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Finnish
Consulting
Group

Haarasuonkankaan tuulivoimahanke, Vaala

Melu- ja varjostusmallinnusraportti



POHJAN VOIMA

Miikka Saranpää

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Sisällysluettelo

1	MELU- JA VARJOSTUSMALLINNUKSEN TAVOITTEET	1
2	LÄHTÖTIEDOT JA MENETELMÄT	1
2.1	Melu.....	1
2.1.1	Melumallinnus ISO 9613-2	1
2.1.2	Matalataajuinen melu	5
2.2	Varjostusmallinnus	6
2.3	Raja- ja ohjearvot.....	7
2.3.1	Melu.....	7
2.3.2	Varjostus.....	7
3	MELU- JA VARJOSTUSMALLINNUSTEN TULOKSET	9
3.1	Melu.....	9
3.1.1	VE1: Melun laskentatulokset (ISO 9613-2).....	9
3.1.2	VE2: Melun laskentatulokset (ISO 9613-2).....	11
3.1.3	Matalataajuiset melutasot	12
3.2	Varjostus.....	15
3.2.1	Hankevaihtoehto VE1, "Real Case, No forest"	15
3.2.2	Hankevaihtoehto VE2, "Real Case, No Forest"	17
4	MELUN JA VARJOSTUKSEN YHTEISMALLINNUSTEN TULOKSET	19
4.1	Melu.....	19
4.1.1	VE1: Yhteismelun laskentatulokset (ISO 9613-2)	19
4.1.2	VE2: Yhteismelun laskentatulokset (ISO 9613-2)	21
4.1.3	Matalataajuiset melutasot	22
4.2	Varjostus.....	25
4.2.1	VE 1: Varjostuksen yhteisvaikutus, "Real Case, No Forest"	25
4.2.2	VE 2: Varjostuksen yhteisvaikutus "Real Case, No Forest"	27

Haarasuonkankaan tuulivoimahanke, Vaala

1 MELU- JA VARJOSTUSMALLINNUKSEN TAVOITTEET

Pohjan Voima Oy suunnittelee Haarasuonkankaan tuulivoimapuistoa Vaalan kunnan alueelle. Tuulivoimahankkeen aiheuttamia melu- ja varjostusvaikutuksia on arvioitu laatimalla mallinnukset tuulivoimaloiden aiheuttamista äänenpainetasoista ja varjostuksista. Mallinnusten tavoitteena on osoittaa, kuinka laajalle alueelle kyseiset vaikutukset ulottuvat ja arvioida vaikutukset lähiseudun ympäristöolosuhteille ja vapaa-ajan asutukselle.

Tuulivoimaloiden aiheuttamia meluvaikutuksia on arvioitu WindPRO-ohjelmalla YVA-vaiheen kahden hankevaihtoehdon voimaloiden sijoitussuunnitelmien mukaisesti. Melu- ja varjostusmallinnukset on laatinut Miikka Saranpää FCG Finnish Consulting Group Oy:stä. Laaduntarkastuksen on tehnyt Liisa Karhu (FCG).

2 LÄHTÖTIEDOT JA MENETELMÄT

2.1 Melu

2.1.1 Melumallinnus ISO 9613-2

Tuulivoimaloiden aiheuttamat äänenpainetasot on mallinnettu WindPRO-laskentaohjelman Decibel-moduulilla ISO 9613-2 standardin mukaisesti. Ympäristöhallinnon tuulivoimaloiden melun mallintamista koskevan ohjeen 2/2014 mukaisesti tuulen nopeutena käytettiin 10 m korkeudella mitattuna 8 m/s, ilman lämpötilana 15 °C, ilmanpaineena 101,325 kPa, ilman suhteellisenä kosteutena 70 % ja maanpinnan kovuutena arvoa 0,4. Laskenta on tehty 4,0 m maan pinnan tasosta (Taulukko 6).

Hankevaihtoehdoissa 1 voimalamäärä on 39 kpl. Hankevaihtoehdossa 2 voimalamäärä on pienempi, koostuen yhteensä 29 tuulivoimalaitoksesta. Tuulivoimaloiden äänenpainetasot on mallinnettu molemmissa hankevaihtoehdoissa käyttäen V172-7,2 MW voimalaitosta (Taulukko 1). Hankevaihtoehdoissa 1 ja 2 voimalaitosten napakorkeutena on käytetty 214 metriä, jolloin voimalaitosten kokonaiskorkeudeksi muodostuu 300 metriä. V172-7,2 MW voimalaitoksen valmistajan ilmoittama tuulivoimalan tuottama äänitehotaso on 110,1 dB(A).

Yhteismelun mallinnoissa on huomioitu Haarasuonkankaan suunniteltujen tuulivoimaloiden lisäksi Turkkielän tuulivoimahankkeen suunnitellut tuulivoimalat sekä Takiankankaan tuulivoimahankkeen suunnitellut tuulivoimalat. Turkkielän tuulivoimalat on mallinnettu napakorkeuksiltaan 190 m korkeilla Nordex N149-4,5 MW voimaloilla, joiden roottorin halkaisija on 180 metriä (Taulukko 2). Takiankankaan tuulivoimalat on mallinnettu V172-7,2 MW voimaloilla ja napakorkeudella 225 m (Taulukko 3).

Melumallinnusten laskentatuloksia on havainnollistettu ns. keskiäänitasokarttojen avulla. Keskiäänitasokartoissa on melun keskiäänitaso- eli ekvivalenttiäänitasokäyrät (LAeq) 5 dB välein.

9.5.2023

Taulukko 1. Haarasuonkankaan tuulivoimahankkeen mallinnusohjelma ja tuulivoimaloiden äänitehotasot voimalaitoksella V172-7,2 MW sekä melun erityispiirteet.

MALLINNUSOHJELMANTIEDOT							
Mallinnusohjelma ja versio: WindPRO version 3.5.584				Mallinnusmenetelmä: ISO 9613-2			
TUULIVOIMALOIDEN TIEDOT							
Tuulivoimalan valmistaja: Vestas				Tyyppi: V172 – 7,2 MW		Sarjanumero/t:-	
Nimellisteho: 7,2 MW		Napakorkeus: 214 m		Roottorinhalkaisija: 172 m		Tornin tyyppi: teräs/hybridi	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä: PO7200-0S (No STE)			
Kyllä	dB	Kyllä	dB	Noise mode säätö:			Kyllä
Ei		Ei		Noise mode, lähtömelutaso			110,1 dB(A)
AKUSTISET TIEDOT/LASKENNA LÄHTÖTIEDOT							
Third octave noise emission V172-7.2MW 50/60 Hz Document no 0128-4336_00							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
		12,5	48,6	125,0	95,2	1250,0	97,8
62,5	91,5	16,0	54,7	160,0	97,2	1600,0	96,3
125	100,2	20	60,4	200,0	98,6	2000,0	94,3
250	104,1	25	66,1	250,0	99,5	2500,0	92
500	105	31,5	71,5	315,0	99,9	3150,0	89,3
1000	103,7	40	76,7	400,0	100,2	4000,0	86,2
2000	99,3	50,0	81,5	500,0	100,2	5000,0	82,8
4000	91,6	63,0	85,8	630,0	100,2	6300,0	79
8000	80,8	80,0	89,5	800,0	99,8	8000,0	74,7
110,1 dB(A)		100,0	92,6	1000,0	99	10000	70,1
Melun erityispiirteiden mittausta ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
kyllä	Ei	kyllä	Ei	kyllä	Ei	kyllä	Ei

9.5.2023

Taulukko 2. Turkkiselkä tuulivoimapuiston mallinnusohjelma ja tuulivoimaloiden äänitehotasot voimalaitoksella N117-2,4 MW sekä melun erityispiirteet.

MALLINNUSOHJELMAN TIEDOT							
Mallinnusohjelma ja versio: WindPRO version 3.5.584				Mallinnusmenetelmä: ISO 9613-2			
TUULIVOIMALOIDEN TIEDOT							
Tuulivoimalan valmistaja: Nordex				Tyyppi: N149 4.5		Sarjanumero/t:-	
Nimellisteho: 4,5 MW		Napakorkeus: 190 m		Roottorin halkaisija: 180 m		Tornin tyyppi: teräs	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä			
Kyllä	- dB	Kyllä	- dB	Noise mode säätö:		Standard Mode	
Ei		Ei		Noise mode, lähtömelutaso		106 dB(A)	
AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Melupäästötiedot perustuvat valmistajan dokumenttiin " DMS no: F008_271_A17_EN, N149/4.0-4.5 Third octave sound power levels, Date 2017-08-29". Sekä (Pöyry Finland Oy, Tuulialfa_Vaala_meluselvyys_OYK_22-10-2019.docx)							
Oktaaveittain [Hz],dB(A)		1/3-oktaaveittain [Hz], unweighted - dB(LIN)					
31,5	-	12,5	-	125	104,4	1250	95,4
63	88	16	-	160	102,8	1600	94
125	94	20	113,2	200	101,7	2000	92,6
250	99	25	111,6	250	100,4	2500	90,6
500	100	31,5	111,4	315	101,6	3150	87,9
1000	101	40	110,4	400	99,4	4000	84,1
2000	98	50	111,2	500	98,1	5000	79,8
4000	91	63	108,4	630	98,7	6300	80,2
8000	83	80	107,4	800	96,7	8000	79,3
106 dB(A)		100	108,8	1000	96,7	10000	76,5
Melun erityispiirteiden mittaustulos ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudi-modulaatio)		Muu, Mikä:	
kyllä	ei	kyllä	ei	kyllä	ei	kyllä	ei

9.5.2023

Taulukko 3. Takiankankaan tuulivoimahankkeen mallinnusohjelma ja tuulivoimaloiden äänitehotasot voimalaitoksella V172-7,2 MW sekä melun erityispiirteet.

MALLINNUSOHJELMANTIEDOT							
Mallinnusohjelma ja versio: WindPRO version 3.5.584				Mallinnusmenetelmä: ISO 9613-2			
TUULIVOIMALOIDEN TIEDOT							
Tuulivoimalan valmistaja: Vestas				Tyyppi: V172 – 7,2 MW		Sarjanumero/t:-	
Nimellisteho: 7,2 MW		Napakorkeus: 225 m		Roottorinhalkaisija: 250 m		Tornin tyyppi: teräs/hybridi	
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun							
Lapakulman säätö		Pyörimisnopeus		Muu, mikä: PO7200-0S (No STE)			
Kyllä	dB	Kyllä	dB	Noise mode säätö:		Kyllä	
Ei		Ei		Noise mode, lähtömelutaso		106,9 + 2 dB(A)	
AKUSTISET TIEDOT/LASKENNA LÄHTÖTIEDOT							
Asiakirja nro: 0128-4336_00, 30.6.2022 (Original instruction T05 0128-4336 VER 00)							
Lähtömelutasoon on lisätty epävarmuusarvoksi 2 dB(A), koska voimalaitosmallin roottorin halkaisijaa on muutettu.							
Oktaaveittain [Hz], dB(A)		1/3-oktaaveittain [Hz], dB(A)					
		12,5	53	125,0	95,2	1250,0	94,4
62,5	92,4	16,0	58,6	160,0	96,8	1600,0	92,4
125	100	20	63,7	200,0	98	2000,0	90,1
250	103,3	25	68,9	250,0	98,6	2500,0	90,1
500	103,5	31,5	73,8	315,0	98,8	3150,0	87,5
1000	101,9	40	79,6	400,0	98,9	4000,0	84,5
2000	97,4	50,0	83	500,0	98,7	5000,0	99,1
4000	89,9	63,0	86,8	630,0	98,1	6300,0	97,4
8000	79,2	80,0	90,2	800,0	98,1	8000,0	73,3
108,9 dB(A)		100,0	92,9	1000,0	97,2	10000	68,9
Melun erityispiirteiden mittausta ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudimodulaatio)		Muu, Mikä:	
kyllä	Ei	kyllä	Ei	kyllä	Ei	kyllä	Ei

9.5.2023

Taulukko 4. Käytetyt mallinnusparametrit ISO 9613-2 laskelmissa

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT			
Laskenta korkeus		Laskentaruudun koko [m·m]	
ISO 9613-2: 4,0 m		25x25 m	
Suhteellinen kosteus		Lämpötila	
70 %	Muu, mikä ja miksi:	ISO 9613-2: 15 C°	
Maastomallin lähde ja tarkkuus			
Maastomallin lähde: MML maastotietokanta		Vaakaresoluutio:1,0	Pystyresoluutio:0,5
Maan- ja vedenpinnan absorption ja heijastuksen huomioiminen, käytetyt kertoimet			
ISO 9613-2	0,4 / vesialueilla 0		HUOM
Ilmakehän stabiilius laskennassa/meteorologinen korjaus			
Neutraali, (0): Neutraali		Muu, mikä ja miksi:	
Sääolosuhteiden huomiointi; laskennassa käytetty tuulen suunnat ja nopeus			
Tuulen suunta: 0-360°		Tuulen nopeus: 10 metrin korkeudella mitattuna 8 m/s	
Voimalan äänen suuntaavuus ja vaimentuminen			
Vapaa avaruus: kyllä		Muu, mikä, miksi:	

2.1.2 Matalataajuinen melu

Matalataajuinen melu laskettiin Ympäristöministeriön ohjeen 2/2014 mukaisin menetelmin käyttäen voimalavalmistajilta saatuja arvioita niiden äänitehotasoista.

Ohje 2/2014 antaa menetelmän matalataajuisen melun laskentaan rakennusten ulkopuolelle. Sosiaali- ja terveysministeriön Asumisterveysasetus 2015 antaa matalataajuiselle melulle toimenpiderajat asuinhuoneissa. Rakennusten sisälle kantautuva äänitaso arvioitiin Turun AMK:n (Keränen, Hakala ja Hongisto, 2019) julkistamien Anojanssi projektin tulosten mukaisten ääneneristävyysarvoin ja tuloksia verrattiin toimenpiderajoihin.

Anojanssi projektissa mitattiin ilmaääneneristävyys standardin ISO 16283-3:2016 mukaan. Projektissa valittiin 13 pientaloa ja 26 julkisivurakennetta niin, että edustettuina oli kevyitä, raskaita, uusia ja vanhoja julkisivurakenteita. Tuloksista johdettiin 84 % persentiili, joka kertoo arvon, joka ylittyi 84 % mitatuista suomalaisista pientaloista.

Taulukko 5. Suomalaisen pientalon julkisivun äänitasoeron alalikiarvo Anojanssi projektin tulosten mukaisesti.

f [Hz]	20	25	31.5	40	50	63	80	100	125	160	200
DL _o [dB]	7.6	8.3	9.2	10.3	11.5	13.0	14.8	16.8	18.8	21.1	22.8

Matalataajuisen melun laskelmassa huomioitiin maanpinnan muodon vaikutus ohjeen 4/2014 mukaisesti. Tulokset on esitetty taajuuskohtaisena taulukkona hankealuetta ympäröiville asuin- ja lomarakennuksille.

9.5.2023

2.2 Varjostusmallinnus

Tuulivoimaloiden varjostusvaikutukset on mallinnettu molemmissa hankevaihtoehdoissa käyttäen roottorinhalkaisijaltaan 200 metristä voimalaitosta, jonka napakorkeus on 200 metriä. Kokonaiskorkeudeltaan voimalat ovat tällöin 300 metriä korkea.

Taulukko 6. Haarasuonkankaan tuulivoimahankkeen mallinnusohjelma ja tuulivoimaloiden koko varjostusmallinuksissa.

MALLINNUSOHJELMAN TIEDOT			
Mallinnusohjelma ja versio: WindPRO versiot 3.5.584		Mallinnusmenetelmä: ISO 9613-2	
TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)			
Tuulivoimalan valmistaja: Generic		Tyyppi: Generic RD200xHH200	Sarjanumero/t:-
Nimellisteho: -	Napakorkeus: 200 m	Roottorin halkaisija: 200 m	Tornin tyyppi: teräs/hybridi

Varjostuksen yhteismallinuksissa on huomioitu Haarasuonkankaan suunniteltujen tuulivoimaloiden lisäksi suunnitellut Turkkielän ja Takiankankaan tuulivoimalat. Turkkielän tuulivoimalat on mallinnettu napakorkeuksiltaan 190 m korkeilla voimaloilla, joiden roottorin halkaisija on 180 metriä. Takiankankaan tuulivoimalat on mallinnettu napakorkeudella 225 metriä ja roottorin halkaisijalla 250 metriä.

Varjostusvaikutuksia mallinnettiin WindPRO-ohjelman Shadow-moduulilla. Laskennassa varjot huomioidaan, kun aurinko on yli 3 astetta horisontin yläpuolella. Varjoksi lasketaan tilanne, jossa siipi peittää vähintään 20 % auringosta.

Auringon keskimääräiset paistetunnit perustuvat Luulajan sääaseman mitattuihin säätietoihin 1969 - 1993. Laskentojen tuulen suunta ja nopeusjakaumana käytettiin NASA:n MERRA-dataa (Modern Era Retrospective-analysis for Research and Applications) hankealueen läheisyydeltä.

Varjostusmallin laskennassa on huomioitu hankealueen korkeustiedot, tuulivoimaloiden sijainnit, tuulivoimalan napakorkeudet ja roottorin halkaisija sekä hankealueen aikavyöhyke. Mallinuksessa otettiin huomioon auringon asema horisontissa eri kellon- ja vuodenaikoina, pilvisuus kuukausittain eli kuinka paljon aurinko paistaa ollessaan horisontin yläpuolella sekä tuulivoimalaitosten arvioitu vuotuinen käyntiaika.

Varjostuksen tarkastelukorkeutena lähialueen asuin- tai lomarakennusten pihapiirissä käytettiin 1,0 metriä ja laskenta-alueen kokoa 5,0 x 5,0 metriä. Laskentaikkunoiden suunnat asennettiin voimaloita kohti ns. "greenhouse mode". Mallinnus tehtiin niin sanotulle todelliselle tilanteelle (Real Case), jossa puuston suojaavaa vaikutusta ei huomioitu (Real Case, No Forest).

Varjostusmallinnusten tuloksia on havainnollistettu karttojen avulla. Kartoilla esitetään varjostusvaikutuksen (1, 8 ja 20 tuntia vuodessa) laajuus. Sen lisäksi mallinuksissa on erikseen laskettu vaikutus tuulivoimahankealueen ympäristössä oleviin herkkiin kohteisiin.

9.5.2023

2.3 Raja- ja ohjearvot

2.3.1 Melu

Valtioneuvoston asetuksessa (1107/2015) tuulivoimaloille on määritelty suunnitteluarvot päivä- ja yöajan keskiäänitasojen maksimiarvolle. Jos tuulivoimalan melu sisältää tonaalisia, kapeakaistaisia tai impulssimaisia komponentteja, tai se on selvästi amplitudimoduloitunutta, mallinnustuloksiin tulee ohjeen mukaan lisätä viisi desibeliä ennen ohjearvoon vertaamista. Koska ohjearvo sisältää jo tyypillisen tuulivoimamelun piirteet, edellä mainitut äänenpiirteiden tulee olla tuulivoimalalle epätyypillisen voimakkaita, jotta mallinnustuloksissa täytyy huomioida viiden desibelin lisä äänenvoimakkuuteen.

Taulukko 7. Valtioneuvoston asetuksen mukaiset tuulivoimaloiden melutason toimenpiderajat (Valtioneuvoston asetus 27.8.2015).

Vaikutuskohde	Päivä (7-22)	Yö (22-7)
Pysyvä asutus	45 dB	40 dB
Loma-asutus	45 dB	40 dB
Hoitolaitokset	45 dB	40 dB
Oppilaitokset	45 dB	—
Virkistysalueet	45 dB	—
Leirintäalueet	45 dB	40 dB
Kansallispuistot	40 dB	40 dB

Sosiaali- ja terveysministeriön asetuksessa (545/2015) on annettu matalataajuiselle melulle toimenpiderajoja. Toimenpiderajat koskevat asuinhuoneita ja ne on annettu taajuuspainottamattomina yhden tunnin keskiäänitasoina tersseittäin. Toimenpiderajat koskevat yöaikaa ja päivällä sallitaan 5 dB suuremmat arvot.

Taulukko 8. Matalataajuisen sisämelen tunnin keskiäänitason toimenpiderajat nukkumiseen tarkoitetuissa tiloissa.

Terssiäkaista Hz	20	25	31,5	40	50	63	80	100	125	160	200
Keskiäänitaso L _{Zeq,1h} , dB	74	64	56	49	44	42	40	38	36	34	32
Edellisestä laskettu keskiäänitaso A-painotettuna L _{Aeq,1h} , dB	24	19	17	14	14	16	18	19	20	21	21

Lisäksi yöaikainen mahdollisesti unihäiriötä aiheuttava melu, joka erottuu selvästi taustamelusta, ei saa ylittää 25 dB yhden tunnin keskiäänitasona L_{Aeq,1h} mitattuna niissä tiloissa, jotka on tarkoitettu nukkumiseen.

2.3.2 Varjostus

Suomessa ei ole viranomaisten antamia yleisiä määräyksiä tuulivoimaloiden muodostaman varjostuksen enimmäiskestoista eikä varjonmuodostuksen arviointiperusteista. Ympäristöministeriön tuulivoimarakentamisen suunnitteluohjeituksessa esitetään käytettäväksi muiden maiden suosituksia välkkeen rajoittamisesta (Ympäristöministeriö 2012).

9.5.2023

Useissa maissa on annettu raja-arvoja tai suosituksia hyväksyttävän välkevaikutuksen määrästä. Esimerkiksi Ruotsissa suositus on kahdeksan tuntia vuodessa ja 30 minuuttia päivässä.

Arvioinnissa on tarkasteltu vaikutuksia alueella, jossa varjoja tai välkettä mallinnuksen mukaisessa todellisessa tilanteessa ("Real Case") esiintyy vähintään kahdeksan tuntia vuodessa.

