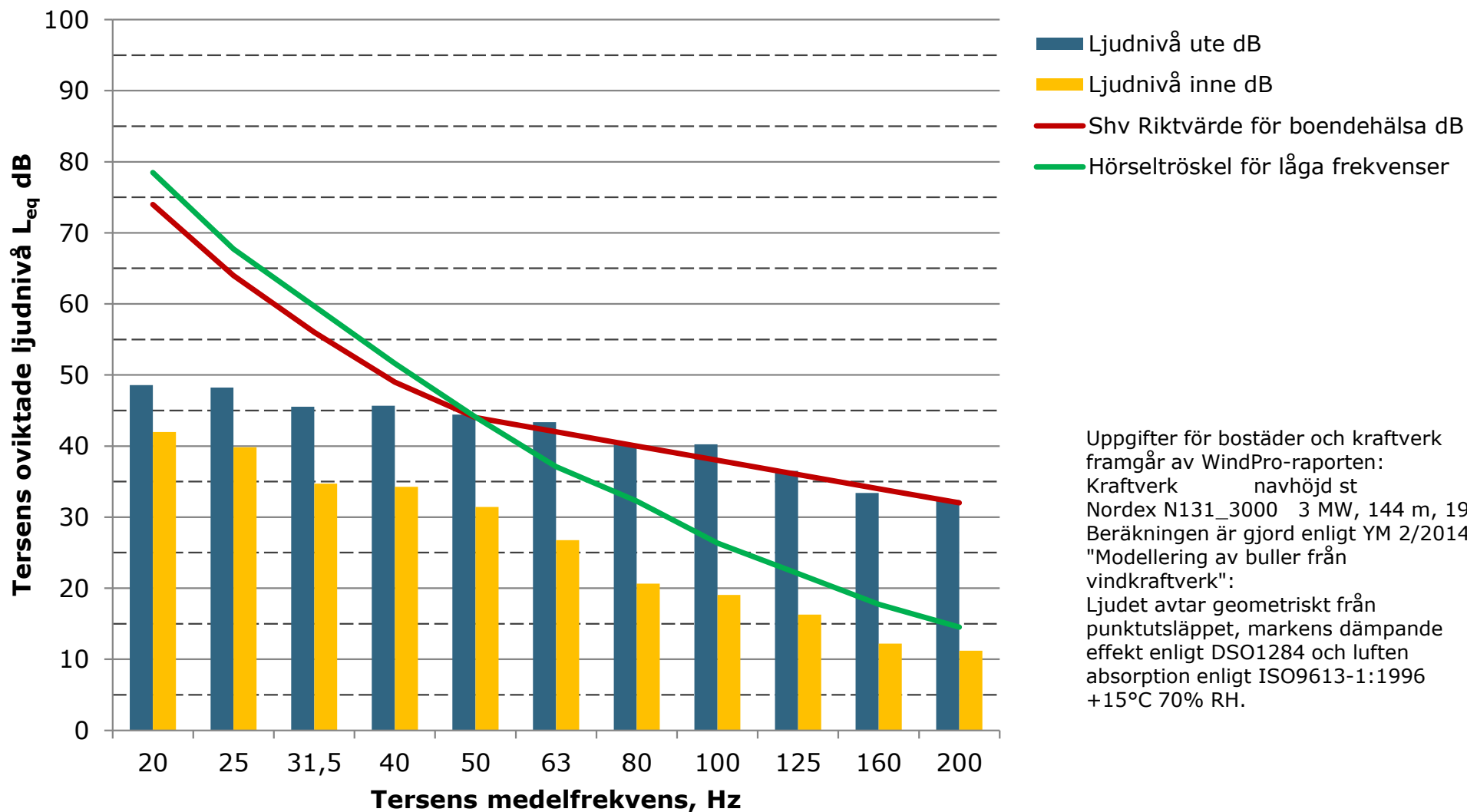


Lågfrekvent buller utom- och inomhus, A Bostad (Munsolbacken), Ljudisolering enligt DSO1284