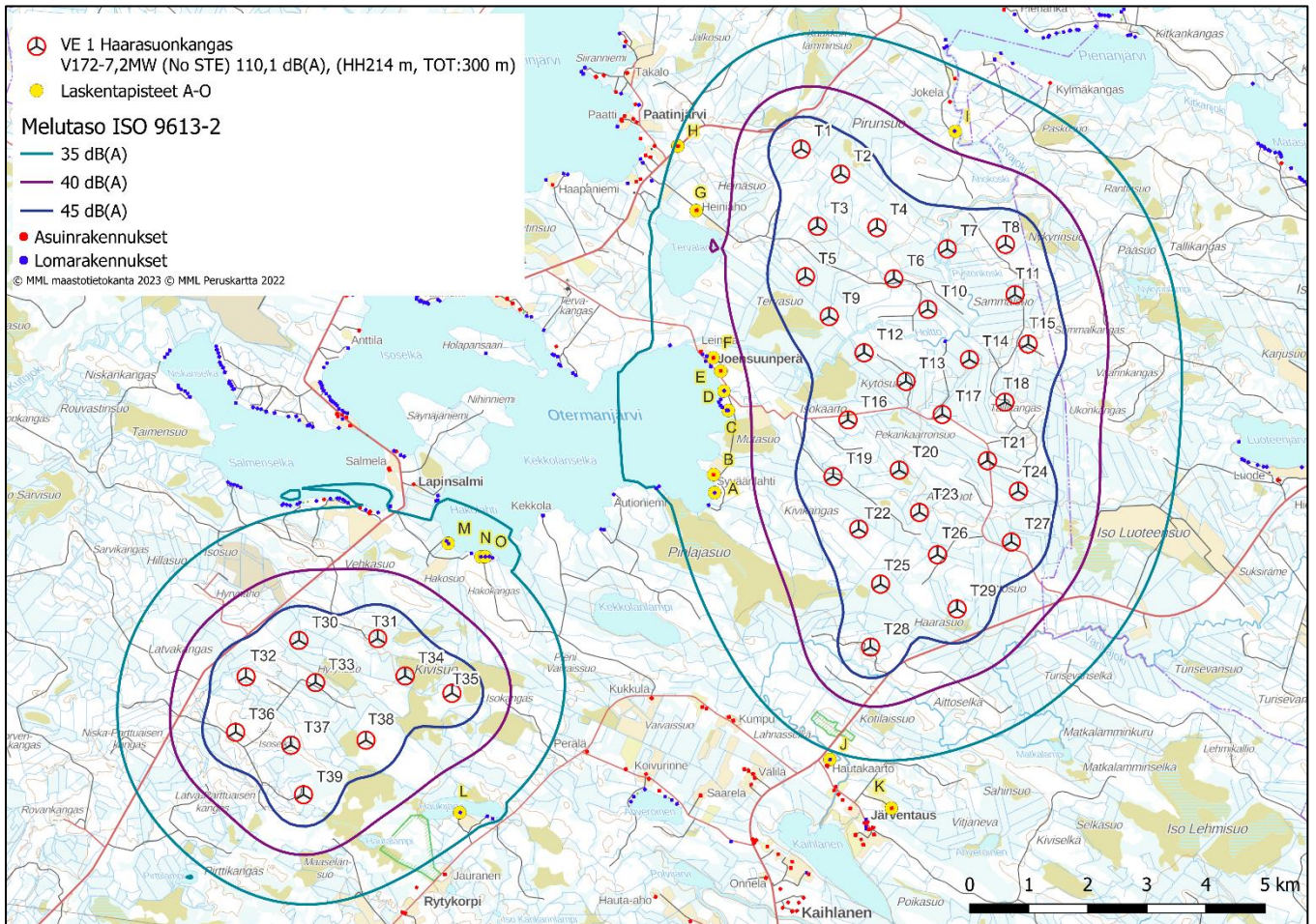
9.5.2023

3 MELU- JA VARJOSTUSMALLINNUSTEN TULOKSET

3.1 Melu

3.1.1 VE1: Melun laskentatulokset (ISO 9613-2)

Hankevaihtoehtoon 1 (VE1) melumallinnuksen tulosten mukaan melutaso 40 dB(A) ei ylitä lähimmillä asuin- ja lomarakennuksilla. Katso tarkemmat laskentatulokset liitteestä 1.



Kuva 1. Melumallinnuksen tulos hankevaihtoehdossa 1

9.5.2023

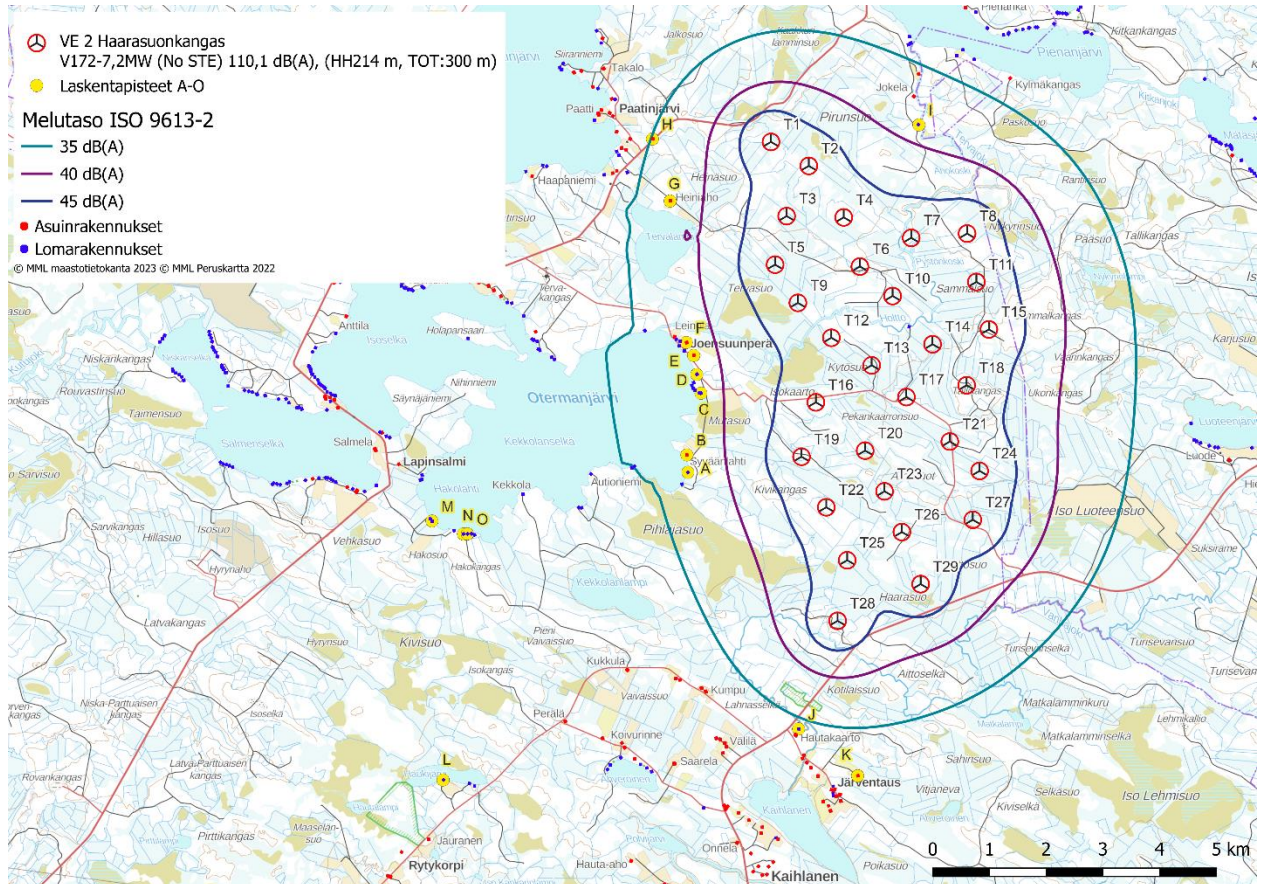
Taulukko 9. Laskennalliset melutasot Haarasuonkankaan tuulivoimahankkeen ympäristössä hankevaihtoehdossa 1

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4	37,2
Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	4	37,3
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4	38,6
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4	38,4
Asuinrakennus E (Alanko)	506 919	7 171 101	145	4	38,4
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4	38,1
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	4	37,4
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4	35,2
Lomarakennus I	510 890	7 175 161	155	4	38,6
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4	34,4
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4	32,2
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	4	37,7
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4	36
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4	35,5
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4	35,4

9.5.2023

3.1.2 VE2: Melun laskentatulokset (ISO 9613-2)

Hankevaihtoehtoon 2 (VE2) melumallinnuksen mukaan melutaso 40 dB(A) ei ylitä lähimmillä asuin- ja lomarakennuksilla. Katso tarkemmat laskentatulokset liitteestä 2.



Kuva 2. Melumallinnuksen tulos hankevaihtoehtossa 2

9.5.2023

Taulukko 10. Laskennalliset melutasot Haarasuonkankaan tuulivoimahankkeen ympäristössä hankevaihtoehdossa 2

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentakorkeus (m)	Melutaso dB(A)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4	37
Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	4	37,1
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4	38,4
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4	38,3
Asuinrakennus E (Alanko)	506 919	7 171 101	145	4	38,3
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4	38
Asuinrakennus G (Heiniaho)	506 504	7 173 821	147,5	4	37,3
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4	35,1
Lomarakennus I	510 890	7 175 161	155	4	38,6
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4	34,2
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4	31,9
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	4	25
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4	27,6
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4	27,5
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4	27,7

3.1.3 Matalataajuiset melutasot

Sisätilojen laskennallisia tuloksia on verrattu Sosiaali- ja terveysministeriön (STM) Asumisterveysasetuksessa (545/2015) annettuihin toimenpiderajoihin. Nämä ovat enimmäisarvoja, jotka on laadittu yöaikaiselle melulle nukkumiseen tarkoitettuihin tiloihin.

Haarasuonkankaan tuulivoimahankkeen aiheuttama matalataajuinen melu ei kummassakaan hankevaihtoehdossa ylitä Sosiaali- ja terveysministeriön asumisterveysohjearvoa laskentapisteiden sisätiloissa.

Hankevaihtoehdon 1 tulokset laskentapisteittäin on esitetty taulukossa 11 ja hankevaihtoehdon 2 taulukossa 12. Taulukoissa näkyy jokaisen laskentapisteen terssikaistakohtaiset arvot.

Tarkemmat matalataajuisen yhteismelun rakennuskohtaiset laskentatulokset ja kuvaajat on esitetty liitteissä 3 ja 4.

9.5.2023

Taulukko 11. Matalataajuisen melun laskentatulokset VE1

Pienitaajuisen melun laskenta menetelmä: ISO 9613-2, Anojanssi (Keränen, Hakala ja Hongisto, 2019)											
Terssin painottamaton äänitaso Leq dB - altistuvien laskentapisteiden (rakennusten) sisätiloissa											
Terssikaista [Hz]	20	25	31,5	40	50	63	80	100	125	160	200
Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat L _{Zeq,1h} , dB	74,0	64,0	56,0	49,0	44,0	42,0	40,0	38,0	36,0	34,0	32,0
Laskentapiste A	41,1	40	39	38	36,8	35,1	32,5	29,1	25	19,5	15,8
Laskentapiste B	41,2	40,1	39,1	38,1	36,9	35,2	32,6	29,2	25,1	19,6	15,9
Laskentapiste C	42	40,9	39,9	38,9	37,7	36	33,4	30,1	26	20,6	17
Laskentapiste D	41,9	40,8	39,8	38,8	37,6	35,9	33,3	30	25,9	20,5	16,9
Laskentapiste E	41,9	40,8	39,7	38,8	37,6	35,9	33,3	30	25,9	20,5	16,8
Laskentapiste F	41,6	40,6	39,5	38,6	37,4	35,6	33,1	29,7	25,7	20,2	16,6
Laskentapiste G	40,8	39,7	38,7	37,7	36,5	34,8	32,2	28,9	24,8	19,3	15,7
Laskentapiste H	39,3	38,3	37,2	36,2	35	33,2	30,6	27,2	23,1	17,5	13,7
Laskentapiste I	41,7	40,6	39,5	38,6	37,4	35,7	33,1	29,8	25,8	20,4	16,9
Laskentapiste J	38,9	37,8	36,7	35,7	34,5	32,7	30,1	26,7	22,5	16,8	13
Laskentapiste K	37,6	36,5	35,4	34,4	33,2	31,4	28,7	25,2	20,9	15	11
Laskentapiste L	39,7	38,7	37,6	36,6	35,5	33,7	31,1	27,8	23,7	18,3	14,7
Laskentapiste M	39,6	38,5	37,4	36,4	35,2	33,5	30,9	27,5	23,4	17,8	14,1
Laskentapiste N	39,4	38,4	37,3	36,3	35,1	33,3	30,7	27,3	23,2	17,6	13,9
Laskentapiste O	39,4	38,3	37,2	36,2	35,1	33,3	30,6	27,2	23,1	17,5	13,7

9.5.2023

Taulukko 12. Matalataajuisen melun laskentatulokset VE2

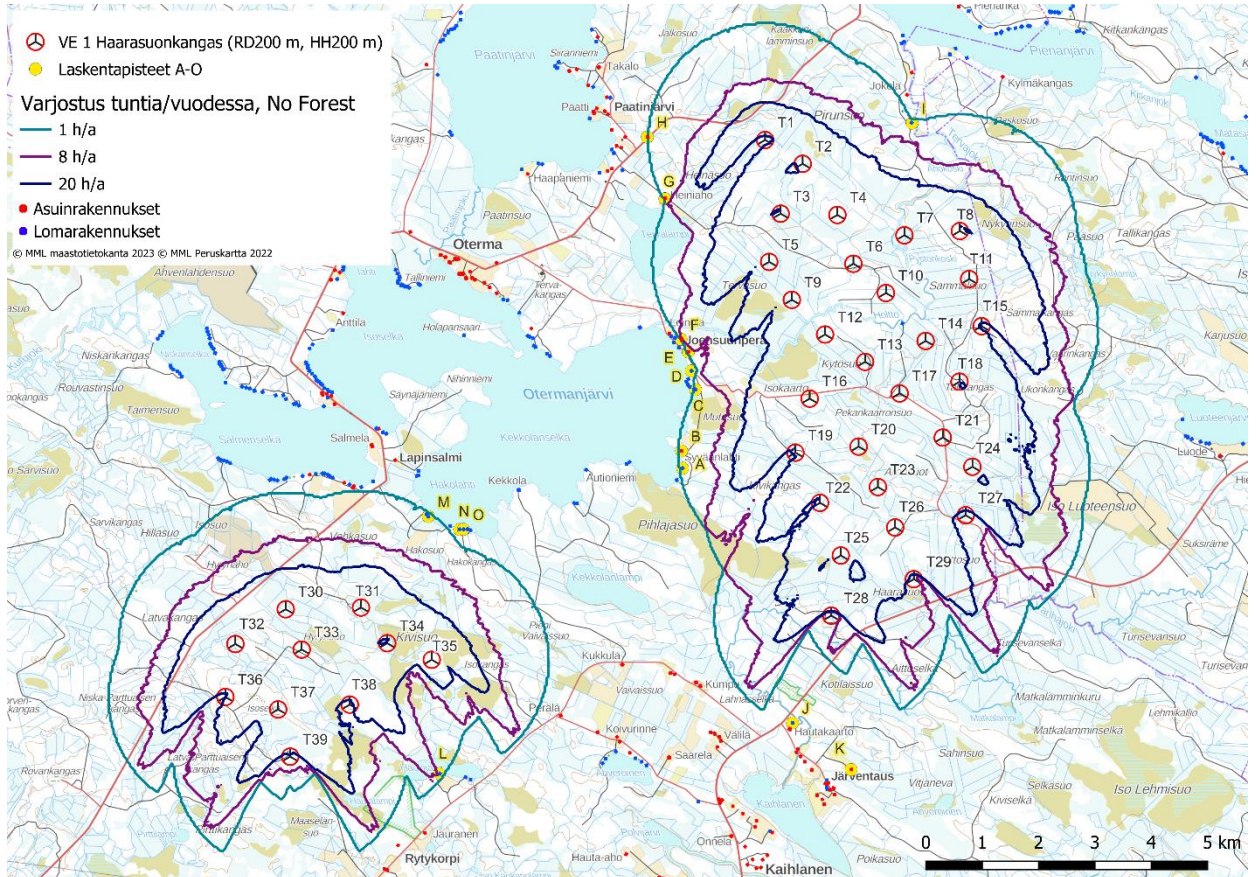
Pienitaajuisen melun laskenta menetelmä: ISO 9613-2, Anojanssi (Keränen, Hakala ja Hongisto, 2019)											
Terssin painottamaton äänitaso Leq dB - altistuvien laskentapisteen (rakennusten) sisätiloissa											
Terssikaista [Hz]	20	25	31,5	40	50	63	80	100	125	160	200
Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat L _{Zeq,1h} , dB	74,0	64,0	56,0	49,0	44,0	42,0	40,0	38,0	36,0	34,0	32,0
Laskentapiste A	40,7	39,6	38,6	37,6	36,4	34,7	32,1	28,8	24,7	19,2	15,6
Laskentapiste B	40,8	39,7	38,7	37,7	36,5	34,8	32,2	28,9	24,8	19,4	15,7
Laskentapiste C	41,7	40,6	39,6	38,6	37,5	35,7	33,2	29,9	25,9	20,4	16,9
Laskentapiste D	41,6	40,6	39,5	38,6	37,4	35,7	33,1	29,8	25,8	20,3	16,7
Laskentapiste E	41,6	40,5	39,5	38,5	37,4	35,6	33,1	29,8	25,8	20,3	16,7
Laskentapiste F	41,4	40,3	39,3	38,3	37,1	35,4	32,8	29,5	25,5	20,1	16,5
Laskentapiste G	40,6	39,5	38,5	37,5	36,4	34,6	32	28,7	24,7	19,3	15,7
Laskentapiste H	39,1	38	37	36	34,8	33	30,4	27	22,9	17,4	13,6
Laskentapiste I	41,6	40,5	39,5	38,5	37,3	35,6	33,1	29,8	25,8	20,4	16,9
Laskentapiste J	38,4	37,3	36,2	35,2	34	32,2	29,6	26,2	22,1	16,5	12,7
Laskentapiste K	37,1	36	34,9	33,9	32,7	30,9	28,2	24,7	20,5	14,7	10,7
Laskentapiste L	32,2	31	29,9	28,8	27,5	25,5	22,6	18,7	13,8	7,1	1,9
Laskentapiste M	34	32,9	31,8	30,7	29,4	27,5	24,7	21	16,3	9,9	5,1
Laskentapiste N	34,5	33,4	32,3	31,2	30	28	25,3	21,6	16,9	10,7	5,9
Laskentapiste O	34,6	33,4	32,4	31,3	30	28,1	25,3	21,6	17	10,8	6,1

9.5.2023

3.2 Varjostus

3.2.1 Hankevaihtoehto VE1, "Real Case, No forest"

Hankevaihtoehdossa 1 varjostusvaikutusalueelle (8 h/a) ei sijoitu asuin- tai lomarakennuksia. Mallinustulosten mukaan varjostusta ilmenee enimmillään 7 h 32 min vuodessa hankealueen länsipuolella sijaitsevan lomarakennuksen (laskentapiste L) alueella. Tarkemmat laskentatulokset on esitetty liitteessä 5.



Kuva 3. Varjostusmallinnuksen tulos hankevaihtoehdossa 1 (puuston suojaava vaikutusta ei ole huomioitu)

9.5.2023

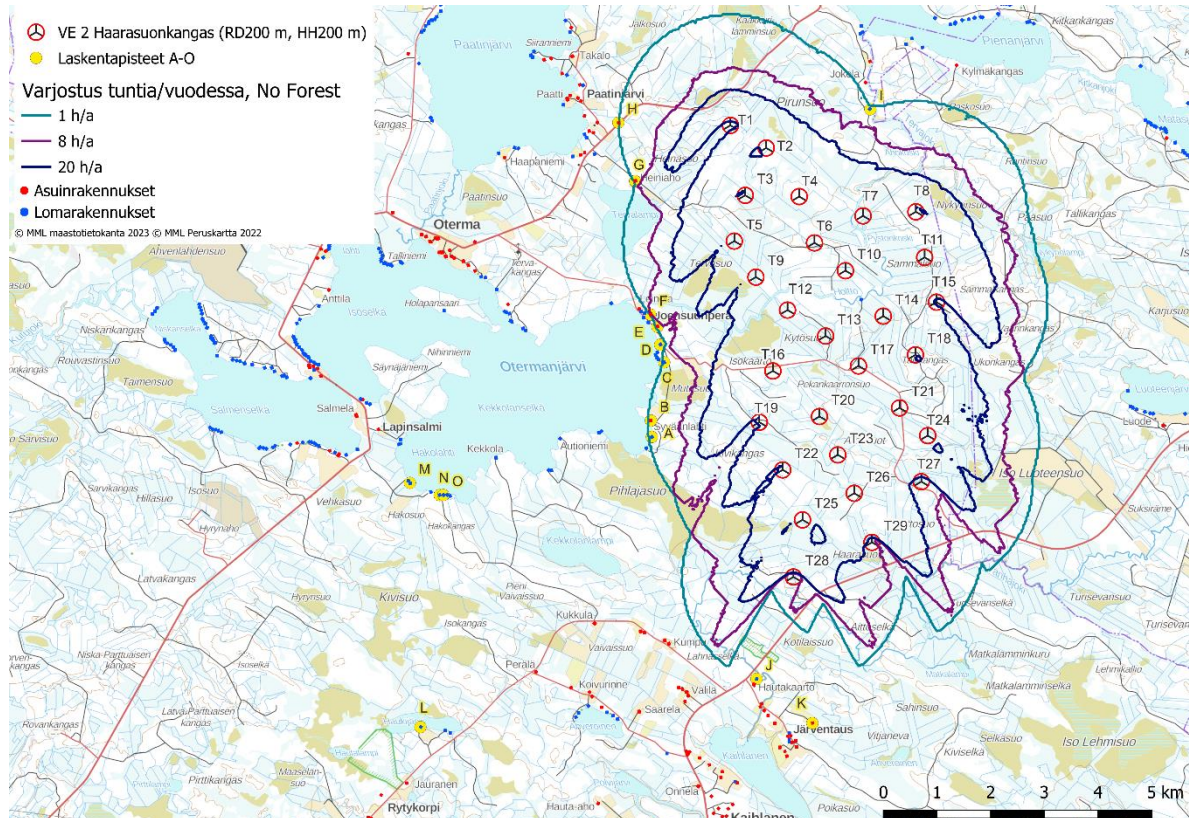
Taulukko 13. Varjostusmallinnuksen tulos VE1, kun puuston suojaavaa vaikutusta ei ole huomioitu "Real case, No Forest".

Rakennus	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikuna (m)	Varjostus (h/a)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0 x 5,0	2:19
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	5,0 x 5,0	1:59
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0 x 5,0	1:52
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0 x 5,0	0:00
Asuinrakennus E (Alanko)	506 919	7 171 101	145	5,0 x 5,0	3:13
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0 x 5,0	0:00
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0 x 5,0	5:39
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0 x 5,0	0:00
Lomarakennus I	510 890	7 175 161	155	5,0 x 5,0	3:16
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0 x 5,0	0:00
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0 x 5,0	0:00
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	5,0 x 5,0	7:32
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0 x 5,0	1:51
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0 x 5,0	0:00
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0 x 5,0	0:00

9.5.2023

3.2.2 Hankevaihtoehto VE2, "Real Case, No Forest"

Hankevaihtoehdossa 2 varjostusvaikutusalueelle (8 h/a) ei sijoitu asuin- tai lomarakennuksia. Mallinustulosten mukaan varjostusta ilmenee enimmillään 5 h 39 min vuodessa, hankealueen länsipuolella sijaitsevan asuinrakennuksen (laskentapiste G) alueella. Tarkemmat laskentatulokset on esitetty liitteessä 6.



Kuva 4. Varjostusmallinnuksen tulos hankevaihtoehdossa 2 (puuston suojaavaa vaikutusta ei ole huomioitu)

9.5.2023

Taulukko 14. Varjostusmallinnuksen tulos VE2, kun puuston suojaavaa vaikutusta ei ole huomioitu "Real case, No forest".

Rakennus	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikuna (m)	Varjostus (h/a)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0 x 5,0	2:19
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	5,0 x 5,0	1:59
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0 x 5,0	1:52
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0 x 5,0	0:00
Asuinrakennus E (Alanko)	506 919	7 171 101	145	5,0 x 5,0	3:13
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0 x 5,0	0:00
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0 x 5,0	5:39
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0 x 5,0	0:00
Lomarakennus I	510 890	7 175 161	155	5,0 x 5,0	3:16
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0 x 5,0	0:00
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0 x 5,0	0:00
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	5,0 x 5,0	0:00
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0 x 5,0	0:00
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0 x 5,0	0:00
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0 x 5,0	0:00

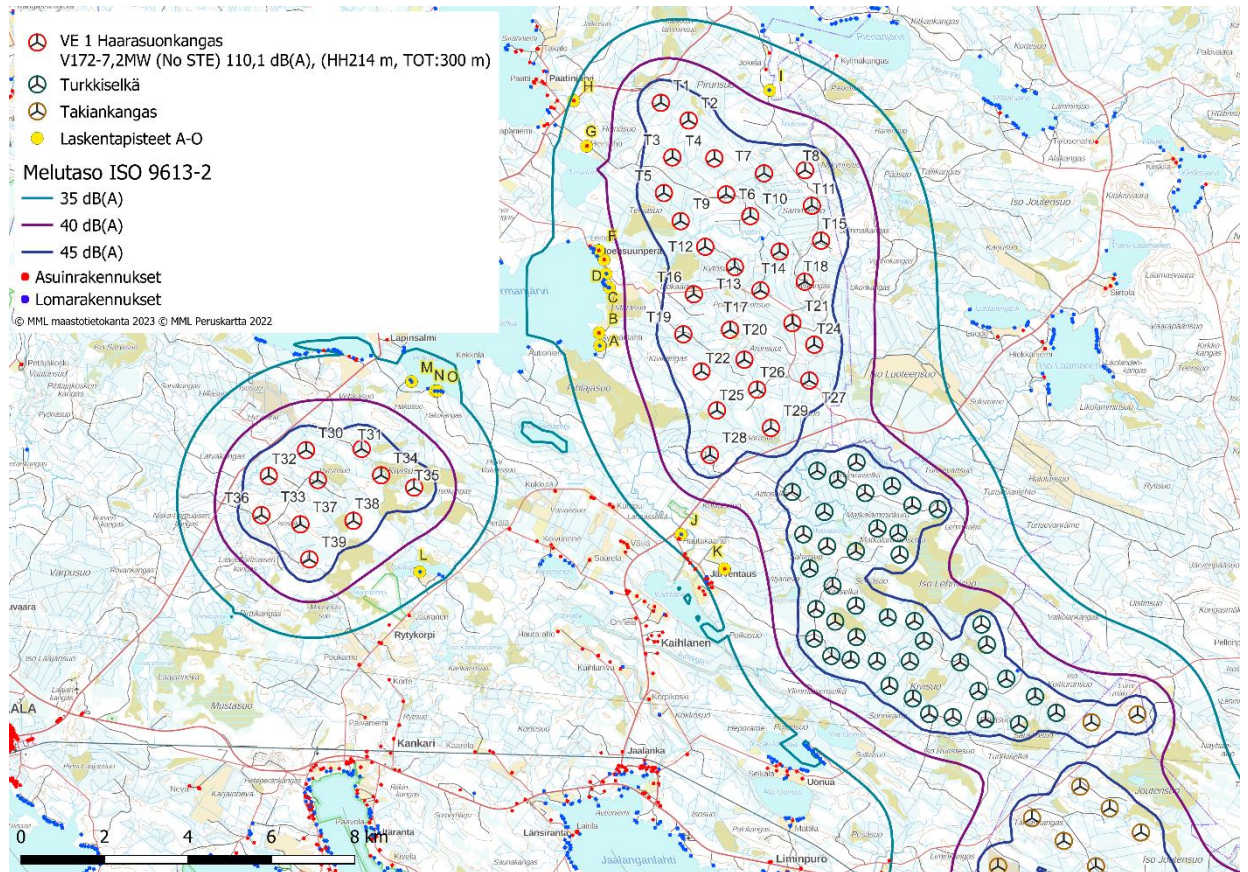
9.5.2023

4 MELUN JA VARJOSTUKSEN YHTEISMALLINNUSTEN TULOKSET

4.1 Melu

4.1.1 VE1: Yhteismelun laskentatulokset (ISO 9613-2)

Hankevaihtoehdon 1 (VE1) yhteismelun mallinnuksen mukaan melutaso 40 dB(A) ei ylitä Haarasuonkankaan tuulivoimapuiston lähimmillä asuin- ja lomarakennuksilla. Katso tarkemmat laskentatulokset liitteestä 7.



Kuva 5. Melun yhteisvaikutuksen mallinnuksen tulos hankevaihtoehdossa VE1.

9.5.2023

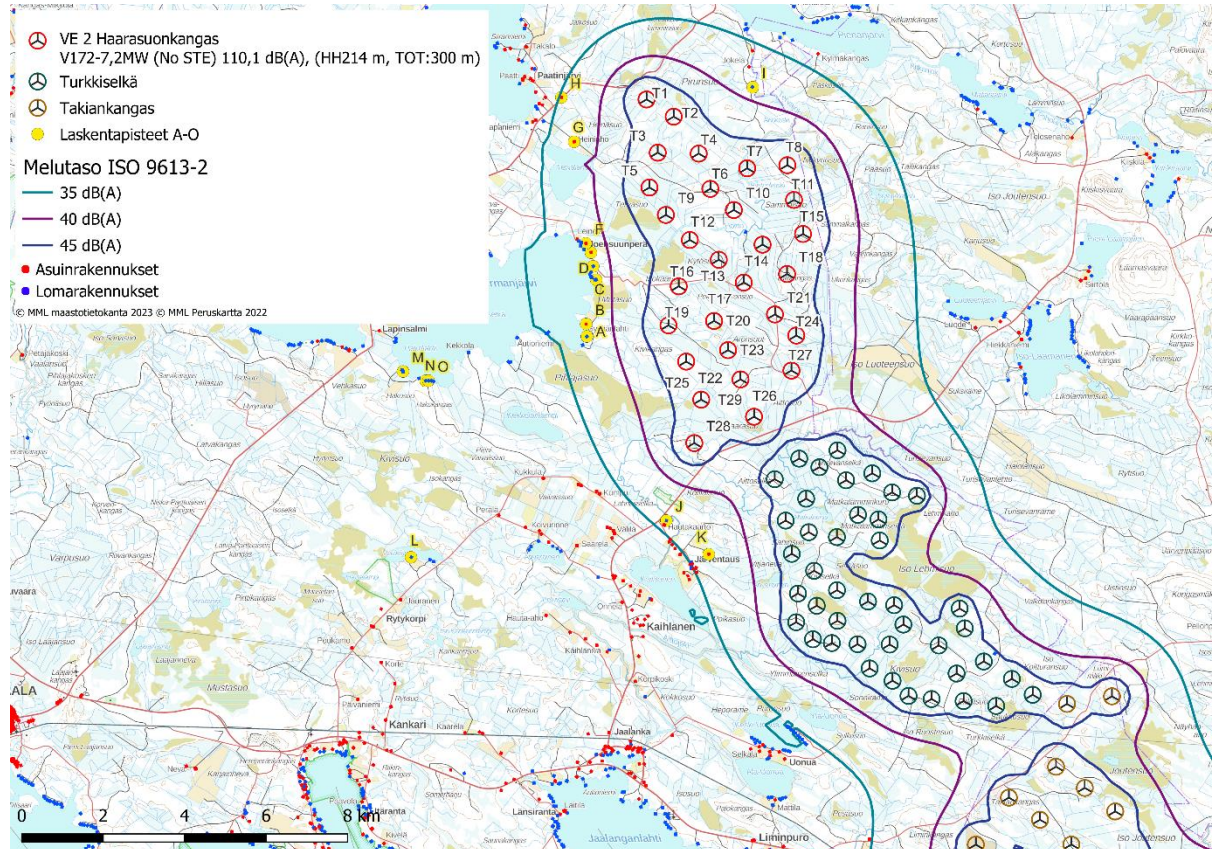
Taulukko 15. Laskennalliset yhteismelun tasot Haarasuonkankaan tuulivoimahankkeen ympäristössä hankevaihtoehdossa 1

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4	37,4
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	4	37,5
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4	38,7
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4	38,5
Asuinrakennus E (Alanko)	506 919	7 171 101	145	4	38,5
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4	38,2
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	4	37,4
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4	35,3
Lomarakennus I	510 890	7 175 161	155	4	38,7
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4	36
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4	36,5
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	4	37,8
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4	36,1
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4	35,6
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4	35,5

9.5.2023

4.1.2 VE2: Yhteismelun laskentatulokset (ISO 9613-2)

Hankevaihtoehdon 2 (VE2) yhteismelun mallinnuksen mukaan melutaso 40 dB(A) ei ylitä Haarasuonkankaan tuulivoimapuiston lähimmillä asuin- ja lomarakennuksilla. Katso tarkemmat laskentatulokset liitteestä 8.



Kuva 6. Melumallinnuksen tulos vaihtoehdossa VE 2.

9.5.2023

Taulukko 16. Laskennalliset yhteismelun tasot Haarasuonkankaan tuulivoimahankkeen ympäristössä hankevaihtoehdossa 2

Laskentapiste	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentakorkeus (m)	Melutaso dB(A)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4	37,2
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	4	37,3
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4	38,5
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4	38,4
Asuinrakennus E (Alanko)	506 919	7 171 101	145	4	38,4
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4	38,1
Asuinrakennus G (Heiniaho)	506 504	7 173 821	147,5	4	37,4
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4	35,2
Lomarakennus I	510 890	7 175 161	155	4	38,7
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4	35,8
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4	36,4
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	4	26,6
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4	28,3
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4	28,3
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4	28,5

4.1.3 Matalataajuiset melutasot

Haarasuonkankaan, Turkkielän ja Takiankankaan tuulivoimahankkeiden aiheuttama matalataajuisen yhteismelu ei Haarasuonkankaan kummassakaan hankevaihtoehdossa ylitä Sosiaali- ja terveysministeriön asumisterveysohjearvoa laskentapisteiden sisätiloissa.

Haarasuonkankaan hankevaihtoehdon 1 tulokset laskentapisteittäin on esitetty taulukossa 17 ja hankevaihtoehdon 2 tulokset taulukossa 18. Taulukoissa näkyy jokaisen laskentapisteen terssikaistakohtaiset arvot. Tarkemmat matalataajuisen yhteismelun laskentatulokset ja kuvaajat on esitetty liitteessä 9 ja 10.

9.5.2023

Taulukko 17. Matalataajuisen yhteismelun laskentatulokset VE1

Pienitaajuisen melun laskenta menetelmä: ISO 9613-2, Anojanssi (Keränen, Hakala ja Hongisto, 2019)											
Terssin painottamaton äänitaso Leq dB - altistuvien laskentapisteen (rakennusten) sisätiloissa											
Terssikaista [Hz]	20	25	31,5	40	50	63	80	100	125	160	200
Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat L _{Zeq,1h} , dB	74,0	64,0	56,0	49,0	44,0	42,0	40,0	38,0	36,0	34,0	32,0
Laskentapiste A	43	41,4	40,4	39	37,8	35,7	32,9	29,6	25,2	19,6	15,9
Laskentapiste B	43	41,4	40,4	39	37,9	35,7	33	29,7	25,3	19,7	16
Laskentapiste C	43,4	41,9	40,8	39,6	38,4	36,4	33,7	30,4	26,2	20,7	17
Laskentapiste D	43,2	41,8	40,7	39,5	38,3	36,3	33,6	30,3	26,1	20,6	16,9
Laskentapiste E	43,2	41,7	40,7	39,4	38,3	36,2	33,6	30,3	26	20,5	16,9
Laskentapiste F	43	41,5	40,4	39,2	38	36	33,3	30	25,8	20,3	16,6
Laskentapiste G	42	40,5	39,5	38,3	37,1	35,1	32,4	29,1	24,9	19,4	15,7
Laskentapiste H	40,7	39,2	38,1	36,9	35,7	33,6	30,9	27,5	23,2	17,5	13,7
Laskentapiste I	42,7	41,3	40,2	39,1	37,9	36	33,3	30	25,9	20,5	16,9
Laskentapiste J	44,7	42,4	41,4	39,5	38,4	35,2	32,2	29,3	23,8	17,9	14
Laskentapiste K	46,2	43,7	42,7	40,5	39,5	35,8	32,6	30,1	23,7	17,7	13,7
Laskentapiste L	41,5	40	38,9	37,6	36,4	34,2	31,5	28,2	23,9	18,4	14,8
Laskentapiste M	41,1	39,6	38,5	37,2	36	33,9	31,2	27,8	23,5	17,9	14,2
Laskentapiste N	41,1	39,6	38,5	37,2	36	33,8	31,1	27,7	23,3	17,7	13,9
Laskentapiste O	41,1	39,5	38,5	37,1	35,9	33,8	31	27,7	23,3	17,6	13,8

9.5.2023

Taulukko 18. Matalataajuisen yhteismelun laskentatulokset VE2

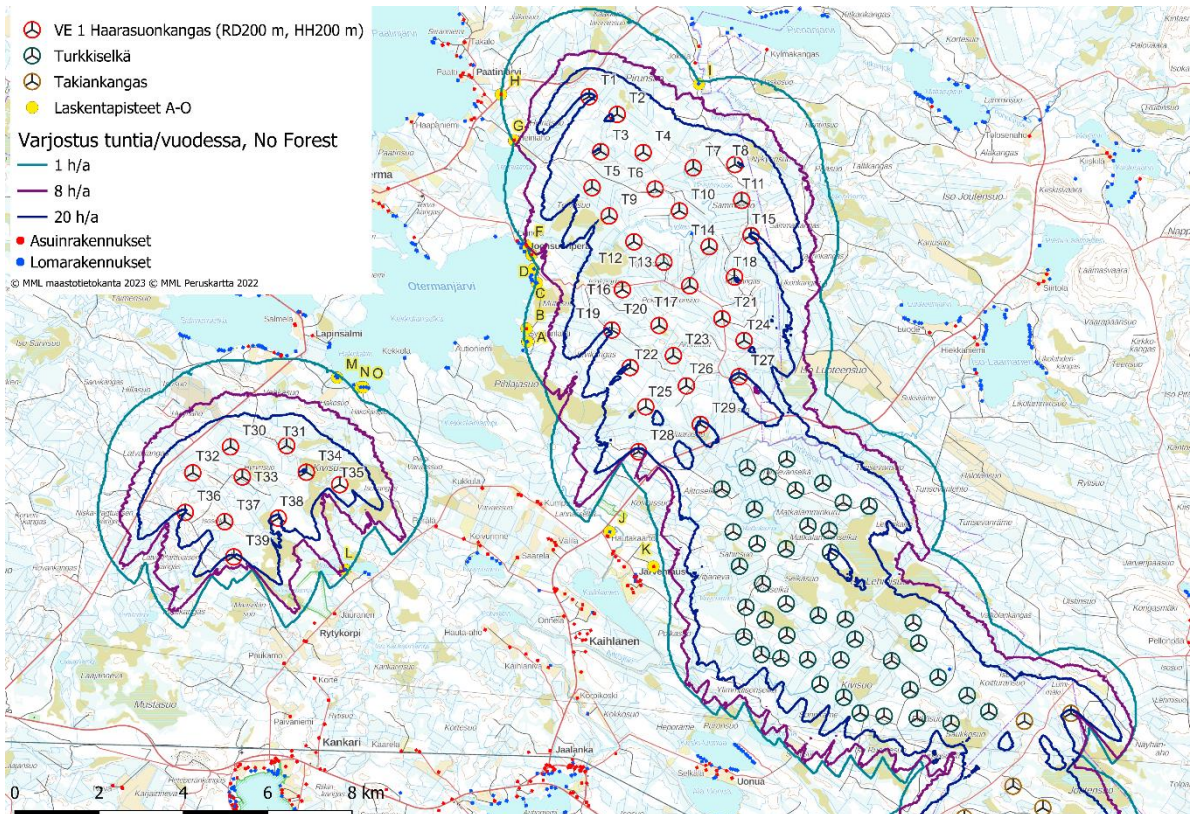
Pienitaajuisen melun laskenta menetelmä: ISO 9613-2, Anojanssi (Keränen, Hakala ja Hongisto, 2019)											
Terssin painottamaton äänitaso Leq dB - altistuvien laskentapisteen (rakennusten) sisätiloissa											
Terssikaista [Hz]	20	25	31,5	40	50	63	80	100	125	160	200
Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat L _{Zeq,1h} , dB	74,0	64,0	56,0	49,0	44,0	42,0	40,0	38,0	36,0	34,0	32,0
Laskentapiste A	42,8	41,1	40,1	38,7	37,5	35,3	32,6	29,3	24,9	19,4	15,7
Laskentapiste B	42,7	41,1	40,1	38,7	37,6	35,4	32,7	29,4	25	19,5	15,8
Laskentapiste C	43,2	41,7	40,6	39,4	38,2	36,2	33,5	30,2	26	20,5	16,9
Laskentapiste D	43,1	41,6	40,5	39,3	38,1	36,1	33,4	30,1	25,9	20,4	16,8
Laskentapiste E	43	41,5	40,5	39,2	38,1	36	33,4	30,1	25,9	20,4	16,8
Laskentapiste F	42,8	41,3	40,2	39	37,8	35,8	33,1	29,9	25,6	20,1	16,5
Laskentapiste G	41,8	40,4	39,3	38,1	36,9	34,9	32,3	29	24,8	19,3	15,7
Laskentapiste H	40,5	39	37,9	36,7	35,5	33,4	30,7	27,3	23	17,4	13,7
Laskentapiste I	42,6	41,2	40,2	39	37,8	35,9	33,3	30	25,8	20,4	16,9
Laskentapiste J	44,5	42,2	41,2	39,2	38,2	34,9	31,9	29,1	23,5	17,7	13,8
Laskentapiste K	46,1	43,6	42,6	40,4	39,4	35,6	32,5	30	23,5	17,5	13,6
Laskentapiste L	38,1	35,8	34,7	32,7	31,4	28,2	24,9	21,3	15,2	8,2	2,8
Laskentapiste M	38	36	34,8	33,1	31,9	29	25,9	22,3	16,9	10,3	5,4
Laskentapiste N	38,5	36,4	35,3	33,6	32,3	29,5	26,5	22,9	17,5	11,1	6,2
Laskentapiste O	38,5	36,5	35,4	33,7	32,4	29,6	26,6	23	17,6	11,2	6,4

9.5.2023

4.2 Varjostus

4.2.1 VE 1: Varjostuksen yhteisvaikutus, "Real Case, No Forest"

Hankevaihtoehdossa 1 yhteisvaikutusmallinnuksen varjostusvaikutusalueelle (8 h/a) ei sijoitu asuintai lomarakennuksia. Mallinnustulosten mukaan varjostusta ilmenee enimmillään 7 h 40 min vuodessa hankealueen eteläpuolella sijaitsevan lomarakennuksen (laskentapiste L) alueella. Tarkemmat laskentatulokset on esitetty liitteessä 11.



Kuva 7. Varjostuksen yhteismallinnuksen tulos hankevaihtoehdossa 1 (puuston suojaava vaikutusta ei ole huomioitu)

9.5.2023

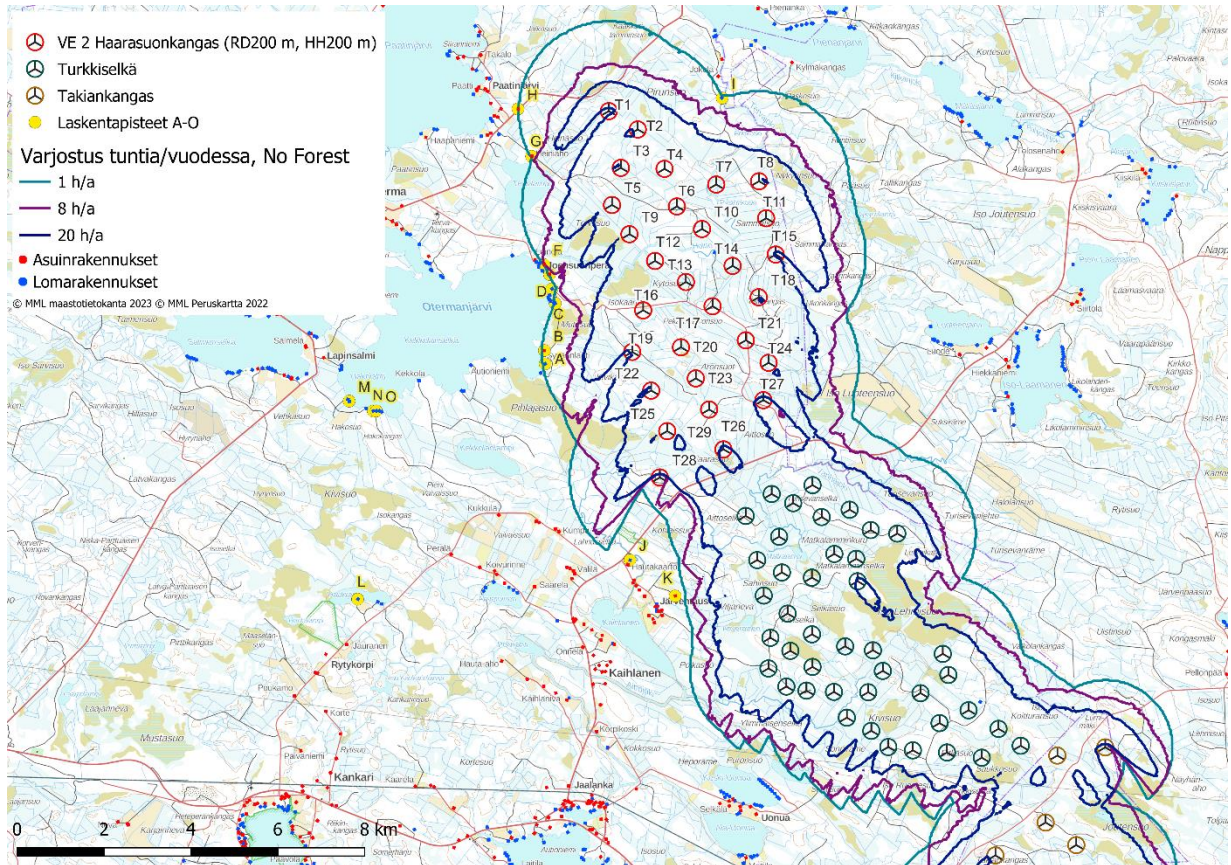
Taulukko 19. Varjostuksen yhteismallinnuksen tulos VE1, kun puuston suojaavaa vaikutusta ei ole huomioitu "Real Case, No Forest".

Rakennus	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikkuna (m)	Varjostus (h/a)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0 x 5,0	2:21
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	5,0 x 5,0	2:01
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0 x 5,0	1:53
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0 x 5,0	0:00
Asuinrakennus E (Alanko)	506 919	7 171 101	145	5,0 x 5,0	3:16
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0 x 5,0	0:00
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0 x 5,0	5:44
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0 x 5,0	0:00
Lomarakennus I	510 890	7 175 161	155	5,0 x 5,0	3:19
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0 x 5,0	0:00
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0 x 5,0	0:00
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	5,0 x 5,0	7:40
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0 x 5,0	1:53
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0 x 5,0	0:00
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0 x 5,0	0:00

9.5.2023

4.2.2 VE 2: Varjostuksen yhteisvaikutus ”Real Case, No Forest”

Hankevaihtoehdossa 2 yhteisvaikutusmallinnuksen varjostusvaikutusalueelle (8 h/a) ei sijoitu asuin- tai lomarakennuksia. Mallinnustulosten mukaan varjostusta ilmenee enimmillään 5 h 45 min vuodessa hankealueen eteläpuolella sijaitsevan asuinrakennuksen (laskentapiste G) alueella. Tarkemmat laskentatulokset on esitetty liitteessä 12.