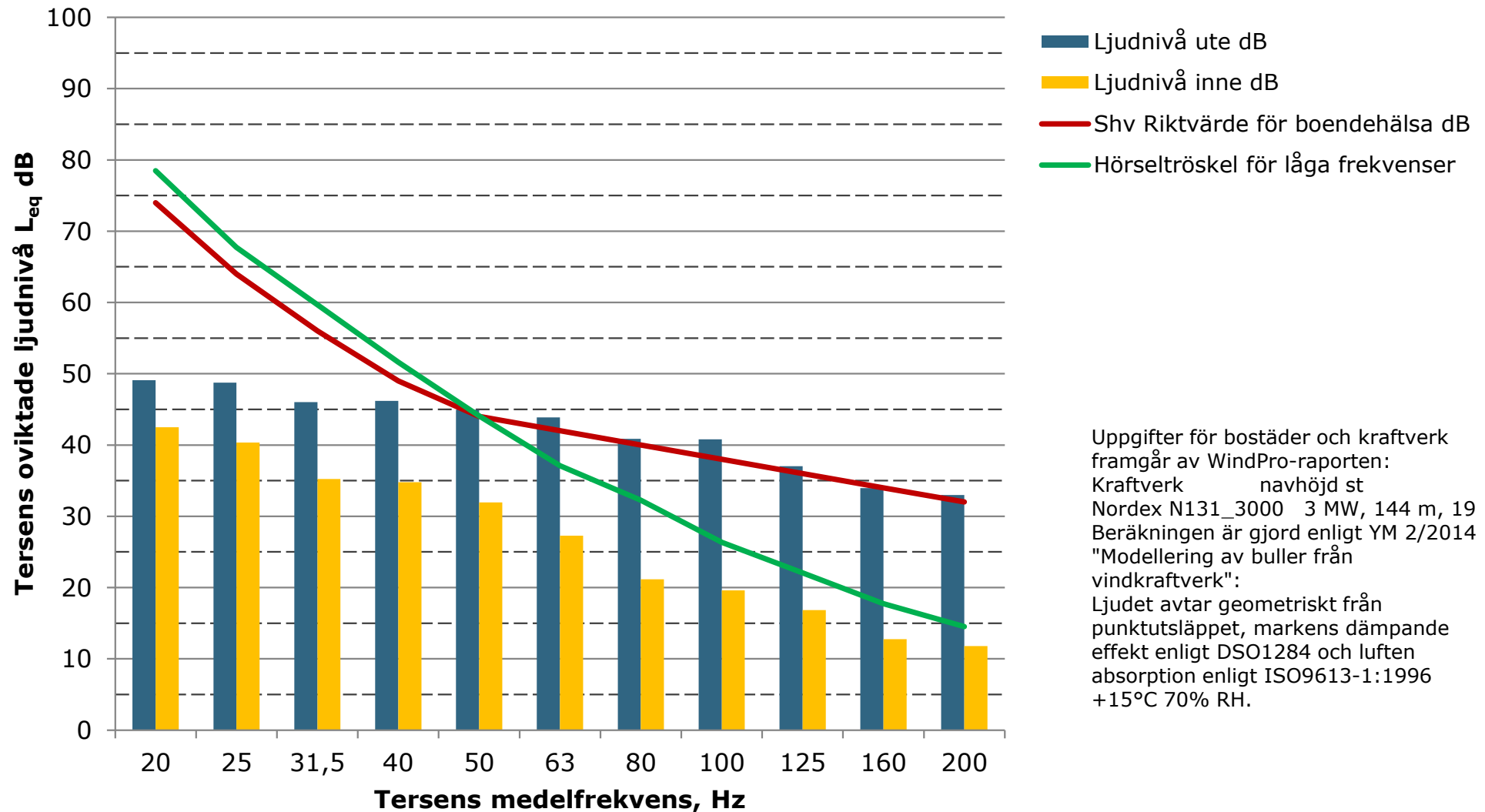




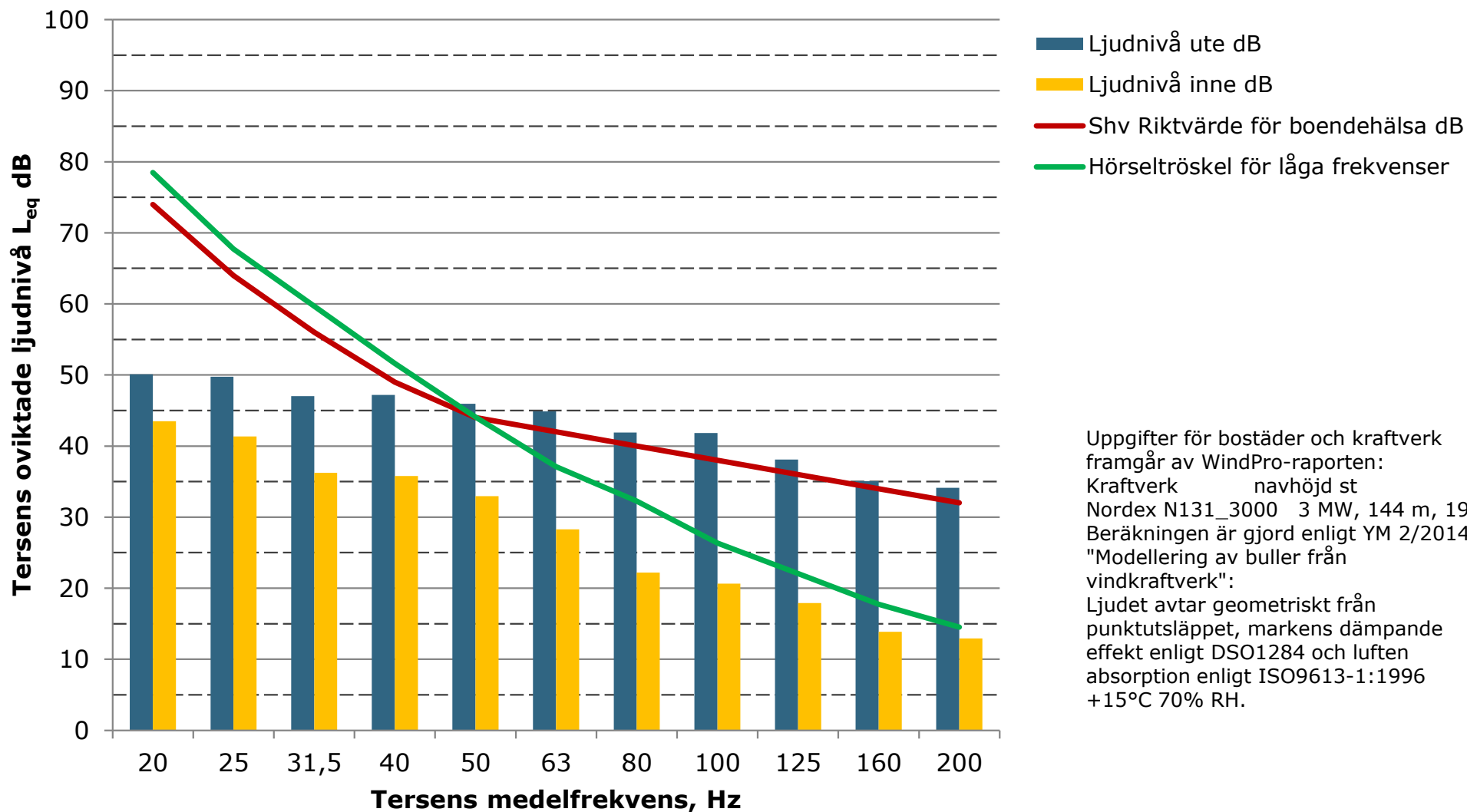
Lågfrekvent buller utom- och inomhus, C Bostad (Vägaminnet), Ljudisolering enligt DSO1284