Kuva 8. Varjostuksen yhteismallinnuksen tulos hankevaihtoehdossa 2 (puuston suojaavaa vaikutusta ei ole huomioitu)

9.5.2023

Taulukko 20. Varjostuksen yhteismallinnuksen tulos VE2, kun puuston suojaavaa vaikutusta ei ole huomioitu "Real Case, No Forest".

Rakennus	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaik- kuna (m)	Varjostus (h/a)
Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0 x 5,0	2:21
Asuinrakennus B (Syvälahti)	506 799	7 169 349	142,5	5,0 x 5,0	2:01
Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0 x 5,0	1:54
Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0 x 5,0	0:00
Asuinrakennus E (Alanko)	506 919	7 171 101	145	5,0 x 5,0	3:17
Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0 x 5,0	0:00
Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0 x 5,0	5:45
Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0 x 5,0	0:00
Lomarakennus I	510 890	7 175 161	155	5,0 x 5,0	3:19
Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0 x 5,0	0:00
Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0 x 5,0	0:00
Lomarakennus L (Haukijärvi)	502 501	7 163 625	140	5,0 x 5,0	0:00
Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0 x 5,0	0:00
Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0 x 5,0	0:00
Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0 x 5,0	0:00

FCG Finnish Consulting Group Oy

Miikka Saranpää, ins. AMK

Laatija

Liisa Karhu, FM

Tarkastaja

9.5.2023

Liite 1. Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 - Hankevaihtoehto 1

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuo

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

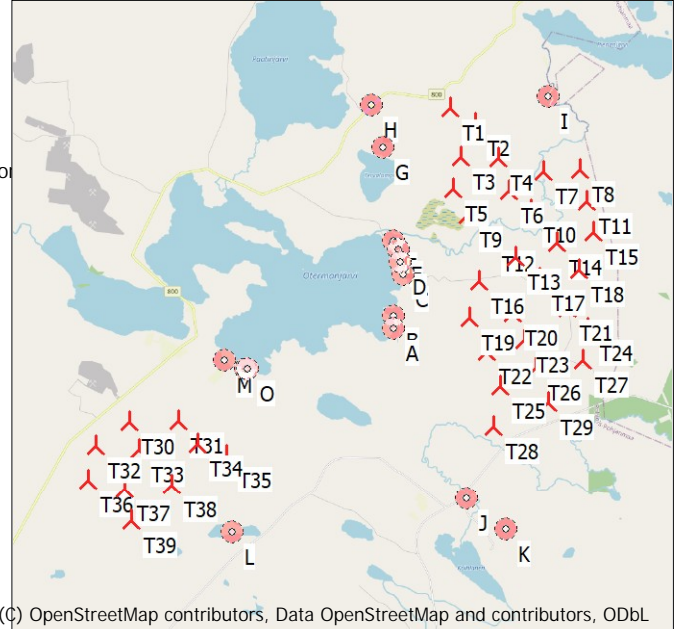
Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0,0 dB(A)



All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	WTG type			Noise data				Wind speed [m/s]	LwA,ref [dB(A)]	
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator			Name
T1	508 282	7 174 861	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T10	510 426	7 172 148	146,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T11	511 902	7 172 395	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T12	509 346	7 171 412	143,2	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T13	510 056	7 170 927	146,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T14	511 130	7 171 298	148,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T15	512 122	7 171 560	159,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T16	509 073	7 170 275	147,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T17	510 668	7 170 368	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T18	511 731	7 170 576	165,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T19	508 820	7 169 317	148,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T2	508 948	7 174 439	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T20	509 941	7 169 425	149,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T21	511 434	7 169 585	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T22	509 256	7 168 427	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T23	510 283	7 168 708	149,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T24	511 959	7 169 067	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T25	509 625	7 167 494	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T26	510 589	7 167 991	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T27	511 839	7 168 207	148,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T28	509 456	7 166 427	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T29	510 920	7 167 074	142,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T3	508 557	7 173 555	151,9	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T30	499 777	7 166 541	137,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T31	501 112	7 166 571	140,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T32	498 884	7 165 924	140,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T33	500 060	7 165 826	146,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T34	501 577	7 165 939	141,7	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T35	502 368	7 165 645	147,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T36	498 706	7 164 985	147,2	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T37	499 643	7 164 765	154,4	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T38	500 913	7 164 850	150,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T39	499 856	7 163 927	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T4	509 564	7 173 532	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T5	508 354	7 172 700	144,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T6	509 849	7 172 666	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T7	510 753	7 173 171	147,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T8	511 738	7 173 247	154,9	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T9	508 756	7 172 027	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1

Calculation Results

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058

Sound level

No.	Name	East	North	Z [m]	Immission height [m]	Demands Noise [dB(A)]	Sound level		Distance to noise demand [m]
							From WTGs [dB(A)]		
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4,0	40,0	37,2	673	
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	4,0	40,0	37,3	657	
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4,0	40,0	38,6	384	
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4,0	40,0	38,4	426	
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	4,0	40,0	38,4	411	
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4,0	40,0	38,1	475	
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	4,0	40,0	37,4	559	
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4,0	40,0	35,2	978	
I	Lomarakennus I	510 890	7 175 161	155,0	4,0	40,0	38,6	330	
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4,0	40,0	34,4	1 029	
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4,0	40,0	32,2	1 734	
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	4,0	40,0	37,7	720	
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4,0	40,0	36,0	827	
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4,0	40,0	35,5	953	
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4,0	40,0	35,4	998	

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T30	7471	7562	8247	8343	8473	8491	9912	10547	14064	9214	10427	3990	3016	3392	3457
T31	6218	6329	7083	7206	7365	7407	9035	9767	13015	7925	9160	3257	2008	2230	2287
T32	8524	8625	9327	9426	9559	9577	10974	11585	15148	9983	11150	4286	4102	4465	4529
T33	7483	7604	8370	8495	8652	8692	10268	10962	14297	8804	9978	3287	3257	3517	3575
T34	6090	6237	7081	7239	7429	7498	9295	10091	13106	7329	8532	2492	2361	2390	2431
T35	5598	5775	6697	6886	7105	7201	9163	10026	12774	6497	7692	2024	2541	2363	2381
T36	9070	9195	9964	10087	10240	10276	11785	12434	15875	10073	11178	4031	4817	5107	5166
T37	8353	8499	9327	9472	9649	9704	11362	12078	15316	9129	10222	3077	4335	4532	4584
T38	7241	7409	8296	8468	8669	8747	10571	11364	14348	7862	8970	2006	3614	3666	3706
T39	8639	8809	9699	9869	10067	10142	11920	12682	15746	8932	9956	2662	4913	5026	5070
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise 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 Lomarakennus A (Syvälahti)

Wind speed: 8,0 m/s

WTG

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]
T1	6 000	6 004	15,94	110,1	0,00	86,57	-	-	0,00	0,00	-
T10	4 760	4 765	19,09	110,1	0,00	84,56	-	-	0,00	0,00	-
T11	6 091	6 094	15,72	110,1	0,00	86,70	-	-	0,00	0,00	-
T12	3 465	3 471	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T13	3 747	3 753	22,28	110,1	0,00	82,49	-	-	0,00	0,00	-
T14	4 867	4 872	18,79	110,1	0,00	84,75	-	-	0,00	0,00	-
T15	5 872	5 876	16,22	110,1	0,00	86,38	-	-	0,00	0,00	-
T16	2 570	2 579	27,10	110,1	0,00	79,23	-	-	0,00	0,00	-
T17	4 073	4 079	21,18	110,1	0,00	83,21	-	-	0,00	0,00	-
T18	5 148	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T19	2 022	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 802	5 806	16,39	110,1	0,00	86,28	-	-	0,00	0,00	-
T20	3 148	3 155	24,55	110,1	0,00	80,98	-	-	0,00	0,00	-
T21	4 649	4 654	19,41	110,1	0,00	84,36	-	-	0,00	0,00	-
T22	2 516	2 525	27,37	110,1	0,00	79,04	-	-	0,00	0,00	-
T23	3 482	3 489	23,24	110,1	0,00	81,85	-	-	0,00	0,00	-
T24	5 142	5 147	18,04	110,1	0,00	85,23	-	-	0,00	0,00	-
T25	3 207	3 214	24,31	110,1	0,00	81,14	-	-	0,00	0,00	-
T26	3 916	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	5 092	5 096	18,18	110,1	0,00	85,14	-	-	0,00	0,00	-
T28	3 716	3 722	22,40	110,1	0,00	82,42	-	-	0,00	0,00	-
T29	4 551	4 556	19,70	110,1	0,00	84,17	-	-	0,00	0,00	-
T3	4 836	4 841	18,88	110,1	0,00	84,70	-	-	0,00	0,00	-
T30	7 471	7 474	14,30	110,1	0,00	88,47	-	-	0,00	0,00	-
T31	6 218	6 221	16,54	110,1	0,00	86,88	-	-	0,00	0,00	-
T32	8 524	8 527	12,64	110,1	0,00	89,62	-	-	0,00	0,00	-
T33	7 483	7 486	14,22	110,1	0,00	88,49	-	-	0,00	0,00	-
T34	6 090	6 094	16,75	110,1	0,00	86,70	-	-	0,00	0,00	-
T35	5 598	5 602	17,68	110,1	0,00	85,97	-	-	0,00	0,00	-
T36	9 070	9 072	11,80	110,1	0,00	90,15	-	-	0,00	0,00	-
T37	8 353	8 356	12,79	110,1	0,00	89,44	-	-	0,00	0,00	-
T38	7 241	7 245	14,37	110,1	0,00	88,20	-	-	0,00	0,00	-
T39	8 639	8 641	12,15	110,1	0,00	89,73	-	-	0,00	0,00	-
T4	5 263	5 268	17,73	110,1	0,00	85,43	-	-	0,00	0,00	-
T5	3 967	3 973	21,53	110,1	0,00	82,98	-	-	0,00	0,00	-
T6	4 724	4 729	19,19	110,1	0,00	84,50	-	-	0,00	0,00	-
T7	5 704	5 708	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T8	6 472	6 476	14,87	110,1	0,00	87,23	-	-	0,00	0,00	-
T9	3 559	3 565	22,96	110,1	0,00	82,04	-	-	0,00	0,00	-
Sum			37,24								

- Data undefined due to calculation with octave data

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 12.57/3.5.584

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Wind speed: 8,0 m/s

WTG

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]
T1	5 708	5 712	16,64	110,1	0,00	86,14	-	-	0,00	0,00	-
T10	4 581	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T11	5 943	5 947	16,06	110,1	0,00	86,49	-	-	0,00	0,00	-
T12	3 277	3 284	24,03	110,1	0,00	81,33	-	-	0,00	0,00	-
T13	3 619	3 625	22,74	110,1	0,00	82,19	-	-	0,00	0,00	-
T14	4 750	4 755	19,12	110,1	0,00	84,54	-	-	0,00	0,00	-
T15	5 764	5 769	16,48	110,1	0,00	86,22	-	-	0,00	0,00	-
T16	2 455	2 465	27,67	110,1	0,00	78,84	-	-	0,00	0,00	-
T17	4 001	4 007	21,42	110,1	0,00	83,06	-	-	0,00	0,00	-
T18	5 082	5 088	18,20	110,1	0,00	85,13	-	-	0,00	0,00	-
T19	2 021	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 525	5 530	17,06	110,1	0,00	85,85	-	-	0,00	0,00	-
T20	3 143	3 151	24,56	110,1	0,00	80,97	-	-	0,00	0,00	-
T21	4 641	4 646	19,43	110,1	0,00	84,34	-	-	0,00	0,00	-
T22	2 624	2 633	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T23	3 542	3 549	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T24	5 168	5 172	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T25	3 380	3 387	23,63	110,1	0,00	81,60	-	-	0,00	0,00	-
T26	4 026	4 032	21,34	110,1	0,00	83,11	-	-	0,00	0,00	-
T27	5 168	5 173	17,97	110,1	0,00	85,27	-	-	0,00	0,00	-
T28	3 949	3 955	21,59	110,1	0,00	82,94	-	-	0,00	0,00	-
T29	4 707	4 712	19,24	110,1	0,00	84,46	-	-	0,00	0,00	-
T3	4 558	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T30	7 562	7 565	13,56	110,1	0,00	88,58	-	-	0,00	0,00	-
T31	6 329	6 333	15,61	110,1	0,00	87,03	-	-	0,00	0,00	-
T32	8 625	8 627	11,91	110,1	0,00	89,72	-	-	0,00	0,00	-
T33	7 604	7 607	13,28	110,1	0,00	88,62	-	-	0,00	0,00	-
T34	6 237	6 240	15,86	110,1	0,00	86,90	-	-	0,00	0,00	-
T35	5 775	5 779	16,94	110,1	0,00	86,24	-	-	0,00	0,00	-
T36	9 195	9 197	10,89	110,1	0,00	90,27	-	-	0,00	0,00	-
T37	8 499	8 502	12,02	110,1	0,00	89,59	-	-	0,00	0,00	-
T38	7 409	7 412	13,75	110,1	0,00	88,40	-	-	0,00	0,00	-
T39	8 809	8 812	11,59	110,1	0,00	89,90	-	-	0,00	0,00	-
T4	5 014	5 019	18,39	110,1	0,00	85,01	-	-	0,00	0,00	-
T5	3 694	3 700	22,47	110,1	0,00	82,36	-	-	0,00	0,00	-
T6	4 506	4 511	19,83	110,1	0,00	84,09	-	-	0,00	0,00	-
T7	5 500	5 504	17,12	110,1	0,00	85,81	-	-	0,00	0,00	-
T8	6 292	6 296	15,27	110,1	0,00	86,98	-	-	0,00	0,00	-
T9	3 317	3 323	23,88	110,1	0,00	81,43	-	-	0,00	0,00	-
Sum			37,31								

- Data undefined due to calculation with octave data

Noise sensitive area: C Lomarakennus C (Mutalahti)

Wind speed: 8,0 m/s

WTG

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]
T1	4 594	4 600	19,57	110,1	0,00	84,25	-	-	0,00	0,00	-
T10	3 787	3 794	22,14	110,1	0,00	82,58	-	-	0,00	0,00	-
T11	5 236	5 240	17,80	110,1	0,00	85,39	-	-	0,00	0,00	-
T12	2 497	2 506	27,46	110,1	0,00	78,98	-	-	0,00	0,00	-
T13	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T14	4 173	4 179	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T15	5 198	5 203	17,89	110,1	0,00	85,33	-	-	0,00	0,00	-
T16	2 032	2 044	29,96	110,1	0,00	77,21	-	-	0,00	0,00	-
T17	3 622	3 629	22,73	110,1	0,00	82,19	-	-	0,00	0,00	-
T18	4 686	4 692	19,30	110,1	0,00	84,43	-	-	0,00	0,00	-
T19	2 097	2 108	29,58	110,1	0,00	77,48	-	-	0,00	0,00	-
T2	4 431	4 437	20,05	110,1	0,00	83,94	-	-	0,00	0,00	-
T20	3 066	3 074	24,88	110,1	0,00	80,75	-	-	0,00	0,00	-
T21	4 469	4 475	19,94	110,1	0,00	84,01	-	-	0,00	0,00	-
T22	2 986	2 994	25,22	110,1	0,00	80,52	-	-	0,00	0,00	-
T23	3 668	3 675	22,56	110,1	0,00	82,30	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T24	5 099	5 104	18,16	110,1	0,00	85,16	-	-	0,00	0,00	-
T25	3 912	3 917	21,88	110,1	0,00	82,86	-	-	0,00	0,00	-
T26	4 304	4 310	20,45	110,1	0,00	83,69	-	-	0,00	0,00	-
T27	5 286	5 290	17,67	110,1	0,00	85,47	-	-	0,00	0,00	-
T28	4 677	4 682	19,80	110,1	0,00	84,41	-	-	0,00	0,00	-
T29	5 129	5 133	18,08	110,1	0,00	85,21	-	-	0,00	0,00	-
T3	3 465	3 472	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T30	8 247	8 250	13,02	110,1	0,00	89,33	-	-	0,00	0,00	-
T31	7 083	7 086	14,83	110,1	0,00	88,01	-	-	0,00	0,00	-
T32	9 327	9 330	11,46	110,1	0,00	90,40	-	-	0,00	0,00	-
T33	8 370	8 373	12,81	110,1	0,00	89,46	-	-	0,00	0,00	-
T34	7 081	7 084	14,79	110,1	0,00	88,01	-	-	0,00	0,00	-
T35	6 697	6 700	15,43	110,1	0,00	87,52	-	-	0,00	0,00	-
T36	9 964	9 967	10,58	110,1	0,00	90,97	-	-	0,00	0,00	-
T37	9 327	9 329	11,39	110,1	0,00	90,40	-	-	0,00	0,00	-
T38	8 296	8 299	12,87	110,1	0,00	89,38	-	-	0,00	0,00	-
T39	9 699	9 702	10,87	110,1	0,00	90,74	-	-	0,00	0,00	-
T4	3 990	3 996	21,45	110,1	0,00	83,03	-	-	0,00	0,00	-
T5	2 614	2 623	26,89	110,1	0,00	79,38	-	-	0,00	0,00	-
T6	3 581	3 588	22,88	110,1	0,00	82,10	-	-	0,00	0,00	-
T7	4 606	4 611	19,54	110,1	0,00	84,28	-	-	0,00	0,00	-
T8	5 469	5 474	17,20	110,1	0,00	85,77	-	-	0,00	0,00	-
T9	2 335	2 344	28,29	110,1	0,00	78,40	-	-	0,00	0,00	-
Sum			38,55								

- Data undefined due to calculation with octave data

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Wind speed: 8,0 m/s

WTG

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]
T1	4 300	4 306	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T10	3 720	3 726	22,38	110,1	0,00	82,43	-	-	0,00	0,00	-
T11	5 193	5 197	17,91	110,1	0,00	85,32	-	-	0,00	0,00	-
T12	2 460	2 469	27,65	110,1	0,00	78,85	-	-	0,00	0,00	-
T13	3 088	3 096	24,79	110,1	0,00	80,82	-	-	0,00	0,00	-
T14	4 192	4 198	20,80	110,1	0,00	83,46	-	-	0,00	0,00	-
T15	5 211	5 216	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T16	2 157	2 168	29,24	110,1	0,00	77,72	-	-	0,00	0,00	-
T17	3 717	3 724	22,39	110,1	0,00	82,42	-	-	0,00	0,00	-
T18	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T19	2 348	2 358	28,22	110,1	0,00	78,45	-	-	0,00	0,00	-
T2	4 172	4 178	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T20	3 258	3 265	24,10	110,1	0,00	81,28	-	-	0,00	0,00	-
T21	4 615	4 621	19,51	110,1	0,00	84,29	-	-	0,00	0,00	-
T22	3 268	3 276	24,06	110,1	0,00	81,31	-	-	0,00	0,00	-
T23	3 898	3 904	21,76	110,1	0,00	82,83	-	-	0,00	0,00	-
T24	5 268	5 273	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T25	4 212	4 217	20,74	110,1	0,00	83,50	-	-	0,00	0,00	-
T26	4 559	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T27	5 499	5 503	17,13	110,1	0,00	85,81	-	-	0,00	0,00	-
T28	4 999	5 003	18,43	110,1	0,00	84,99	-	-	0,00	0,00	-
T29	5 405	5 409	17,36	110,1	0,00	85,66	-	-	0,00	0,00	-
T3	3 209	3 216	24,30	110,1	0,00	81,15	-	-	0,00	0,00	-
T30	8 343	8 346	13,47	110,1	0,00	89,43	-	-	0,00	0,00	-
T31	7 206	7 209	15,12	110,1	0,00	88,16	-	-	0,00	0,00	-
T32	9 426	9 429	11,92	110,1	0,00	90,49	-	-	0,00	0,00	-
T33	8 495	8 497	13,12	110,1	0,00	89,59	-	-	0,00	0,00	-
T34	7 239	7 242	14,97	110,1	0,00	88,20	-	-	0,00	0,00	-
T35	6 886	6 889	15,25	110,1	0,00	87,76	-	-	0,00	0,00	-
T36	10 087	10 089	10,93	110,1	0,00	91,08	-	-	0,00	0,00	-
T37	9 472	9 475	11,70	110,1	0,00	90,53	-	-	0,00	0,00	-
T38	8 468	8 470	12,99	110,1	0,00	89,56	-	-	0,00	0,00	-
T39	9 869	9 871	11,05	110,1	0,00	90,89	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T4	3 792	3 798	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
T5	2 378	2 387	28,06	110,1	0,00	78,56	-	-	0,00	0,00	-
T6	3 448	3 455	23,37	110,1	0,00	81,77	-	-	0,00	0,00	-
T7	4 482	4 487	19,90	110,1	0,00	84,04	-	-	0,00	0,00	-
T8	5 374	5 378	17,44	110,1	0,00	85,61	-	-	0,00	0,00	-
T9	2 185	2 195	29,09	110,1	0,00	77,83	-	-	0,00	0,00	-
Sum			38,42								

- Data undefined due to calculation with octave data

Noise sensitive area: E Asuinrakennus E (Alanko)

Wind speed: 8,0 m/s

WTG

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]
T1	3 999	4 006	21,42	110,1	0,00	83,05	-	-	0,00	0,00	-
T10	3 660	3 666	22,60	110,1	0,00	82,28	-	-	0,00	0,00	-
T11	5 149	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T12	2 446	2 455	27,72	110,1	0,00	78,80	-	-	0,00	0,00	-
T13	3 142	3 149	24,57	110,1	0,00	80,96	-	-	0,00	0,00	-
T14	4 216	4 221	20,72	110,1	0,00	83,51	-	-	0,00	0,00	-
T15	5 224	5 228	17,83	110,1	0,00	85,37	-	-	0,00	0,00	-
T16	2 307	2 317	28,43	110,1	0,00	78,30	-	-	0,00	0,00	-
T17	3 820	3 826	22,03	110,1	0,00	82,66	-	-	0,00	0,00	-
T18	4 841	4 846	18,86	110,1	0,00	84,71	-	-	0,00	0,00	-
T19	2 607	2 616	26,93	110,1	0,00	79,35	-	-	0,00	0,00	-
T2	3 906	3 913	21,73	110,1	0,00	82,85	-	-	0,00	0,00	-
T20	3 456	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T21	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T22	3 551	3 558	22,99	110,1	0,00	82,02	-	-	0,00	0,00	-
T23	4 128	4 134	21,00	110,1	0,00	83,33	-	-	0,00	0,00	-
T24	5 435	5 439	17,29	110,1	0,00	85,71	-	-	0,00	0,00	-
T25	4 509	4 514	19,82	110,1	0,00	84,09	-	-	0,00	0,00	-
T26	4 811	4 816	18,95	110,1	0,00	84,65	-	-	0,00	0,00	-
T27	5 709	5 713	16,61	110,1	0,00	86,14	-	-	0,00	0,00	-
T28	5 318	5 322	17,58	110,1	0,00	85,52	-	-	0,00	0,00	-
T29	5 677	5 680	16,69	110,1	0,00	86,09	-	-	0,00	0,00	-
T3	2 950	2 958	25,37	110,1	0,00	80,42	-	-	0,00	0,00	-
T30	8 473	8 476	12,23	110,1	0,00	89,56	-	-	0,00	0,00	-
T31	7 365	7 368	13,90	110,1	0,00	88,35	-	-	0,00	0,00	-
T32	9 559	9 561	10,70	110,1	0,00	90,61	-	-	0,00	0,00	-
T33	8 652	8 655	11,94	110,1	0,00	89,75	-	-	0,00	0,00	-
T34	7 429	7 431	13,60	110,1	0,00	88,42	-	-	0,00	0,00	-
T35	7 105	7 108	14,23	110,1	0,00	88,04	-	-	0,00	0,00	-
T36	10 240	10 242	9,78	110,1	0,00	91,21	-	-	0,00	0,00	-
T37	9 649	9 651	10,45	110,1	0,00	90,69	-	-	0,00	0,00	-
T38	8 669	8 671	11,71	110,1	0,00	89,76	-	-	0,00	0,00	-
T39	10 067	10 070	9,78	110,1	0,00	91,06	-	-	0,00	0,00	-
T4	3 593	3 599	22,84	110,1	0,00	82,12	-	-	0,00	0,00	-
T5	2 149	2 159	29,29	110,1	0,00	77,68	-	-	0,00	0,00	-
T6	3 322	3 329	23,85	110,1	0,00	81,45	-	-	0,00	0,00	-
T7	4 358	4 363	20,28	110,1	0,00	83,80	-	-	0,00	0,00	-
T8	5 275	5 280	17,69	110,1	0,00	85,45	-	-	0,00	0,00	-
T9	2 057	2 068	29,82	110,1	0,00	77,31	-	-	0,00	0,00	-
Sum			38,41								

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Joensuu)

Wind speed: 8,0 m/s

WTG

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]
T1	3 835	3 841	21,98	110,1	0,00	82,69	-	-	0,00	0,00	-
T10	3 727	3 733	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T11	5 222	5 227	17,83	110,1	0,00	85,36	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T12	2 557	2 565	27,17	110,1	0,00	79,18	-	-	0,00	0,00	-
T13	3 291	3 297	23,98	110,1	0,00	81,36	-	-	0,00	0,00	-
T14	4 340	4 345	20,34	110,1	0,00	83,76	-	-	0,00	0,00	-
T15	5 338	5 342	17,53	110,1	0,00	85,55	-	-	0,00	0,00	-
T16	2 514	2 523	27,38	110,1	0,00	79,04	-	-	0,00	0,00	-
T17	3 995	4 001	21,44	110,1	0,00	83,04	-	-	0,00	0,00	-
T18	4 998	5 003	18,43	110,1	0,00	84,98	-	-	0,00	0,00	-
T19	2 857	2 865	25,78	110,1	0,00	80,14	-	-	0,00	0,00	-
T2	3 786	3 793	22,15	110,1	0,00	82,58	-	-	0,00	0,00	-
T20	3 682	3 688	22,52	110,1	0,00	82,34	-	-	0,00	0,00	-
T21	4 960	4 965	18,53	110,1	0,00	84,92	-	-	0,00	0,00	-
T22	3 807	3 813	22,08	110,1	0,00	82,63	-	-	0,00	0,00	-
T23	4 366	4 372	20,25	110,1	0,00	83,81	-	-	0,00	0,00	-
T24	5 642	5 646	16,77	110,1	0,00	86,03	-	-	0,00	0,00	-
T25	4 768	4 773	19,07	110,1	0,00	84,58	-	-	0,00	0,00	-
T26	5 057	5 061	18,27	110,1	0,00	85,09	-	-	0,00	0,00	-
T27	5 936	5 940	16,07	110,1	0,00	86,48	-	-	0,00	0,00	-
T28	5 579	5 583	16,93	110,1	0,00	85,94	-	-	0,00	0,00	-
T29	5 929	5 933	16,09	110,1	0,00	86,46	-	-	0,00	0,00	-
T3	2 843	2 851	25,84	110,1	0,00	80,10	-	-	0,00	0,00	-
T30	8 491	8 493	12,01	110,1	0,00	89,58	-	-	0,00	0,00	-
T31	7 407	7 410	13,67	110,1	0,00	88,40	-	-	0,00	0,00	-
T32	9 577	9 579	10,48	110,1	0,00	90,63	-	-	0,00	0,00	-
T33	8 692	8 695	11,70	110,1	0,00	89,79	-	-	0,00	0,00	-
T34	7 498	7 501	13,42	110,1	0,00	88,50	-	-	0,00	0,00	-
T35	7 201	7 204	13,88	110,1	0,00	88,15	-	-	0,00	0,00	-
T36	10 276	10 278	9,56	110,1	0,00	91,24	-	-	0,00	0,00	-
T37	9 704	9 706	10,24	110,1	0,00	90,74	-	-	0,00	0,00	-
T38	8 747	8 749	11,51	110,1	0,00	89,84	-	-	0,00	0,00	-
T39	10 142	10 144	9,62	110,1	0,00	91,12	-	-	0,00	0,00	-
T4	3 543	3 550	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T5	2 081	2 091	29,68	110,1	0,00	77,41	-	-	0,00	0,00	-
T6	3 339	3 345	23,79	110,1	0,00	81,49	-	-	0,00	0,00	-
T7	4 371	4 376	20,24	110,1	0,00	83,82	-	-	0,00	0,00	-
T8	5 307	5 312	17,61	110,1	0,00	85,50	-	-	0,00	0,00	-
T9	2 087	2 097	29,65	110,1	0,00	77,43	-	-	0,00	0,00	-
Sum			38,10								

- Data undefined due to calculation with octave data

Noise sensitive area: G Asuinrakennus G (Heiniaho)

Wind speed: 8,0 m/s

WTG

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]
T1	2 060	2 071	29,79	110,1	0,00	77,33	-	-	0,00	0,00	-
T10	4 264	4 269	20,57	110,1	0,00	83,61	-	-	0,00	0,00	-
T11	5 583	5 587	16,92	110,1	0,00	85,94	-	-	0,00	0,00	-
T12	3 725	3 731	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T13	4 582	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T14	5 269	5 274	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T15	6 057	6 061	15,79	110,1	0,00	86,65	-	-	0,00	0,00	-
T16	4 379	4 384	20,25	110,1	0,00	83,84	-	-	0,00	0,00	-
T17	5 410	5 414	17,35	110,1	0,00	85,67	-	-	0,00	0,00	-
T18	6 152	6 157	15,58	110,1	0,00	86,79	-	-	0,00	0,00	-
T19	5 065	5 069	18,30	110,1	0,00	85,10	-	-	0,00	0,00	-
T2	2 521	2 531	27,34	110,1	0,00	79,07	-	-	0,00	0,00	-
T20	5 581	5 585	16,94	110,1	0,00	85,94	-	-	0,00	0,00	-
T21	6 500	6 504	14,81	110,1	0,00	87,26	-	-	0,00	0,00	-
T22	6 055	6 059	15,84	110,1	0,00	86,65	-	-	0,00	0,00	-
T23	6 358	6 361	15,14	110,1	0,00	87,07	-	-	0,00	0,00	-
T24	7 236	7 239	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T25	7 055	7 058	13,88	110,1	0,00	87,97	-	-	0,00	0,00	-
T26	7 119	7 122	13,75	110,1	0,00	88,05	-	-	0,00	0,00	-
T27	7 745	7 748	12,69	110,1	0,00	88,78	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T28	7 962	7 964	12,41	110,1	0,00	89,02	-	-	0,00	0,00	-
T29	8 064	8 066	12,23	110,1	0,00	89,13	-	-	0,00	0,00	-
T3	2 071	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T30	9 912	9 914	9,74	110,1	0,00	90,92	-	-	0,00	0,00	-
T31	9 035	9 038	11,10	110,1	0,00	90,12	-	-	0,00	0,00	-
T32	10 974	10 976	8,44	110,1	0,00	91,81	-	-	0,00	0,00	-
T33	10 268	10 270	9,45	110,1	0,00	91,23	-	-	0,00	0,00	-
T34	9 295	9 297	10,74	110,1	0,00	90,37	-	-	0,00	0,00	-
T35	9 163	9 165	10,89	110,1	0,00	90,24	-	-	0,00	0,00	-
T36	11 785	11 787	7,58	110,1	0,00	92,43	-	-	0,00	0,00	-
T37	11 362	11 364	8,16	110,1	0,00	92,11	-	-	0,00	0,00	-
T38	10 571	10 573	9,09	110,1	0,00	91,48	-	-	0,00	0,00	-
T39	11 920	11 922	7,53	110,1	0,00	92,53	-	-	0,00	0,00	-
T4	3 074	3 081	24,85	110,1	0,00	80,77	-	-	0,00	0,00	-
T5	2 163	2 173	29,21	110,1	0,00	77,74	-	-	0,00	0,00	-
T6	3 538	3 545	23,04	110,1	0,00	81,99	-	-	0,00	0,00	-
T7	4 299	4 304	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T8	5 266	5 270	17,72	110,1	0,00	85,44	-	-	0,00	0,00	-
T9	2 879	2 887	25,69	110,1	0,00	80,21	-	-	0,00	0,00	-
Sum			37,38								

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Wind speed: 8,0 m/s

WTG

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]
T1	2 090	2 102	29,62	110,1	0,00	77,45	-	-	0,00	0,00	-
T10	5 057	5 061	18,27	110,1	0,00	85,08	-	-	0,00	0,00	-
T11	6 241	6 244	15,38	110,1	0,00	86,91	-	-	0,00	0,00	-
T12	4 712	4 716	19,23	110,1	0,00	84,47	-	-	0,00	0,00	-
T13	5 551	5 555	17,00	110,1	0,00	85,89	-	-	0,00	0,00	-
T14	6 120	6 123	15,65	110,1	0,00	86,74	-	-	0,00	0,00	-
T15	6 813	6 816	14,24	110,1	0,00	87,67	-	-	0,00	0,00	-
T16	5 460	5 464	17,22	110,1	0,00	85,75	-	-	0,00	0,00	-
T17	6 379	6 383	15,08	110,1	0,00	87,10	-	-	0,00	0,00	-
T18	7 035	7 038	13,85	110,1	0,00	87,95	-	-	0,00	0,00	-
T19	6 182	6 186	15,52	110,1	0,00	86,83	-	-	0,00	0,00	-
T2	2 797	2 805	26,05	110,1	0,00	79,96	-	-	0,00	0,00	-
T20	6 647	6 650	14,54	110,1	0,00	87,46	-	-	0,00	0,00	-
T21	7 475	7 478	13,12	110,1	0,00	88,48	-	-	0,00	0,00	-
T22	7 173	7 176	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T23	7 432	7 435	13,19	110,1	0,00	88,43	-	-	0,00	0,00	-
T24	8 212	8 214	11,96	110,1	0,00	89,29	-	-	0,00	0,00	-
T25	8 175	8 177	12,02	110,1	0,00	89,25	-	-	0,00	0,00	-
T26	8 201	8 203	11,97	110,1	0,00	89,28	-	-	0,00	0,00	-
T27	8 768	8 770	11,14	110,1	0,00	89,86	-	-	0,00	0,00	-
T28	9 092	9 094	10,73	110,1	0,00	90,18	-	-	0,00	0,00	-
T29	9 154	9 157	10,60	110,1	0,00	90,23	-	-	0,00	0,00	-
T3	2 728	2 736	26,36	110,1	0,00	79,74	-	-	0,00	0,00	-
T30	10 547	10 549	8,90	110,1	0,00	91,46	-	-	0,00	0,00	-
T31	9 767	9 769	10,00	110,1	0,00	90,80	-	-	0,00	0,00	-
T32	11 585	11 587	7,72	110,1	0,00	92,28	-	-	0,00	0,00	-
T33	10 962	10 964	8,46	110,1	0,00	91,80	-	-	0,00	0,00	-
T34	10 091	10 093	9,61	110,1	0,00	91,08	-	-	0,00	0,00	-
T35	10 026	10 028	9,68	110,1	0,00	91,02	-	-	0,00	0,00	-
T36	12 434	12 436	6,77	110,1	0,00	92,89	-	-	0,00	0,00	-
T37	12 078	12 080	7,23	110,1	0,00	92,64	-	-	0,00	0,00	-
T38	11 364	11 366	8,08	110,1	0,00	92,11	-	-	0,00	0,00	-
T39	12 682	12 684	6,66	110,1	0,00	93,07	-	-	0,00	0,00	-
T4	3 644	3 650	22,65	110,1	0,00	82,25	-	-	0,00	0,00	-
T5	3 094	3 100	24,77	110,1	0,00	80,83	-	-	0,00	0,00	-
T6	4 292	4 297	20,49	110,1	0,00	83,66	-	-	0,00	0,00	-
T7	4 883	4 887	18,75	110,1	0,00	84,78	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
T8	5 791	5 795	16,41	110,1	0,00	86,26	-	-	0,00	0,00	-
T9	3 860	3 866	21,89	110,1	0,00	82,74	-	-	0,00	0,00	-
Sum			35,20								

- Data undefined due to calculation with octave data

Noise sensitive area: I Lomarakenus I

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]
T1	2 625	2 634	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T10	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T11	2 945	2 952	25,40	110,1	0,00	80,40	-	-	0,00	0,00	-
T12	4 055	4 059	21,25	110,1	0,00	83,17	-	-	0,00	0,00	-
T13	4 315	4 320	20,41	110,1	0,00	83,71	-	-	0,00	0,00	-
T14	3 870	3 876	21,86	110,1	0,00	82,77	-	-	0,00	0,00	-
T15	3 806	3 813	22,08	110,1	0,00	82,62	-	-	0,00	0,00	-
T16	5 213	5 217	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T17	4 798	4 802	18,99	110,1	0,00	84,63	-	-	0,00	0,00	-
T18	4 661	4 667	19,37	110,1	0,00	84,38	-	-	0,00	0,00	-
T19	6 200	6 203	15,47	110,1	0,00	86,85	-	-	0,00	0,00	-
T2	2 072	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T20	5 814	5 818	16,36	110,1	0,00	86,30	-	-	0,00	0,00	-
T21	5 603	5 607	16,87	110,1	0,00	85,97	-	-	0,00	0,00	-
T22	6 929	6 932	14,04	110,1	0,00	87,82	-	-	0,00	0,00	-
T23	6 481	6 485	14,86	110,1	0,00	87,24	-	-	0,00	0,00	-
T24	6 187	6 190	15,50	110,1	0,00	86,83	-	-	0,00	0,00	-
T25	7 771	7 773	12,64	110,1	0,00	88,81	-	-	0,00	0,00	-
T26	7 177	7 179	13,61	110,1	0,00	88,12	-	-	0,00	0,00	-
T27	7 019	7 022	13,88	110,1	0,00	87,93	-	-	0,00	0,00	-
T28	8 851	8 853	11,02	110,1	0,00	89,94	-	-	0,00	0,00	-
T29	8 087	8 089	12,15	110,1	0,00	89,16	-	-	0,00	0,00	-
T3	2 832	2 840	25,89	110,1	0,00	80,07	-	-	0,00	0,00	-
T30	14 064	14 065	5,38	110,1	0,00	93,96	-	-	0,00	0,00	-
T31	13 015	13 017	6,41	110,1	0,00	93,29	-	-	0,00	0,00	-
T32	15 148	15 150	4,37	110,1	0,00	94,61	-	-	0,00	0,00	-
T33	14 297	14 299	5,16	110,1	0,00	94,11	-	-	0,00	0,00	-
T34	13 106	13 108	6,22	110,1	0,00	93,35	-	-	0,00	0,00	-
T35	12 774	12 776	6,48	110,1	0,00	93,13	-	-	0,00	0,00	-
T36	15 875	15 876	3,75	110,1	0,00	95,01	-	-	0,00	0,00	-
T37	15 316	15 318	4,18	110,1	0,00	94,70	-	-	0,00	0,00	-
T38	14 348	14 349	5,01	110,1	0,00	94,14	-	-	0,00	0,00	-
T39	15 746	15 748	3,76	110,1	0,00	94,94	-	-	0,00	0,00	-
T4	2 100	2 111	29,57	110,1	0,00	77,49	-	-	0,00	0,00	-
T5	3 534	3 539	23,06	110,1	0,00	81,98	-	-	0,00	0,00	-
T6	2 703	2 711	26,48	110,1	0,00	79,66	-	-	0,00	0,00	-
T7	1 994	2 005	30,19	110,1	0,00	77,04	-	-	0,00	0,00	-
T8	2 093	2 104	29,61	110,1	0,00	77,46	-	-	0,00	0,00	-
T9	3 792	3 797	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
Sum			38,62								

- Data undefined due to calculation with octave data

Noise sensitive area: J Lomarakenus J (Hautakaarto)

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]
T1	10 347	10 350	9,04	110,1	0,00	91,30	-	-	0,00	0,00	-
T10	7 801	7 804	12,59	110,1	0,00	88,85	-	-	0,00	0,00	-
T11	8 471	8 474	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T12	6 911	6 915	14,07	110,1	0,00	87,80	-	-	0,00	0,00	-
T13	6 530	6 534	14,75	110,1	0,00	87,30	-	-	0,00	0,00	-
T14	7 173	7 177	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T15	7 793	7 797	12,60	110,1	0,00	88,84	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
T16	5 758	5 762	16,49	110,1	0,00	86,21	-	-	0,00	0,00	-
T17	6 144	6 149	15,59	110,1	0,00	86,78	-	-	0,00	0,00	-
T18	6 738	6 742	14,37	110,1	0,00	87,58	-	-	0,00	0,00	-
T19	4 792	4 798	19,00	110,1	0,00	84,62	-	-	0,00	0,00	-
T2	9 915	9 918	9,59	110,1	0,00	90,93	-	-	0,00	0,00	-
T20	5 038	5 043	18,32	110,1	0,00	85,05	-	-	0,00	0,00	-
T21	5 719	5 724	16,58	110,1	0,00	86,15	-	-	0,00	0,00	-
T22	3 932	3 939	21,65	110,1	0,00	82,91	-	-	0,00	0,00	-
T23	4 449	4 455	20,00	110,1	0,00	83,98	-	-	0,00	0,00	-
T24	5 551	5 556	16,99	110,1	0,00	85,90	-	-	0,00	0,00	-
T25	3 090	3 098	24,78	110,1	0,00	80,82	-	-	0,00	0,00	-
T26	3 915	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	4 795	4 800	18,99	110,1	0,00	84,62	-	-	0,00	0,00	-
T28	2 023	2 035	30,01	110,1	0,00	77,17	-	-	0,00	0,00	-
T29	3 336	3 343	23,80	110,1	0,00	81,48	-	-	0,00	0,00	-
T3	9 032	9 035	10,77	110,1	0,00	90,12	-	-	0,00	0,00	-
T30	9 214	9 216	10,52	110,1	0,00	90,29	-	-	0,00	0,00	-
T31	7 925	7 928	12,40	110,1	0,00	88,98	-	-	0,00	0,00	-
T32	9 983	9 985	9,50	110,1	0,00	90,99	-	-	0,00	0,00	-
T33	8 804	8 807	11,09	110,1	0,00	89,90	-	-	0,00	0,00	-
T34	7 329	7 332	13,36	110,1	0,00	88,30	-	-	0,00	0,00	-
T35	6 497	6 501	14,82	110,1	0,00	87,26	-	-	0,00	0,00	-
T36	10 073	10 075	9,39	110,1	0,00	91,07	-	-	0,00	0,00	-
T37	9 129	9 132	10,63	110,1	0,00	90,21	-	-	0,00	0,00	-
T38	7 862	7 865	12,49	110,1	0,00	88,91	-	-	0,00	0,00	-
T39	8 932	8 935	10,91	110,1	0,00	90,02	-	-	0,00	0,00	-
T4	9 042	9 045	10,75	110,1	0,00	90,13	-	-	0,00	0,00	-
T5	8 186	8 189	12,00	110,1	0,00	89,26	-	-	0,00	0,00	-
T6	8 213	8 216	11,95	110,1	0,00	89,29	-	-	0,00	0,00	-
T7	8 871	8 874	10,99	110,1	0,00	89,96	-	-	0,00	0,00	-
T8	9 214	9 217	10,51	110,1	0,00	90,29	-	-	0,00	0,00	-
T9	7 502	7 505	13,07	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			34,42								

- Data undefined due to calculation with octave data

Noise sensitive area: K Asuinrakennus K (Takalo)

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]
T1	11 268	11 270	7,95	110,1	0,00	92,04	-	-	0,00	0,00	-
T10	8 473	8 476	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T11	8 946	8 949	10,89	110,1	0,00	90,04	-	-	0,00	0,00	-
T12	7 729	7 732	12,70	110,1	0,00	88,77	-	-	0,00	0,00	-
T13	7 234	7 238	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T14	7 715	7 719	12,73	110,1	0,00	88,75	-	-	0,00	0,00	-
T15	8 196	8 199	11,98	110,1	0,00	89,28	-	-	0,00	0,00	-
T16	6 619	6 623	14,59	110,1	0,00	87,42	-	-	0,00	0,00	-
T17	6 726	6 730	14,39	110,1	0,00	87,56	-	-	0,00	0,00	-
T18	7 142	7 147	13,67	110,1	0,00	88,08	-	-	0,00	0,00	-
T19	5 706	5 711	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T2	10 776	10 779	8,52	110,1	0,00	91,65	-	-	0,00	0,00	-
T20	5 729	5 734	16,56	110,1	0,00	86,17	-	-	0,00	0,00	-
T21	6 108	6 112	15,68	110,1	0,00	86,72	-	-	0,00	0,00	-
T22	4 762	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T23	5 033	5 038	18,33	110,1	0,00	85,05	-	-	0,00	0,00	-
T24	5 785	5 789	16,43	110,1	0,00	86,25	-	-	0,00	0,00	-
T25	3 801	3 808	22,09	110,1	0,00	82,61	-	-	0,00	0,00	-
T26	4 364	4 370	20,26	110,1	0,00	83,81	-	-	0,00	0,00	-
T27	4 946	4 951	18,57	110,1	0,00	84,89	-	-	0,00	0,00	-
T28	2 753	2 761	26,25	110,1	0,00	79,82	-	-	0,00	0,00	-
T29	3 555	3 562	22,97	110,1	0,00	82,03	-	-	0,00	0,00	-
T3	9 937	9 939	9,56	110,1	0,00	90,95	-	-	0,00	0,00	-
T30	10 427	10 429	8,95	110,1	0,00	91,37	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T31	9 160	9 162	10,59	110,1	0,00	90,24	-	-	0,00	0,00	-
T32	11 150	11 152	8,09	110,1	0,00	91,95	-	-	0,00	0,00	-
T33	9 978	9 981	9,51	110,1	0,00	90,98	-	-	0,00	0,00	-
T34	8 532	8 535	11,48	110,1	0,00	89,62	-	-	0,00	0,00	-
T35	7 692	7 695	12,76	110,1	0,00	88,72	-	-	0,00	0,00	-
T36	11 178	11 180	8,06	110,1	0,00	91,97	-	-	0,00	0,00	-
T37	10 222	10 225	9,20	110,1	0,00	91,19	-	-	0,00	0,00	-
T38	8 970	8 973	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-
T39	9 956	9 958	9,61	110,1	0,00	90,96	-	-	0,00	0,00	-
T4	9 838	9 841	9,69	110,1	0,00	90,86	-	-	0,00	0,00	-
T5	9 120	9 123	10,64	110,1	0,00	90,20	-	-	0,00	0,00	-
T6	8 970	8 972	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-
T7	9 521	9 524	10,10	110,1	0,00	90,58	-	-	0,00	0,00	-
T8	9 743	9 746	9,81	110,1	0,00	90,78	-	-	0,00	0,00	-
T9	8 396	8 399	11,68	110,1	0,00	89,48	-	-	0,00	0,00	-
Sum			32,19								