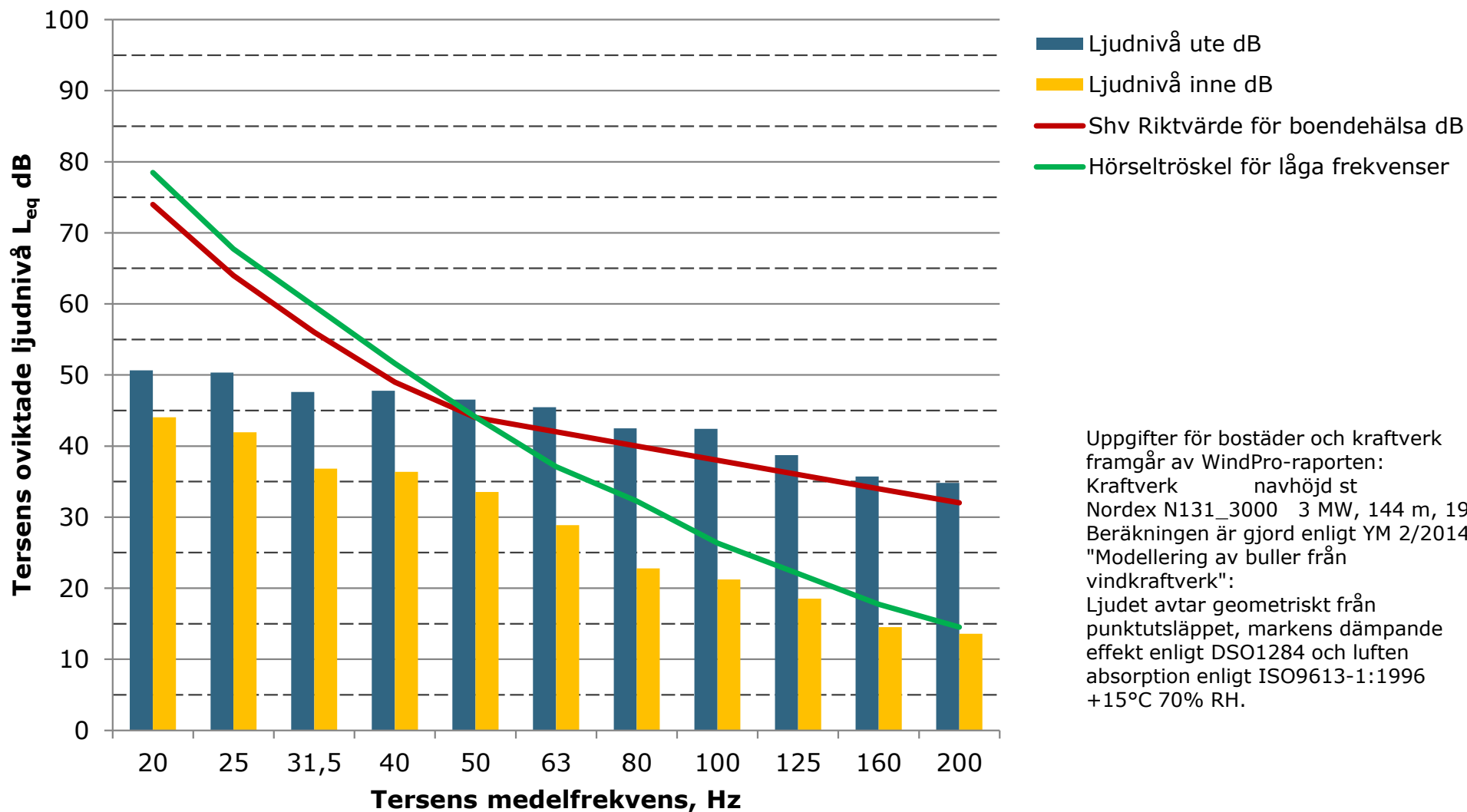
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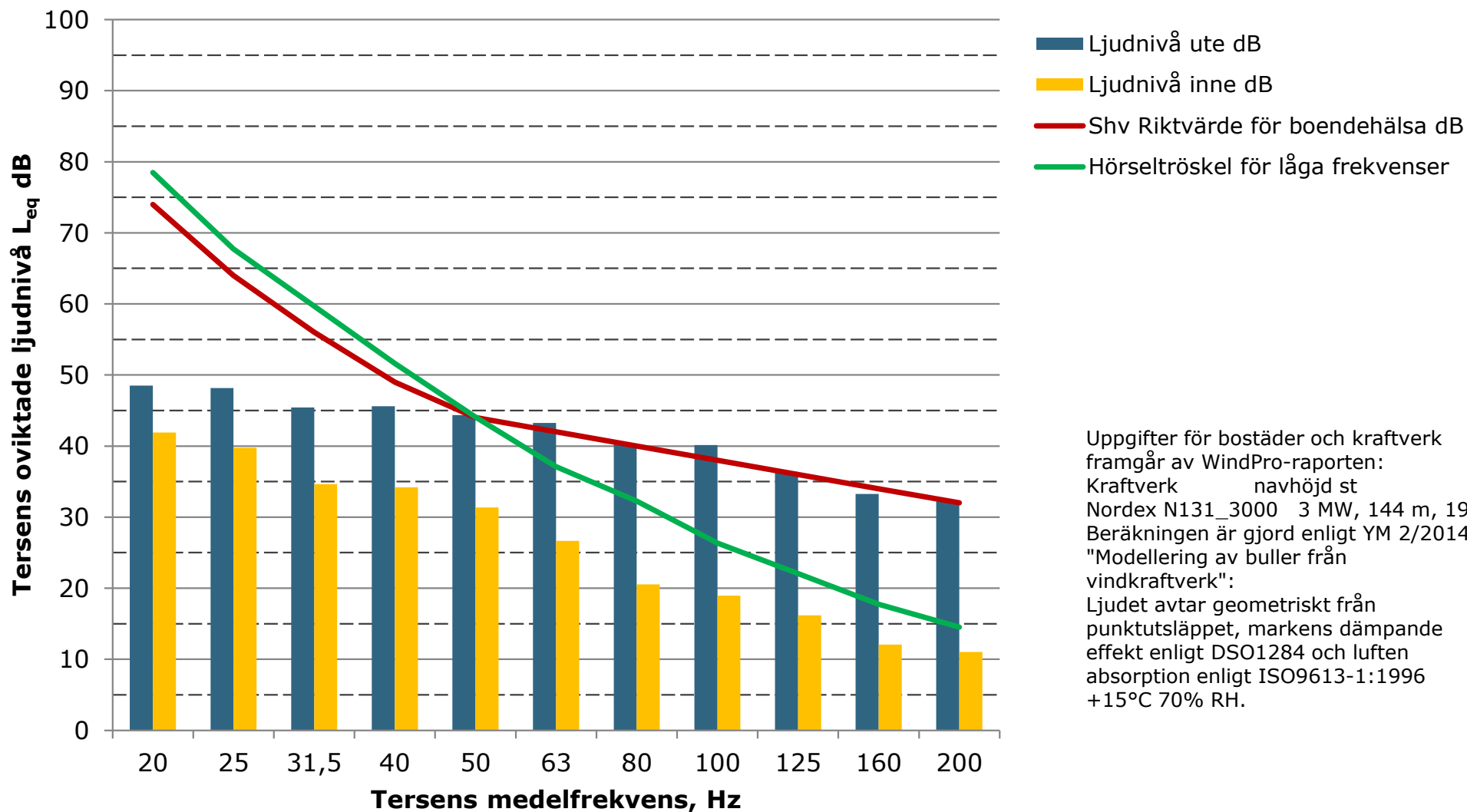