- Data undefined due to calculation with octave data

Noise sensitive area: L Lomarakenus L (Haukijärvi)

Wind speed: 8,0 m/s

WTG

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]
T1	12 636	12 638	7,85	110,1	0,00	93,03	-	-	0,00	0,00	-
T10	11 638	11 640	8,74	110,1	0,00	92,32	-	-	0,00	0,00	-
T11	12 857	12 859	7,39	110,1	0,00	93,18	-	-	0,00	0,00	-
T12	10 368	10 370	10,26	110,1	0,00	91,32	-	-	0,00	0,00	-
T13	10 507	10 509	10,04	110,1	0,00	91,43	-	-	0,00	0,00	-
T14	11 547	11 549	8,81	110,1	0,00	92,25	-	-	0,00	0,00	-
T15	12 471	12 473	7,78	110,1	0,00	92,92	-	-	0,00	0,00	-
T16	9 350	9 352	11,55	110,1	0,00	90,42	-	-	0,00	0,00	-
T17	10 591	10 594	9,92	110,1	0,00	91,50	-	-	0,00	0,00	-
T18	11 555	11 557	8,75	110,1	0,00	92,26	-	-	0,00	0,00	-
T19	8 505	8 507	12,74	110,1	0,00	89,60	-	-	0,00	0,00	-
T2	12 590	12 592	7,85	110,1	0,00	93,00	-	-	0,00	0,00	-
T20	9 434	9 436	11,38	110,1	0,00	90,50	-	-	0,00	0,00	-
T21	10 738	10 741	9,69	110,1	0,00	91,62	-	-	0,00	0,00	-
T22	8 288	8 291	13,00	110,1	0,00	89,37	-	-	0,00	0,00	-
T23	9 295	9 298	11,54	110,1	0,00	90,37	-	-	0,00	0,00	-
T24	10 912	10 914	9,46	110,1	0,00	91,76	-	-	0,00	0,00	-
T25	8 107	8 110	13,23	110,1	0,00	89,18	-	-	0,00	0,00	-
T26	9 191	9 194	11,65	110,1	0,00	90,27	-	-	0,00	0,00	-
T27	10 402	10 404	10,05	110,1	0,00	91,34	-	-	0,00	0,00	-
T28	7 498	7 501	14,15	110,1	0,00	88,50	-	-	0,00	0,00	-
T29	9 098	9 101	11,74	110,1	0,00	90,18	-	-	0,00	0,00	-
T3	11 631	11 633	8,89	110,1	0,00	92,31	-	-	0,00	0,00	-
T30	3 990	3 996	22,70	110,1	0,00	83,03	-	-	0,00	0,00	-
T31	3 257	3 264	25,30	110,1	0,00	81,27	-	-	0,00	0,00	-
T32	4 286	4 292	21,76	110,1	0,00	83,65	-	-	0,00	0,00	-
T33	3 287	3 294	25,20	110,1	0,00	81,35	-	-	0,00	0,00	-
T34	2 492	2 501	28,63	110,1	0,00	78,96	-	-	0,00	0,00	-
T35	2 024	2 036	31,10	110,1	0,00	77,18	-	-	0,00	0,00	-
T36	4 031	4 037	22,56	110,1	0,00	83,12	-	-	0,00	0,00	-
T37	3 077	3 085	26,03	110,1	0,00	80,79	-	-	0,00	0,00	-
T38	2 006	2 018	31,25	110,1	0,00	77,10	-	-	0,00	0,00	-
T39	2 662	2 671	27,82	110,1	0,00	79,53	-	-	0,00	0,00	-
T4	12 167	12 169	8,25	110,1	0,00	92,71	-	-	0,00	0,00	-
T5	10 799	10 801	9,84	110,1	0,00	91,67	-	-	0,00	0,00	-
T6	11 650	11 653	8,75	110,1	0,00	92,33	-	-	0,00	0,00	-
T7	12 619	12 621	7,69	110,1	0,00	93,02	-	-	0,00	0,00	-
T8	13 338	13 340	6,92	110,1	0,00	93,50	-	-	0,00	0,00	-
T9	10 475	10 477	10,19	110,1	0,00	91,40	-	-	0,00	0,00	-
Sum			37,68								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: M Lomarakennus M (Haukilahti)

Wind speed: 8,0 m/s

WTG

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]
T1	8 960	8 963	12,33	110,1	0,00	90,05	-	-	0,00	0,00	-
T10	9 035	9 038	12,29	110,1	0,00	90,12	-	-	0,00	0,00	-
T11	10 479	10 481	10,37	110,1	0,00	91,41	-	-	0,00	0,00	-
T12	7 744	7 747	14,21	110,1	0,00	88,78	-	-	0,00	0,00	-
T13	8 221	8 224	13,43	110,1	0,00	89,30	-	-	0,00	0,00	-
T14	9 357	9 360	11,80	110,1	0,00	90,43	-	-	0,00	0,00	-
T15	10 380	10 383	10,44	110,1	0,00	91,33	-	-	0,00	0,00	-
T16	7 082	7 086	15,11	110,1	0,00	88,01	-	-	0,00	0,00	-
T17	8 642	8 645	12,63	110,1	0,00	89,74	-	-	0,00	0,00	-
T18	9 724	9 726	11,12	110,1	0,00	90,76	-	-	0,00	0,00	-
T19	6 612	6 615	15,77	110,1	0,00	87,41	-	-	0,00	0,00	-
T2	9 123	9 126	12,11	110,1	0,00	90,21	-	-	0,00	0,00	-
T20	7 735	7 738	13,91	110,1	0,00	88,77	-	-	0,00	0,00	-
T21	9 235	9 237	11,67	110,1	0,00	90,31	-	-	0,00	0,00	-
T22	6 954	6 958	15,01	110,1	0,00	87,85	-	-	0,00	0,00	-
T23	7 994	7 997	13,36	110,1	0,00	89,06	-	-	0,00	0,00	-
T24	9 693	9 696	10,94	110,1	0,00	90,73	-	-	0,00	0,00	-
T25	7 352	7 355	14,28	110,1	0,00	88,33	-	-	0,00	0,00	-
T26	8 286	8 288	12,85	110,1	0,00	89,37	-	-	0,00	0,00	-
T27	9 533	9 536	11,07	110,1	0,00	90,59	-	-	0,00	0,00	-
T28	7 363	7 366	14,12	110,1	0,00	88,34	-	-	0,00	0,00	-
T29	8 685	8 688	12,17	110,1	0,00	89,78	-	-	0,00	0,00	-
T3	8 241	8 244	13,43	110,1	0,00	89,32	-	-	0,00	0,00	-
T30	3 016	3 023	25,10	110,1	0,00	80,61	-	-	0,00	0,00	-
T31	2 008	2 018	30,11	110,1	0,00	77,10	-	-	0,00	0,00	-
T32	4 102	4 107	21,09	110,1	0,00	83,27	-	-	0,00	0,00	-
T33	3 257	3 264	24,11	110,1	0,00	81,27	-	-	0,00	0,00	-
T34	2 361	2 371	28,15	110,1	0,00	78,50	-	-	0,00	0,00	-
T35	2 541	2 550	27,25	110,1	0,00	79,13	-	-	0,00	0,00	-
T36	4 817	4 822	18,93	110,1	0,00	84,66	-	-	0,00	0,00	-
T37	4 335	4 341	20,35	110,1	0,00	83,75	-	-	0,00	0,00	-
T38	3 614	3 621	22,76	110,1	0,00	82,18	-	-	0,00	0,00	-
T39	4 913	4 917	18,66	110,1	0,00	84,83	-	-	0,00	0,00	-
T4	9 015	9 018	12,33	110,1	0,00	90,10	-	-	0,00	0,00	-
T5	7 547	7 550	14,53	110,1	0,00	88,56	-	-	0,00	0,00	-
T6	8 773	8 776	12,68	110,1	0,00	89,87	-	-	0,00	0,00	-
T7	9 809	9 812	11,25	110,1	0,00	90,83	-	-	0,00	0,00	-
T8	10 705	10 707	10,09	110,1	0,00	91,59	-	-	0,00	0,00	-
T9	7 508	7 510	14,60	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			35,96								

- Data undefined due to calculation with octave data

Noise sensitive area: N Lomarakennus N (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
T1	8 779	8 782	12,71	110,1	0,00	89,87	-	-	0,00	0,00	-
T10	8 649	8 652	11,97	110,1	0,00	89,74	-	-	0,00	0,00	-
T11	10 073	10 075	9,90	110,1	0,00	91,07	-	-	0,00	0,00	-
T12	7 349	7 352	13,93	110,1	0,00	88,33	-	-	0,00	0,00	-
T13	7 785	7 788	12,96	110,1	0,00	88,83	-	-	0,00	0,00	-
T14	8 920	8 923	11,25	110,1	0,00	90,01	-	-	0,00	0,00	-
T15	9 939	9 941	9,82	110,1	0,00	90,95	-	-	0,00	0,00	-
T16	6 632	6 635	14,80	110,1	0,00	87,44	-	-	0,00	0,00	-
T17	8 172	8 175	12,18	110,1	0,00	89,25	-	-	0,00	0,00	-
T18	9 250	9 253	10,62	110,1	0,00	90,33	-	-	0,00	0,00	-
T19	6 113	6 117	15,75	110,1	0,00	86,73	-	-	0,00	0,00	-
T2	8 894	8 896	12,43	110,1	0,00	89,98	-	-	0,00	0,00	-
T20	7 232	7 235	13,60	110,1	0,00	88,19	-	-	0,00	0,00	-
T21	8 727	8 730	11,25	110,1	0,00	89,82	-	-	0,00	0,00	-
T22	6 413	6 417	15,04	110,1	0,00	87,15	-	-	0,00	0,00	-
T23	7 461	7 464	13,20	110,1	0,00	88,46	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T24	9 167	9 169	10,63	110,1	0,00	90,25	-	-	0,00	0,00	-
T25	6 781	6 784	14,33	110,1	0,00	87,63	-	-	0,00	0,00	-
T26	7 729	7 732	12,75	110,1	0,00	88,77	-	-	0,00	0,00	-
T27	8 983	8 986	10,87	110,1	0,00	90,07	-	-	0,00	0,00	-
T28	6 771	6 774	14,34	110,1	0,00	87,62	-	-	0,00	0,00	-
T29	8 108	8 111	12,15	110,1	0,00	89,18	-	-	0,00	0,00	-
T3	7 988	7 991	13,69	110,1	0,00	89,05	-	-	0,00	0,00	-
T30	3 392	3 398	23,59	110,1	0,00	81,62	-	-	0,00	0,00	-
T31	2 230	2 240	28,85	110,1	0,00	78,00	-	-	0,00	0,00	-
T32	4 465	4 470	19,95	110,1	0,00	84,01	-	-	0,00	0,00	-
T33	3 517	3 524	23,11	110,1	0,00	81,94	-	-	0,00	0,00	-
T34	2 390	2 400	28,00	110,1	0,00	78,60	-	-	0,00	0,00	-
T35	2 363	2 373	28,14	110,1	0,00	78,50	-	-	0,00	0,00	-
T36	5 107	5 112	18,14	110,1	0,00	85,17	-	-	0,00	0,00	-
T37	4 532	4 537	19,75	110,1	0,00	84,14	-	-	0,00	0,00	-
T38	3 666	3 672	22,57	110,1	0,00	82,30	-	-	0,00	0,00	-
T39	5 026	5 030	18,36	110,1	0,00	85,03	-	-	0,00	0,00	-
T4	8 720	8 723	12,40	110,1	0,00	89,81	-	-	0,00	0,00	-
T5	7 259	7 262	14,70	110,1	0,00	88,22	-	-	0,00	0,00	-
T6	8 428	8 431	12,52	110,1	0,00	89,52	-	-	0,00	0,00	-
T7	9 461	9 463	11,02	110,1	0,00	90,52	-	-	0,00	0,00	-
T8	10 335	10 338	9,77	110,1	0,00	91,29	-	-	0,00	0,00	-
T9	7 165	7 168	14,53	110,1	0,00	88,11	-	-	0,00	0,00	-
Sum			35,51								

- Data undefined due to calculation with octave data

Noise sensitive area: O Lomarakennus O (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
T1	8 734	8 737	12,50	110,1	0,00	89,83	-	-	0,00	0,00	-
T10	8 587	8 589	12,36	110,1	0,00	89,68	-	-	0,00	0,00	-
T11	10 009	10 011	10,24	110,1	0,00	91,01	-	-	0,00	0,00	-
T12	7 286	7 289	14,33	110,1	0,00	88,25	-	-	0,00	0,00	-
T13	7 719	7 722	13,24	110,1	0,00	88,75	-	-	0,00	0,00	-
T14	8 854	8 857	11,51	110,1	0,00	89,95	-	-	0,00	0,00	-
T15	9 872	9 875	10,08	110,1	0,00	90,89	-	-	0,00	0,00	-
T16	6 565	6 569	15,10	110,1	0,00	87,35	-	-	0,00	0,00	-
T17	8 105	8 108	12,47	110,1	0,00	89,18	-	-	0,00	0,00	-
T18	9 182	9 185	10,87	110,1	0,00	90,26	-	-	0,00	0,00	-
T19	6 045	6 048	15,94	110,1	0,00	86,63	-	-	0,00	0,00	-
T2	8 844	8 846	12,35	110,1	0,00	89,94	-	-	0,00	0,00	-
T20	7 163	7 166	13,71	110,1	0,00	88,11	-	-	0,00	0,00	-
T21	8 658	8 661	11,35	110,1	0,00	89,75	-	-	0,00	0,00	-
T22	6 343	6 347	15,19	110,1	0,00	87,05	-	-	0,00	0,00	-
T23	7 391	7 394	13,31	110,1	0,00	88,38	-	-	0,00	0,00	-
T24	9 097	9 099	10,72	110,1	0,00	90,18	-	-	0,00	0,00	-
T25	6 711	6 714	14,45	110,1	0,00	87,54	-	-	0,00	0,00	-
T26	7 659	7 662	12,86	110,1	0,00	88,69	-	-	0,00	0,00	-
T27	8 913	8 916	10,97	110,1	0,00	90,00	-	-	0,00	0,00	-
T28	6 703	6 707	14,46	110,1	0,00	87,53	-	-	0,00	0,00	-
T29	8 039	8 042	12,26	110,1	0,00	89,11	-	-	0,00	0,00	-
T3	7 936	7 939	13,68	110,1	0,00	89,00	-	-	0,00	0,00	-
T30	3 457	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T31	2 287	2 297	28,54	110,1	0,00	78,22	-	-	0,00	0,00	-
T32	4 529	4 534	19,76	110,1	0,00	84,13	-	-	0,00	0,00	-
T33	3 575	3 582	22,90	110,1	0,00	82,08	-	-	0,00	0,00	-
T34	2 431	2 440	27,79	110,1	0,00	78,75	-	-	0,00	0,00	-
T35	2 381	2 391	28,04	110,1	0,00	78,57	-	-	0,00	0,00	-
T36	5 166	5 171	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T37	4 584	4 589	19,60	110,1	0,00	84,23	-	-	0,00	0,00	-
T38	3 706	3 712	22,43	110,1	0,00	82,39	-	-	0,00	0,00	-
T39	5 070	5 075	18,24	110,1	0,00	85,11	-	-	0,00	0,00	-

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 12.57/3.5.584

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T4	8 664	8 667	12,54	110,1	0,00	89,76	-	-	0,00	0,00	-
T5	7 204	7 207	14,81	110,1	0,00	88,16	-	-	0,00	0,00	-
T6	8 368	8 371	12,80	110,1	0,00	89,46	-	-	0,00	0,00	-
T7	9 401	9 403	11,32	110,1	0,00	90,47	-	-	0,00	0,00	-
T8	10 274	10 276	10,11	110,1	0,00	91,24	-	-	0,00	0,00	-
T9	7 106	7 109	14,84	110,1	0,00	88,04	-	-	0,00	0,00	-
Sum			35,37								

- Data undefined due to calculation with octave data

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 12.57/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuonkangas_melu ja varjot_1.w2r (11)

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA 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]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited

Manufacturer 8.7.2022 USER 8.5.2023 15.45

Based on Document no.: 0127-1584 V01.

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	214,0	8,0	110,1	No	91,5	100,2	104,1	105,0	103,7	99,3	91,6	80,8

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Asuinrakennus B (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 12.57/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 12.57/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard:

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

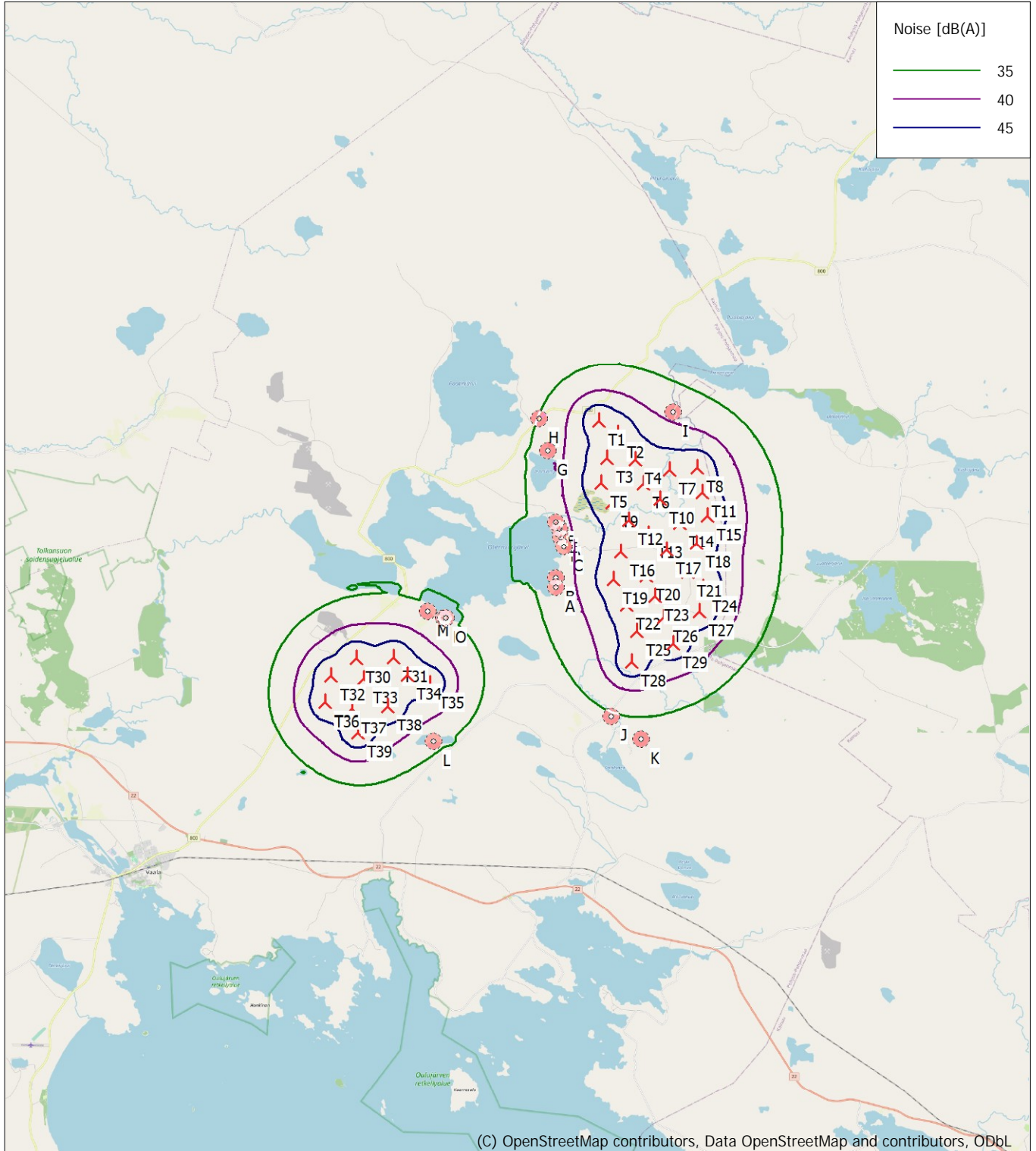
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058



🚧 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

Liite 2. Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 - Hankevaihtoehto 2

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuo

Area type with hard ground: Vesistö

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

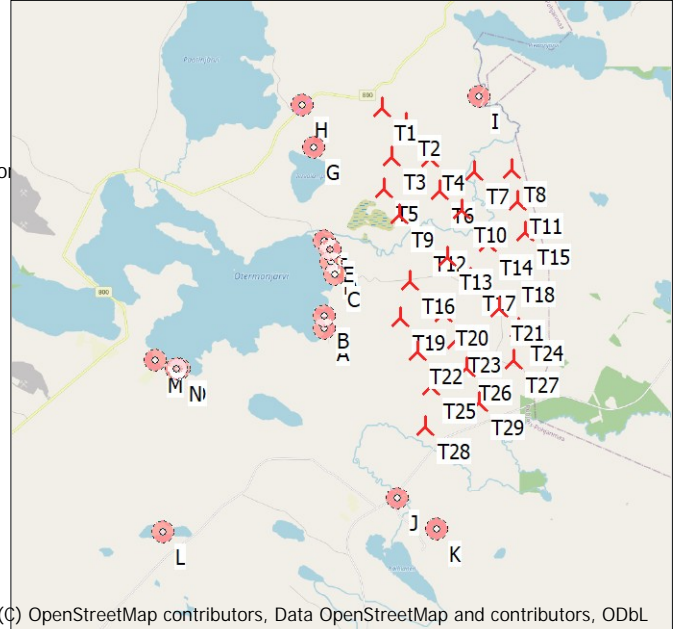
Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0,0 dB(A)



All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	WTG type			Noise data				Wind speed [m/s]	LwA,ref [dB(A)]	
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator			Name
T1	508 282	7 174 861	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T10	510 426	7 172 148	146,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T11	511 902	7 172 395	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T12	509 346	7 171 412	143,2	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T13	510 056	7 170 927	146,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T14	511 130	7 171 298	148,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T15	512 122	7 171 560	159,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T16	509 073	7 170 275	147,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T17	510 668	7 170 368	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T18	511 731	7 170 576	165,0	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T19	508 820	7 169 317	148,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T2	508 948	7 174 439	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T20	509 941	7 169 425	149,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T21	511 434	7 169 585	157,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T22	509 256	7 168 427	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T23	510 283	7 168 708	149,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T24	511 959	7 169 067	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T25	509 625	7 167 494	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T26	510 589	7 167 991	147,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T27	511 839	7 168 207	148,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T28	509 456	7 166 427	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T29	510 920	7 167 074	142,1	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T3	508 557	7 173 555	151,9	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T4	509 564	7 173 532	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T5	508 354	7 172 700	144,8	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T6	509 849	7 172 666	152,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T7	510 753	7 173 171	147,6	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T8	511 738	7 173 247	154,9	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1
T9	508 756	7 172 027	142,5	VESTAS V172-7.2 HH214 72...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-0S - 07-2022	8,0	110,1

Calculation Results

Sound level

Noise sensitive area

No.	Name	East	North	Z	Immission height	Demands Noise	Sound level From WTGs	Distance to noise demand
				[m]	[m]	[dB(A)]	[dB(A)]	[m]
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	4,0	40,0	37,0	689
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	4,0	40,0	37,1	672
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	4,0	40,0	38,4	400
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	4,0	40,0	38,3	442
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	4,0	40,0	38,3	425
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	4,0	40,0	38,0	489
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	4,0	40,0	37,3	578

To be continued on next page...