Lågfrekvent buller utom- och inomhus, E Bostad (Gunilackvägen, Ljudisolering enligt DSO1284



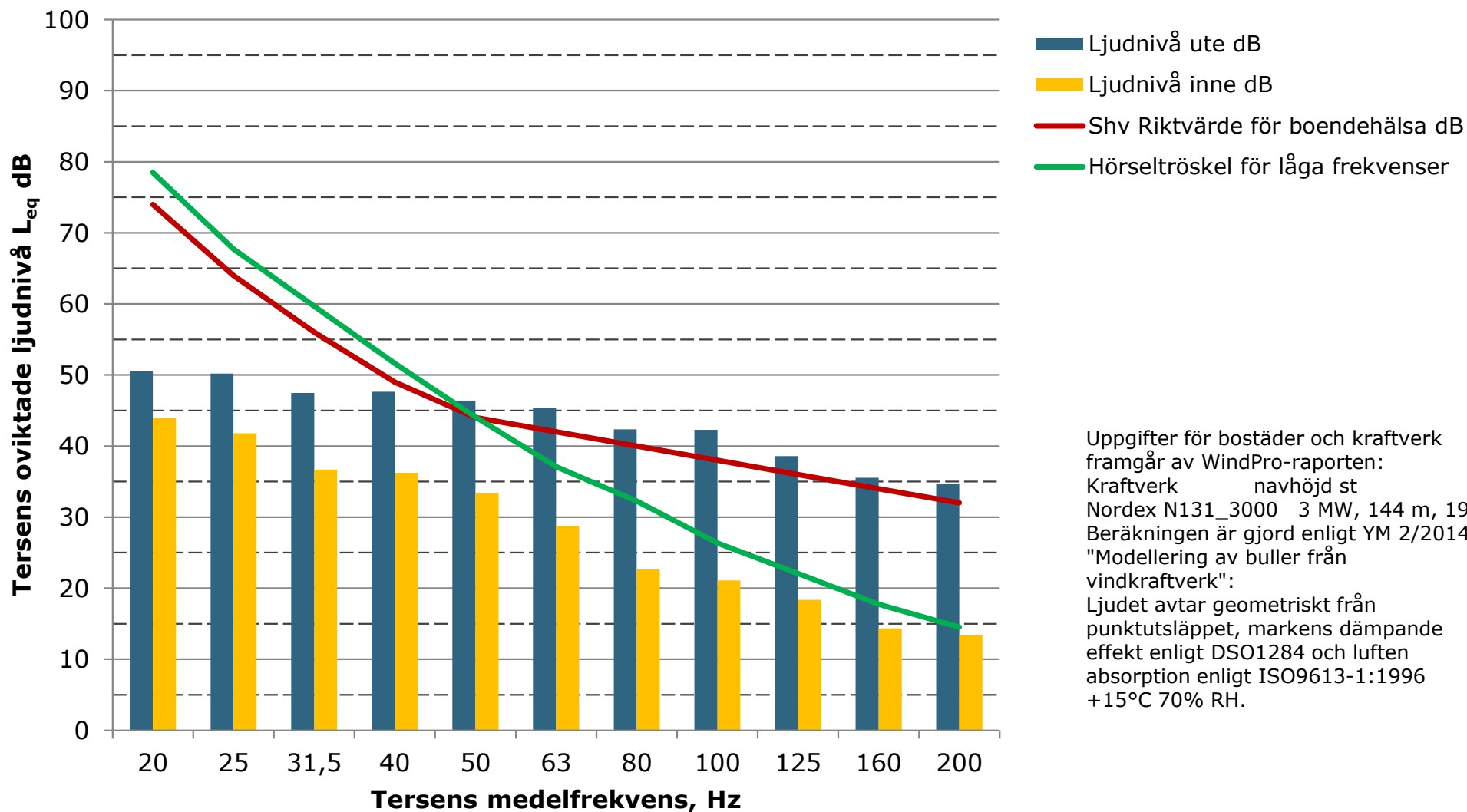
Lågfrekvent buller utom- och inomhus, F Bostad (Monåvägen 19), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, G Bostad (Harjuxvägen 336), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, H Bostad (Harjuxvägen 425), Ljudisolering enligt DSO1284



Lågfrekvent buller utom- och inomhus, I Bostad (Harjuxvägen 430), Ljudisolering enligt DSO1284