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058

...continued from previous page

No.	Name	East	North	Z [m]	Immission height [m]	Demands		Distance to noise demand [m]
						Noise [dB(A)]	Sound level From WTGs [dB(A)]	
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4,0	40,0	35,1	983
I	Lomarakennus I	510 890	7 175 161	155,0	4,0	40,0	38,6	334
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4,0	40,0	34,2	1 036
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4,0	40,0	31,9	1 740
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	4,0	40,0	25,0	6 449
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4,0	40,0	27,6	5 279
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4,0	40,0	27,5	4 777
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4,0	40,0	27,7	4 708

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise 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 Lomarakennus A (Syvälahti)

Wind speed: 8,0 m/s

WTG

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]
T1	6 000	6 004	15,94	110,1	0,00	86,57	-	-	0,00	0,00	-
T10	4 760	4 765	19,09	110,1	0,00	84,56	-	-	0,00	0,00	-
T11	6 091	6 094	15,72	110,1	0,00	86,70	-	-	0,00	0,00	-
T12	3 465	3 471	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T13	3 747	3 753	22,28	110,1	0,00	82,49	-	-	0,00	0,00	-
T14	4 867	4 872	18,79	110,1	0,00	84,75	-	-	0,00	0,00	-
T15	5 872	5 876	16,22	110,1	0,00	86,38	-	-	0,00	0,00	-
T16	2 570	2 579	27,10	110,1	0,00	79,23	-	-	0,00	0,00	-
T17	4 073	4 079	21,18	110,1	0,00	83,21	-	-	0,00	0,00	-
T18	5 148	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T19	2 022	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 802	5 806	16,39	110,1	0,00	86,28	-	-	0,00	0,00	-
T20	3 148	3 155	24,55	110,1	0,00	80,98	-	-	0,00	0,00	-
T21	4 649	4 654	19,41	110,1	0,00	84,36	-	-	0,00	0,00	-
T22	2 516	2 525	27,37	110,1	0,00	79,04	-	-	0,00	0,00	-
T23	3 482	3 489	23,24	110,1	0,00	81,85	-	-	0,00	0,00	-
T24	5 142	5 147	18,04	110,1	0,00	85,23	-	-	0,00	0,00	-
T25	3 207	3 214	24,31	110,1	0,00	81,14	-	-	0,00	0,00	-
T26	3 916	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	5 092	5 096	18,18	110,1	0,00	85,14	-	-	0,00	0,00	-
T28	3 716	3 722	22,40	110,1	0,00	82,42	-	-	0,00	0,00	-
T29	4 551	4 556	19,70	110,1	0,00	84,17	-	-	0,00	0,00	-
T3	4 836	4 841	18,88	110,1	0,00	84,70	-	-	0,00	0,00	-
T4	5 263	5 268	17,73	110,1	0,00	85,43	-	-	0,00	0,00	-
T5	3 967	3 973	21,53	110,1	0,00	82,98	-	-	0,00	0,00	-
T6	4 724	4 729	19,19	110,1	0,00	84,50	-	-	0,00	0,00	-
T7	5 704	5 708	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T8	6 472	6 476	14,87	110,1	0,00	87,23	-	-	0,00	0,00	-
T9	3 559	3 565	22,96	110,1	0,00	82,04	-	-	0,00	0,00	-
Sum			36,98								

- Data undefined due to calculation with octave data

Noise sensitive area: B Asuinrakennus B (Syvälahti)

Wind speed: 8,0 m/s

WTG

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]
T1	5 708	5 712	16,64	110,1	0,00	86,14	-	-	0,00	0,00	-
T10	4 581	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T11	5 943	5 947	16,06	110,1	0,00	86,49	-	-	0,00	0,00	-
T12	3 277	3 284	24,03	110,1	0,00	81,33	-	-	0,00	0,00	-
T13	3 619	3 625	22,74	110,1	0,00	82,19	-	-	0,00	0,00	-
T14	4 750	4 755	19,12	110,1	0,00	84,54	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T15	5 764	5 769	16,48	110,1	0,00	86,22	-	-	0,00	0,00	-
T16	2 455	2 465	27,67	110,1	0,00	78,84	-	-	0,00	0,00	-
T17	4 001	4 007	21,42	110,1	0,00	83,06	-	-	0,00	0,00	-
T18	5 082	5 088	18,20	110,1	0,00	85,13	-	-	0,00	0,00	-
T19	2 021	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 525	5 530	17,06	110,1	0,00	85,85	-	-	0,00	0,00	-
T20	3 143	3 151	24,56	110,1	0,00	80,97	-	-	0,00	0,00	-
T21	4 641	4 646	19,43	110,1	0,00	84,34	-	-	0,00	0,00	-
T22	2 624	2 633	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T23	3 542	3 549	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T24	5 168	5 172	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T25	3 380	3 387	23,63	110,1	0,00	81,60	-	-	0,00	0,00	-
T26	4 026	4 032	21,34	110,1	0,00	83,11	-	-	0,00	0,00	-
T27	5 168	5 173	17,97	110,1	0,00	85,27	-	-	0,00	0,00	-
T28	3 949	3 955	21,59	110,1	0,00	82,94	-	-	0,00	0,00	-
T29	4 707	4 712	19,24	110,1	0,00	84,46	-	-	0,00	0,00	-
T3	4 558	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T4	5 014	5 019	18,39	110,1	0,00	85,01	-	-	0,00	0,00	-
T5	3 694	3 700	22,47	110,1	0,00	82,36	-	-	0,00	0,00	-
T6	4 506	4 511	19,83	110,1	0,00	84,09	-	-	0,00	0,00	-
T7	5 500	5 504	17,12	110,1	0,00	85,81	-	-	0,00	0,00	-
T8	6 292	6 296	15,27	110,1	0,00	86,98	-	-	0,00	0,00	-
T9	3 317	3 323	23,88	110,1	0,00	81,43	-	-	0,00	0,00	-
Sum			37,10								

- Data undefined due to calculation with octave data

Noise sensitive area: C Lomarakennus C (Mutalahti)

Wind speed: 8,0 m/s

WTG

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]
T1	4 594	4 600	19,57	110,1	0,00	84,25	-	-	0,00	0,00	-
T10	3 787	3 794	22,14	110,1	0,00	82,58	-	-	0,00	0,00	-
T11	5 236	5 240	17,80	110,1	0,00	85,39	-	-	0,00	0,00	-
T12	2 497	2 506	27,46	110,1	0,00	78,98	-	-	0,00	0,00	-
T13	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T14	4 173	4 179	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T15	5 198	5 203	17,89	110,1	0,00	85,33	-	-	0,00	0,00	-
T16	2 032	2 044	29,96	110,1	0,00	77,21	-	-	0,00	0,00	-
T17	3 622	3 629	22,73	110,1	0,00	82,19	-	-	0,00	0,00	-
T18	4 686	4 692	19,30	110,1	0,00	84,43	-	-	0,00	0,00	-
T19	2 097	2 108	29,58	110,1	0,00	77,48	-	-	0,00	0,00	-
T2	4 431	4 437	20,05	110,1	0,00	83,94	-	-	0,00	0,00	-
T20	3 066	3 074	24,88	110,1	0,00	80,75	-	-	0,00	0,00	-
T21	4 469	4 475	19,94	110,1	0,00	84,01	-	-	0,00	0,00	-
T22	2 986	2 994	25,22	110,1	0,00	80,52	-	-	0,00	0,00	-
T23	3 668	3 675	22,56	110,1	0,00	82,30	-	-	0,00	0,00	-
T24	5 099	5 104	18,16	110,1	0,00	85,16	-	-	0,00	0,00	-
T25	3 912	3 917	21,88	110,1	0,00	82,86	-	-	0,00	0,00	-
T26	4 304	4 310	20,45	110,1	0,00	83,69	-	-	0,00	0,00	-
T27	5 286	5 290	17,67	110,1	0,00	85,47	-	-	0,00	0,00	-
T28	4 677	4 682	19,80	110,1	0,00	84,41	-	-	0,00	0,00	-
T29	5 129	5 133	18,08	110,1	0,00	85,21	-	-	0,00	0,00	-
T3	3 465	3 472	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T4	3 990	3 996	21,45	110,1	0,00	83,03	-	-	0,00	0,00	-
T5	2 614	2 623	26,89	110,1	0,00	79,38	-	-	0,00	0,00	-
T6	3 581	3 588	22,88	110,1	0,00	82,10	-	-	0,00	0,00	-
T7	4 606	4 611	19,54	110,1	0,00	84,28	-	-	0,00	0,00	-
T8	5 469	5 474	17,20	110,1	0,00	85,77	-	-	0,00	0,00	-
T9	2 335	2 344	28,29	110,1	0,00	78,40	-	-	0,00	0,00	-
Sum			38,43								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s
Noise sensitive area: D Lomarakennus D (Mutaniemi)

Wind speed: 8,0 m/s
WTG

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]
T1	4 300	4 306	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T10	3 720	3 726	22,38	110,1	0,00	82,43	-	-	0,00	0,00	-
T11	5 193	5 197	17,91	110,1	0,00	85,32	-	-	0,00	0,00	-
T12	2 460	2 469	27,65	110,1	0,00	78,85	-	-	0,00	0,00	-
T13	3 088	3 096	24,79	110,1	0,00	80,82	-	-	0,00	0,00	-
T14	4 192	4 198	20,80	110,1	0,00	83,46	-	-	0,00	0,00	-
T15	5 211	5 216	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T16	2 157	2 168	29,24	110,1	0,00	77,72	-	-	0,00	0,00	-
T17	3 717	3 724	22,39	110,1	0,00	82,42	-	-	0,00	0,00	-
T18	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T19	2 348	2 358	28,22	110,1	0,00	78,45	-	-	0,00	0,00	-
T2	4 172	4 178	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T20	3 258	3 265	24,10	110,1	0,00	81,28	-	-	0,00	0,00	-
T21	4 615	4 621	19,51	110,1	0,00	84,29	-	-	0,00	0,00	-
T22	3 268	3 276	24,06	110,1	0,00	81,31	-	-	0,00	0,00	-
T23	3 898	3 904	21,76	110,1	0,00	82,83	-	-	0,00	0,00	-
T24	5 268	5 273	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T25	4 212	4 217	20,74	110,1	0,00	83,50	-	-	0,00	0,00	-
T26	4 559	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T27	5 499	5 503	17,13	110,1	0,00	85,81	-	-	0,00	0,00	-
T28	4 999	5 003	18,43	110,1	0,00	84,99	-	-	0,00	0,00	-
T29	5 405	5 409	17,36	110,1	0,00	85,66	-	-	0,00	0,00	-
T3	3 209	3 216	24,30	110,1	0,00	81,15	-	-	0,00	0,00	-
T4	3 792	3 798	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
T5	2 378	2 387	28,06	110,1	0,00	78,56	-	-	0,00	0,00	-
T6	3 448	3 455	23,37	110,1	0,00	81,77	-	-	0,00	0,00	-
T7	4 482	4 487	19,90	110,1	0,00	84,04	-	-	0,00	0,00	-
T8	5 374	5 378	17,44	110,1	0,00	85,61	-	-	0,00	0,00	-
T9	2 185	2 195	29,09	110,1	0,00	77,83	-	-	0,00	0,00	-
Sum			38,29								

- Data undefined due to calculation with octave data

Noise sensitive area: E Asuinrakennus E (Alanko)

Wind speed: 8,0 m/s
WTG

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]
T1	3 999	4 006	21,42	110,1	0,00	83,05	-	-	0,00	0,00	-
T10	3 660	3 666	22,60	110,1	0,00	82,28	-	-	0,00	0,00	-
T11	5 149	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T12	2 446	2 455	27,72	110,1	0,00	78,80	-	-	0,00	0,00	-
T13	3 142	3 149	24,57	110,1	0,00	80,96	-	-	0,00	0,00	-
T14	4 216	4 221	20,72	110,1	0,00	83,51	-	-	0,00	0,00	-
T15	5 224	5 228	17,83	110,1	0,00	85,37	-	-	0,00	0,00	-
T16	2 307	2 317	28,43	110,1	0,00	78,30	-	-	0,00	0,00	-
T17	3 820	3 826	22,03	110,1	0,00	82,66	-	-	0,00	0,00	-
T18	4 841	4 846	18,86	110,1	0,00	84,71	-	-	0,00	0,00	-
T19	2 607	2 616	26,93	110,1	0,00	79,35	-	-	0,00	0,00	-
T2	3 906	3 913	21,73	110,1	0,00	82,85	-	-	0,00	0,00	-
T20	3 456	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T21	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T22	3 551	3 558	22,99	110,1	0,00	82,02	-	-	0,00	0,00	-
T23	4 128	4 134	21,00	110,1	0,00	83,33	-	-	0,00	0,00	-
T24	5 435	5 439	17,29	110,1	0,00	85,71	-	-	0,00	0,00	-
T25	4 509	4 514	19,82	110,1	0,00	84,09	-	-	0,00	0,00	-
T26	4 811	4 816	18,95	110,1	0,00	84,65	-	-	0,00	0,00	-
T27	5 709	5 713	16,61	110,1	0,00	86,14	-	-	0,00	0,00	-
T28	5 318	5 322	17,58	110,1	0,00	85,52	-	-	0,00	0,00	-
T29	5 677	5 680	16,69	110,1	0,00	86,09	-	-	0,00	0,00	-
T3	2 950	2 958	25,37	110,1	0,00	80,42	-	-	0,00	0,00	-
T4	3 593	3 599	22,84	110,1	0,00	82,12	-	-	0,00	0,00	-
T5	2 149	2 159	29,29	110,1	0,00	77,68	-	-	0,00	0,00	-
T6	3 322	3 329	23,85	110,1	0,00	81,45	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T7	4 358	4 363	20,28	110,1	0,00	83,80	-	-	0,00	0,00	-
T8	5 275	5 280	17,69	110,1	0,00	85,45	-	-	0,00	0,00	-
T9	2 057	2 068	29,82	110,1	0,00	77,31	-	-	0,00	0,00	-
Sum			38,31								

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Joensuu)

Wind speed: 8,0 m/s

WTG

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]
T1	3 835	3 841	21,98	110,1	0,00	82,69	-	-	0,00	0,00	-
T10	3 727	3 733	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T11	5 222	5 227	17,83	110,1	0,00	85,36	-	-	0,00	0,00	-
T12	2 557	2 565	27,17	110,1	0,00	79,18	-	-	0,00	0,00	-
T13	3 291	3 297	23,98	110,1	0,00	81,36	-	-	0,00	0,00	-
T14	4 340	4 345	20,34	110,1	0,00	83,76	-	-	0,00	0,00	-
T15	5 338	5 342	17,53	110,1	0,00	85,55	-	-	0,00	0,00	-
T16	2 514	2 523	27,38	110,1	0,00	79,04	-	-	0,00	0,00	-
T17	3 995	4 001	21,44	110,1	0,00	83,04	-	-	0,00	0,00	-
T18	4 998	5 003	18,43	110,1	0,00	84,98	-	-	0,00	0,00	-
T19	2 857	2 865	25,78	110,1	0,00	80,14	-	-	0,00	0,00	-
T2	3 786	3 793	22,15	110,1	0,00	82,58	-	-	0,00	0,00	-
T20	3 682	3 688	22,52	110,1	0,00	82,34	-	-	0,00	0,00	-
T21	4 960	4 965	18,53	110,1	0,00	84,92	-	-	0,00	0,00	-
T22	3 807	3 813	22,08	110,1	0,00	82,63	-	-	0,00	0,00	-
T23	4 366	4 372	20,25	110,1	0,00	83,81	-	-	0,00	0,00	-
T24	5 642	5 646	16,77	110,1	0,00	86,03	-	-	0,00	0,00	-
T25	4 768	4 773	19,07	110,1	0,00	84,58	-	-	0,00	0,00	-
T26	5 057	5 061	18,27	110,1	0,00	85,09	-	-	0,00	0,00	-
T27	5 936	5 940	16,07	110,1	0,00	86,48	-	-	0,00	0,00	-
T28	5 579	5 583	16,93	110,1	0,00	85,94	-	-	0,00	0,00	-
T29	5 929	5 933	16,09	110,1	0,00	86,46	-	-	0,00	0,00	-
T3	2 843	2 851	25,84	110,1	0,00	80,10	-	-	0,00	0,00	-
T4	3 543	3 550	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T5	2 081	2 091	29,68	110,1	0,00	77,41	-	-	0,00	0,00	-
T6	3 339	3 345	23,79	110,1	0,00	81,49	-	-	0,00	0,00	-
T7	4 371	4 376	20,24	110,1	0,00	83,82	-	-	0,00	0,00	-
T8	5 307	5 312	17,61	110,1	0,00	85,50	-	-	0,00	0,00	-
T9	2 087	2 097	29,65	110,1	0,00	77,43	-	-	0,00	0,00	-
Sum			38,00								

- Data undefined due to calculation with octave data

Noise sensitive area: G Asuinrakennus G (Heiniahö)

Wind speed: 8,0 m/s

WTG

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]
T1	2 060	2 071	29,79	110,1	0,00	77,33	-	-	0,00	0,00	-
T10	4 264	4 269	20,57	110,1	0,00	83,61	-	-	0,00	0,00	-
T11	5 583	5 587	16,92	110,1	0,00	85,94	-	-	0,00	0,00	-
T12	3 725	3 731	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T13	4 582	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T14	5 269	5 274	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T15	6 057	6 061	15,79	110,1	0,00	86,65	-	-	0,00	0,00	-
T16	4 379	4 384	20,25	110,1	0,00	83,84	-	-	0,00	0,00	-
T17	5 410	5 414	17,35	110,1	0,00	85,67	-	-	0,00	0,00	-
T18	6 152	6 157	15,58	110,1	0,00	86,79	-	-	0,00	0,00	-
T19	5 065	5 069	18,30	110,1	0,00	85,10	-	-	0,00	0,00	-
T2	2 521	2 531	27,34	110,1	0,00	79,07	-	-	0,00	0,00	-
T20	5 581	5 585	16,94	110,1	0,00	85,94	-	-	0,00	0,00	-
T21	6 500	6 504	14,81	110,1	0,00	87,26	-	-	0,00	0,00	-
T22	6 055	6 059	15,84	110,1	0,00	86,65	-	-	0,00	0,00	-
T23	6 358	6 361	15,14	110,1	0,00	87,07	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T24	7 236	7 239	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T25	7 055	7 058	13,88	110,1	0,00	87,97	-	-	0,00	0,00	-
T26	7 119	7 122	13,75	110,1	0,00	88,05	-	-	0,00	0,00	-
T27	7 745	7 748	12,69	110,1	0,00	88,78	-	-	0,00	0,00	-
T28	7 962	7 964	12,41	110,1	0,00	89,02	-	-	0,00	0,00	-
T29	8 064	8 066	12,23	110,1	0,00	89,13	-	-	0,00	0,00	-
T3	2 071	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T4	3 074	3 081	24,85	110,1	0,00	80,77	-	-	0,00	0,00	-
T5	2 163	2 173	29,21	110,1	0,00	77,74	-	-	0,00	0,00	-
T6	3 538	3 545	23,04	110,1	0,00	81,99	-	-	0,00	0,00	-
T7	4 299	4 304	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T8	5 266	5 270	17,72	110,1	0,00	85,44	-	-	0,00	0,00	-
T9	2 879	2 887	25,69	110,1	0,00	80,21	-	-	0,00	0,00	-
Sum			37,31								

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Wind speed: 8,0 m/s

WTG

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]
T1	2 090	2 102	29,62	110,1	0,00	77,45	-	-	0,00	0,00	-
T10	5 057	5 061	18,27	110,1	0,00	85,08	-	-	0,00	0,00	-
T11	6 241	6 244	15,38	110,1	0,00	86,91	-	-	0,00	0,00	-
T12	4 712	4 716	19,23	110,1	0,00	84,47	-	-	0,00	0,00	-
T13	5 551	5 555	17,00	110,1	0,00	85,89	-	-	0,00	0,00	-
T14	6 120	6 123	15,65	110,1	0,00	86,74	-	-	0,00	0,00	-
T15	6 813	6 816	14,24	110,1	0,00	87,67	-	-	0,00	0,00	-
T16	5 460	5 464	17,22	110,1	0,00	85,75	-	-	0,00	0,00	-
T17	6 379	6 383	15,08	110,1	0,00	87,10	-	-	0,00	0,00	-
T18	7 035	7 038	13,85	110,1	0,00	87,95	-	-	0,00	0,00	-
T19	6 182	6 186	15,52	110,1	0,00	86,83	-	-	0,00	0,00	-
T2	2 797	2 805	26,05	110,1	0,00	79,96	-	-	0,00	0,00	-
T20	6 647	6 650	14,54	110,1	0,00	87,46	-	-	0,00	0,00	-
T21	7 475	7 478	13,12	110,1	0,00	88,48	-	-	0,00	0,00	-
T22	7 173	7 176	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T23	7 432	7 435	13,19	110,1	0,00	88,43	-	-	0,00	0,00	-
T24	8 212	8 214	11,96	110,1	0,00	89,29	-	-	0,00	0,00	-
T25	8 175	8 177	12,02	110,1	0,00	89,25	-	-	0,00	0,00	-
T26	8 201	8 203	11,97	110,1	0,00	89,28	-	-	0,00	0,00	-
T27	8 768	8 770	11,14	110,1	0,00	89,86	-	-	0,00	0,00	-
T28	9 092	9 094	10,73	110,1	0,00	90,18	-	-	0,00	0,00	-
T29	9 154	9 157	10,60	110,1	0,00	90,23	-	-	0,00	0,00	-
T3	2 728	2 736	26,36	110,1	0,00	79,74	-	-	0,00	0,00	-
T4	3 644	3 650	22,65	110,1	0,00	82,25	-	-	0,00	0,00	-
T5	3 094	3 100	24,77	110,1	0,00	80,83	-	-	0,00	0,00	-
T6	4 292	4 297	20,49	110,1	0,00	83,66	-	-	0,00	0,00	-
T7	4 883	4 887	18,75	110,1	0,00	84,78	-	-	0,00	0,00	-
T8	5 791	5 795	16,41	110,1	0,00	86,26	-	-	0,00	0,00	-
T9	3 860	3 866	21,89	110,1	0,00	82,74	-	-	0,00	0,00	-
Sum			35,11								

- Data undefined due to calculation with octave data

Noise sensitive area: I Lomarakennus I

Wind speed: 8,0 m/s

WTG

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]
T1	2 625	2 634	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T10	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T11	2 945	2 952	25,40	110,1	0,00	80,40	-	-	0,00	0,00	-
T12	4 055	4 059	21,25	110,1	0,00	83,17	-	-	0,00	0,00	-
T13	4 315	4 320	20,41	110,1	0,00	83,71	-	-	0,00	0,00	-
T14	3 870	3 876	21,86	110,1	0,00	82,77	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T15	3 806	3 813	22,08	110,1	0,00	82,62	-	-	0,00	0,00	-
T16	5 213	5 217	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T17	4 798	4 802	18,99	110,1	0,00	84,63	-	-	0,00	0,00	-
T18	4 661	4 667	19,37	110,1	0,00	84,38	-	-	0,00	0,00	-
T19	6 200	6 203	15,47	110,1	0,00	86,85	-	-	0,00	0,00	-
T2	2 072	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T20	5 814	5 818	16,36	110,1	0,00	86,30	-	-	0,00	0,00	-
T21	5 603	5 607	16,87	110,1	0,00	85,97	-	-	0,00	0,00	-
T22	6 929	6 932	14,04	110,1	0,00	87,82	-	-	0,00	0,00	-
T23	6 481	6 485	14,86	110,1	0,00	87,24	-	-	0,00	0,00	-
T24	6 187	6 190	15,50	110,1	0,00	86,83	-	-	0,00	0,00	-
T25	7 771	7 773	12,64	110,1	0,00	88,81	-	-	0,00	0,00	-
T26	7 177	7 179	13,61	110,1	0,00	88,12	-	-	0,00	0,00	-
T27	7 019	7 022	13,88	110,1	0,00	87,93	-	-	0,00	0,00	-
T28	8 851	8 853	11,02	110,1	0,00	89,94	-	-	0,00	0,00	-
T29	8 087	8 089	12,15	110,1	0,00	89,16	-	-	0,00	0,00	-
T3	2 832	2 840	25,89	110,1	0,00	80,07	-	-	0,00	0,00	-
T4	2 100	2 111	29,57	110,1	0,00	77,49	-	-	0,00	0,00	-
T5	3 534	3 539	23,06	110,1	0,00	81,98	-	-	0,00	0,00	-
T6	2 703	2 711	26,48	110,1	0,00	79,66	-	-	0,00	0,00	-
T7	1 994	2 005	30,19	110,1	0,00	77,04	-	-	0,00	0,00	-
T8	2 093	2 104	29,61	110,1	0,00	77,46	-	-	0,00	0,00	-
T9	3 792	3 797	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
Sum			38,60								

- Data undefined due to calculation with octave data

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Wind speed: 8,0 m/s

WTG

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]
T1	10 347	10 350	9,04	110,1	0,00	91,30	-	-	0,00	0,00	-
T10	7 801	7 804	12,59	110,1	0,00	88,85	-	-	0,00	0,00	-
T11	8 471	8 474	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T12	6 911	6 915	14,07	110,1	0,00	87,80	-	-	0,00	0,00	-
T13	6 530	6 534	14,75	110,1	0,00	87,30	-	-	0,00	0,00	-
T14	7 173	7 177	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T15	7 793	7 797	12,60	110,1	0,00	88,84	-	-	0,00	0,00	-
T16	5 758	5 762	16,49	110,1	0,00	86,21	-	-	0,00	0,00	-
T17	6 144	6 149	15,59	110,1	0,00	86,78	-	-	0,00	0,00	-
T18	6 738	6 742	14,37	110,1	0,00	87,58	-	-	0,00	0,00	-
T19	4 792	4 798	19,00	110,1	0,00	84,62	-	-	0,00	0,00	-
T2	9 915	9 918	9,59	110,1	0,00	90,93	-	-	0,00	0,00	-
T20	5 038	5 043	18,32	110,1	0,00	85,05	-	-	0,00	0,00	-
T21	5 719	5 724	16,58	110,1	0,00	86,15	-	-	0,00	0,00	-
T22	3 932	3 939	21,65	110,1	0,00	82,91	-	-	0,00	0,00	-
T23	4 449	4 455	20,00	110,1	0,00	83,98	-	-	0,00	0,00	-
T24	5 551	5 556	16,99	110,1	0,00	85,90	-	-	0,00	0,00	-
T25	3 090	3 098	24,78	110,1	0,00	80,82	-	-	0,00	0,00	-
T26	3 915	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	4 795	4 800	18,99	110,1	0,00	84,62	-	-	0,00	0,00	-
T28	2 023	2 035	30,01	110,1	0,00	77,17	-	-	0,00	0,00	-
T29	3 336	3 343	23,80	110,1	0,00	81,48	-	-	0,00	0,00	-
T3	9 032	9 035	10,77	110,1	0,00	90,12	-	-	0,00	0,00	-
T4	9 042	9 045	10,75	110,1	0,00	90,13	-	-	0,00	0,00	-
T5	8 186	8 189	12,00	110,1	0,00	89,26	-	-	0,00	0,00	-
T6	8 213	8 216	11,95	110,1	0,00	89,29	-	-	0,00	0,00	-
T7	8 871	8 874	10,99	110,1	0,00	89,96	-	-	0,00	0,00	-
T8	9 214	9 217	10,51	110,1	0,00	90,29	-	-	0,00	0,00	-
T9	7 502	7 505	13,07	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			34,17								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: K Asuinrakennus K (Takalo)

Wind speed: 8,0 m/s

WTG

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]
T1	11 268	11 270	7,95	110,1	0,00	92,04	-	-	0,00	0,00	-
T10	8 473	8 476	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T11	8 946	8 949	10,89	110,1	0,00	90,04	-	-	0,00	0,00	-
T12	7 729	7 732	12,70	110,1	0,00	88,77	-	-	0,00	0,00	-
T13	7 234	7 238	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T14	7 715	7 719	12,73	110,1	0,00	88,75	-	-	0,00	0,00	-
T15	8 196	8 199	11,98	110,1	0,00	89,28	-	-	0,00	0,00	-
T16	6 619	6 623	14,59	110,1	0,00	87,42	-	-	0,00	0,00	-
T17	6 726	6 730	14,39	110,1	0,00	87,56	-	-	0,00	0,00	-
T18	7 142	7 147	13,67	110,1	0,00	88,08	-	-	0,00	0,00	-
T19	5 706	5 711	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T2	10 776	10 779	8,52	110,1	0,00	91,65	-	-	0,00	0,00	-
T20	5 729	5 734	16,56	110,1	0,00	86,17	-	-	0,00	0,00	-
T21	6 108	6 112	15,68	110,1	0,00	86,72	-	-	0,00	0,00	-
T22	4 762	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T23	5 033	5 038	18,33	110,1	0,00	85,05	-	-	0,00	0,00	-
T24	5 785	5 789	16,43	110,1	0,00	86,25	-	-	0,00	0,00	-
T25	3 801	3 808	22,09	110,1	0,00	82,61	-	-	0,00	0,00	-
T26	4 364	4 370	20,26	110,1	0,00	83,81	-	-	0,00	0,00	-
T27	4 946	4 951	18,57	110,1	0,00	84,89	-	-	0,00	0,00	-
T28	2 753	2 761	26,25	110,1	0,00	79,82	-	-	0,00	0,00	-
T29	3 555	3 562	22,97	110,1	0,00	82,03	-	-	0,00	0,00	-
T3	9 937	9 939	9,56	110,1	0,00	90,95	-	-	0,00	0,00	-
T4	9 838	9 841	9,69	110,1	0,00	90,86	-	-	0,00	0,00	-
T5	9 120	9 123	10,64	110,1	0,00	90,20	-	-	0,00	0,00	-
T6	8 970	8 972	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-
T7	9 521	9 524	10,10	110,1	0,00	90,58	-	-	0,00	0,00	-
T8	9 743	9 746	9,81	110,1	0,00	90,78	-	-	0,00	0,00	-
T9	8 396	8 399	11,68	110,1	0,00	89,48	-	-	0,00	0,00	-
Sum			31,91								

- Data undefined due to calculation with octave data

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Wind speed: 8,0 m/s

WTG

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]
T1	12 636	12 638	7,85	110,1	0,00	93,03	-	-	0,00	0,00	-
T10	11 638	11 640	8,74	110,1	0,00	92,32	-	-	0,00	0,00	-
T11	12 857	12 859	7,39	110,1	0,00	93,18	-	-	0,00	0,00	-
T12	10 368	10 370	10,26	110,1	0,00	91,32	-	-	0,00	0,00	-
T13	10 507	10 509	10,04	110,1	0,00	91,43	-	-	0,00	0,00	-
T14	11 547	11 549	8,81	110,1	0,00	92,25	-	-	0,00	0,00	-
T15	12 471	12 473	7,78	110,1	0,00	92,92	-	-	0,00	0,00	-
T16	9 350	9 352	11,55	110,1	0,00	90,42	-	-	0,00	0,00	-
T17	10 591	10 594	9,92	110,1	0,00	91,50	-	-	0,00	0,00	-
T18	11 555	11 557	8,75	110,1	0,00	92,26	-	-	0,00	0,00	-
T19	8 505	8 507	12,74	110,1	0,00	89,60	-	-	0,00	0,00	-
T2	12 590	12 592	7,85	110,1	0,00	93,00	-	-	0,00	0,00	-
T20	9 434	9 436	11,38	110,1	0,00	90,50	-	-	0,00	0,00	-
T21	10 738	10 741	9,69	110,1	0,00	91,62	-	-	0,00	0,00	-
T22	8 288	8 291	13,00	110,1	0,00	89,37	-	-	0,00	0,00	-
T23	9 295	9 298	11,54	110,1	0,00	90,37	-	-	0,00	0,00	-
T24	10 912	10 914	9,46	110,1	0,00	91,76	-	-	0,00	0,00	-
T25	8 107	8 110	13,23	110,1	0,00	89,18	-	-	0,00	0,00	-
T26	9 191	9 194	11,65	110,1	0,00	90,27	-	-	0,00	0,00	-
T27	10 402	10 404	10,05	110,1	0,00	91,34	-	-	0,00	0,00	-
T28	7 498	7 501	14,15	110,1	0,00	88,50	-	-	0,00	0,00	-
T29	9 098	9 101	11,74	110,1	0,00	90,18	-	-	0,00	0,00	-
T3	11 631	11 633	8,89	110,1	0,00	92,31	-	-	0,00	0,00	-
T4	12 167	12 169	8,25	110,1	0,00	92,71	-	-	0,00	0,00	-
T5	10 799	10 801	9,84	110,1	0,00	91,67	-	-	0,00	0,00	-
T6	11 650	11 653	8,75	110,1	0,00	92,33	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T7	12 619	12 621	7,69	110,1	0,00	93,02	-	-	0,00	0,00	-
T8	13 338	13 340	6,92	110,1	0,00	93,50	-	-	0,00	0,00	-
T9	10 475	10 477	10,19	110,1	0,00	91,40	-	-	0,00	0,00	-
Sum			24,99								

- Data undefined due to calculation with octave data

Noise sensitive area: M Lomarakennus M (Haukilahti)

Wind speed: 8,0 m/s

WTG

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]
T1	8 960	8 963	12,33	110,1	0,00	90,05	-	-	0,00	0,00	-
T10	9 035	9 038	12,29	110,1	0,00	90,12	-	-	0,00	0,00	-
T11	10 479	10 481	10,37	110,1	0,00	91,41	-	-	0,00	0,00	-
T12	7 744	7 747	14,21	110,1	0,00	88,78	-	-	0,00	0,00	-
T13	8 221	8 224	13,43	110,1	0,00	89,30	-	-	0,00	0,00	-
T14	9 357	9 360	11,80	110,1	0,00	90,43	-	-	0,00	0,00	-
T15	10 380	10 383	10,44	110,1	0,00	91,33	-	-	0,00	0,00	-
T16	7 082	7 086	15,11	110,1	0,00	88,01	-	-	0,00	0,00	-
T17	8 642	8 645	12,63	110,1	0,00	89,74	-	-	0,00	0,00	-
T18	9 724	9 726	11,12	110,1	0,00	90,76	-	-	0,00	0,00	-
T19	6 612	6 615	15,77	110,1	0,00	87,41	-	-	0,00	0,00	-
T2	9 123	9 126	12,11	110,1	0,00	90,21	-	-	0,00	0,00	-
T20	7 735	7 738	13,91	110,1	0,00	88,77	-	-	0,00	0,00	-
T21	9 235	9 237	11,67	110,1	0,00	90,31	-	-	0,00	0,00	-
T22	6 954	6 958	15,01	110,1	0,00	87,85	-	-	0,00	0,00	-
T23	7 994	7 997	13,36	110,1	0,00	89,06	-	-	0,00	0,00	-
T24	9 693	9 696	10,94	110,1	0,00	90,73	-	-	0,00	0,00	-
T25	7 352	7 355	14,28	110,1	0,00	88,33	-	-	0,00	0,00	-
T26	8 286	8 288	12,85	110,1	0,00	89,37	-	-	0,00	0,00	-
T27	9 533	9 536	11,07	110,1	0,00	90,59	-	-	0,00	0,00	-
T28	7 363	7 366	14,12	110,1	0,00	88,34	-	-	0,00	0,00	-
T29	8 685	8 688	12,17	110,1	0,00	89,78	-	-	0,00	0,00	-
T3	8 241	8 244	13,43	110,1	0,00	89,32	-	-	0,00	0,00	-
T4	9 015	9 018	12,33	110,1	0,00	90,10	-	-	0,00	0,00	-
T5	7 547	7 550	14,53	110,1	0,00	88,56	-	-	0,00	0,00	-
T6	8 773	8 776	12,68	110,1	0,00	89,87	-	-	0,00	0,00	-
T7	9 809	9 812	11,25	110,1	0,00	90,83	-	-	0,00	0,00	-
T8	10 705	10 707	10,09	110,1	0,00	91,59	-	-	0,00	0,00	-
T9	7 508	7 510	14,60	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			27,65								

- Data undefined due to calculation with octave data

Noise sensitive area: N Lomarakennus N (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
T1	8 779	8 782	12,71	110,1	0,00	89,87	-	-	0,00	0,00	-
T10	8 649	8 652	11,97	110,1	0,00	89,74	-	-	0,00	0,00	-
T11	10 073	10 075	9,90	110,1	0,00	91,07	-	-	0,00	0,00	-
T12	7 349	7 352	13,93	110,1	0,00	88,33	-	-	0,00	0,00	-
T13	7 785	7 788	12,96	110,1	0,00	88,83	-	-	0,00	0,00	-
T14	8 920	8 923	11,25	110,1	0,00	90,01	-	-	0,00	0,00	-
T15	9 939	9 941	9,82	110,1	0,00	90,95	-	-	0,00	0,00	-
T16	6 632	6 635	14,80	110,1	0,00	87,44	-	-	0,00	0,00	-
T17	8 172	8 175	12,18	110,1	0,00	89,25	-	-	0,00	0,00	-
T18	9 250	9 253	10,62	110,1	0,00	90,33	-	-	0,00	0,00	-
T19	6 113	6 117	15,75	110,1	0,00	86,73	-	-	0,00	0,00	-
T2	8 894	8 896	12,43	110,1	0,00	89,98	-	-	0,00	0,00	-
T20	7 232	7 235	13,60	110,1	0,00	88,19	-	-	0,00	0,00	-
T21	8 727	8 730	11,25	110,1	0,00	89,82	-	-	0,00	0,00	-
T22	6 413	6 417	15,04	110,1	0,00	87,15	-	-	0,00	0,00	-
T23	7 461	7 464	13,20	110,1	0,00	88,46	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T24	9 167	9 169	10,63	110,1	0,00	90,25	-	-	0,00	0,00	-
T25	6 781	6 784	14,33	110,1	0,00	87,63	-	-	0,00	0,00	-
T26	7 729	7 732	12,75	110,1	0,00	88,77	-	-	0,00	0,00	-
T27	8 983	8 986	10,87	110,1	0,00	90,07	-	-	0,00	0,00	-
T28	6 771	6 774	14,34	110,1	0,00	87,62	-	-	0,00	0,00	-
T29	8 108	8 111	12,15	110,1	0,00	89,18	-	-	0,00	0,00	-
T3	7 988	7 991	13,69	110,1	0,00	89,05	-	-	0,00	0,00	-
T4	8 720	8 723	12,40	110,1	0,00	89,81	-	-	0,00	0,00	-
T5	7 259	7 262	14,70	110,1	0,00	88,22	-	-	0,00	0,00	-
T6	8 428	8 431	12,52	110,1	0,00	89,52	-	-	0,00	0,00	-
T7	9 461	9 463	11,02	110,1	0,00	90,52	-	-	0,00	0,00	-
T8	10 335	10 338	9,77	110,1	0,00	91,29	-	-	0,00	0,00	-
T9	7 165	7 168	14,53	110,1	0,00	88,11	-	-	0,00	0,00	-
Sum			27,53								

- Data undefined due to calculation with octave data

Noise sensitive area: O Lomarakennus O (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
T1	8 734	8 737	12,50	110,1	0,00	89,83	-	-	0,00	0,00	-
T10	8 587	8 589	12,36	110,1	0,00	89,68	-	-	0,00	0,00	-
T11	10 009	10 011	10,24	110,1	0,00	91,01	-	-	0,00	0,00	-
T12	7 286	7 289	14,33	110,1	0,00	88,25	-	-	0,00	0,00	-
T13	7 719	7 722	13,24	110,1	0,00	88,75	-	-	0,00	0,00	-
T14	8 854	8 857	11,51	110,1	0,00	89,95	-	-	0,00	0,00	-
T15	9 872	9 875	10,08	110,1	0,00	90,89	-	-	0,00	0,00	-
T16	6 565	6 569	15,10	110,1	0,00	87,35	-	-	0,00	0,00	-
T17	8 105	8 108	12,47	110,1	0,00	89,18	-	-	0,00	0,00	-
T18	9 182	9 185	10,87	110,1	0,00	90,26	-	-	0,00	0,00	-
T19	6 045	6 048	15,94	110,1	0,00	86,63	-	-	0,00	0,00	-
T2	8 844	8 846	12,35	110,1	0,00	89,94	-	-	0,00	0,00	-
T20	7 163	7 166	13,71	110,1	0,00	88,11	-	-	0,00	0,00	-
T21	8 658	8 661	11,35	110,1	0,00	89,75	-	-	0,00	0,00	-
T22	6 343	6 347	15,19	110,1	0,00	87,05	-	-	0,00	0,00	-
T23	7 391	7 394	13,31	110,1	0,00	88,38	-	-	0,00	0,00	-
T24	9 097	9 099	10,72	110,1	0,00	90,18	-	-	0,00	0,00	-
T25	6 711	6 714	14,45	110,1	0,00	87,54	-	-	0,00	0,00	-
T26	7 659	7 662	12,86	110,1	0,00	88,69	-	-	0,00	0,00	-
T27	8 913	8 916	10,97	110,1	0,00	90,00	-	-	0,00	0,00	-
T28	6 703	6 707	14,46	110,1	0,00	87,53	-	-	0,00	0,00	-
T29	8 039	8 042	12,26	110,1	0,00	89,11	-	-	0,00	0,00	-
T3	7 936	7 939	13,68	110,1	0,00	89,00	-	-	0,00	0,00	-
T4	8 664	8 667	12,54	110,1	0,00	89,76	-	-	0,00	0,00	-
T5	7 204	7 207	14,81	110,1	0,00	88,16	-	-	0,00	0,00	-
T6	8 368	8 371	12,80	110,1	0,00	89,46	-	-	0,00	0,00	-
T7	9 401	9 403	11,32	110,1	0,00	90,47	-	-	0,00	0,00	-
T8	10 274	10 276	10,11	110,1	0,00	91,24	-	-	0,00	0,00	-
T9	7 106	7 109	14,84	110,1	0,00	88,04	-	-	0,00	0,00	-
Sum			27,71								

- Data undefined due to calculation with octave data

Project:
Haarasuonkangas

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 12.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuonkangas_melu ja varjot_1.w2r (11)

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA 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]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source	Source/Date	Creator	Edited
Manufacturer	8.7.2022	USER	8.5.2023 15.45

Based on Document no.: 0127-1584 V01.

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	214,0	8,0	110,1	No	91,5	100,2	104,1	105,0	103,7	99,3	91,6	80,8

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Asuinrakennus B (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 12.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 12.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard:

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

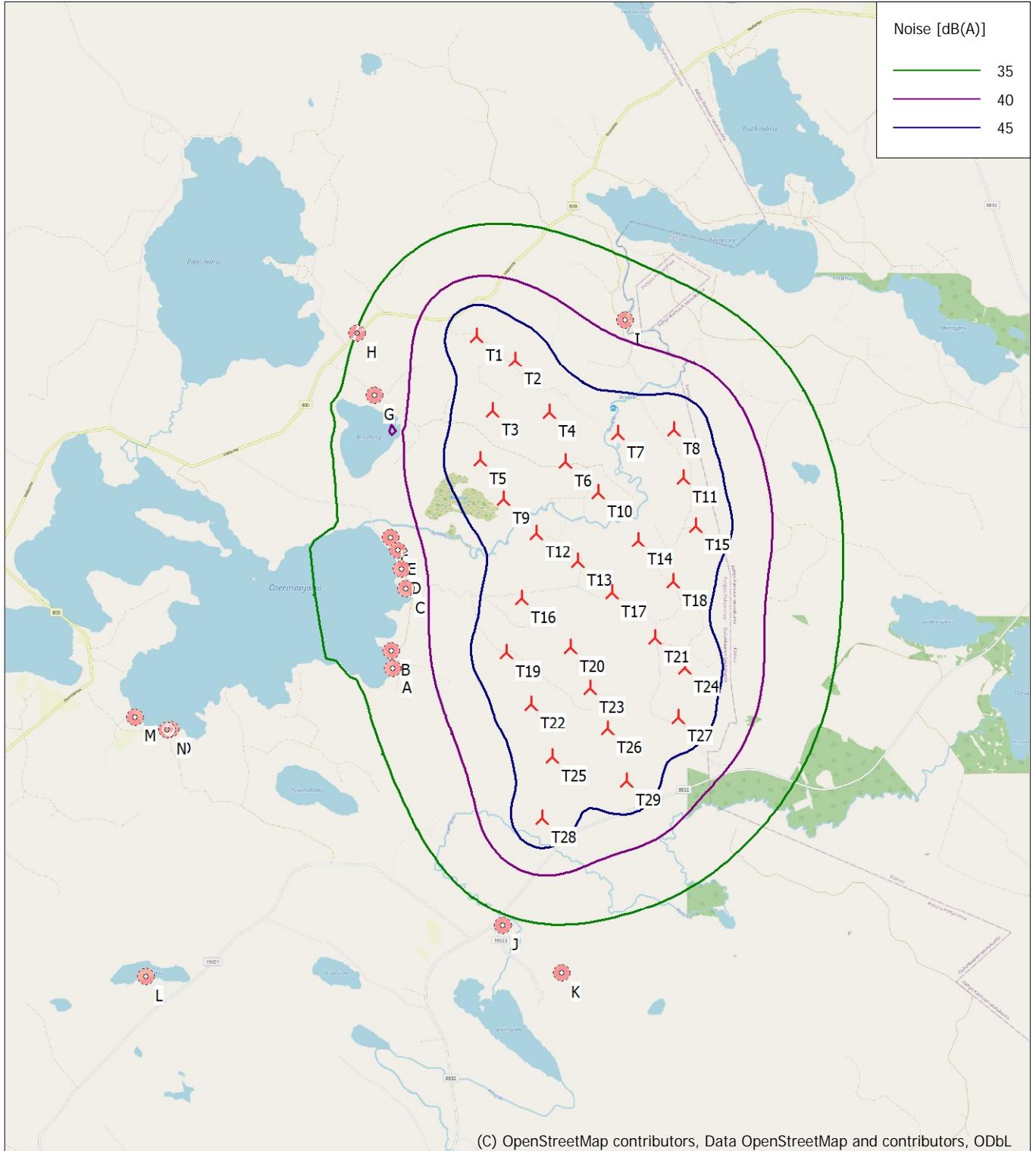
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL



Map: EMD OpenStreetMap, Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 508 964 North: 7 170 644

New WTG

Noise sensitive area

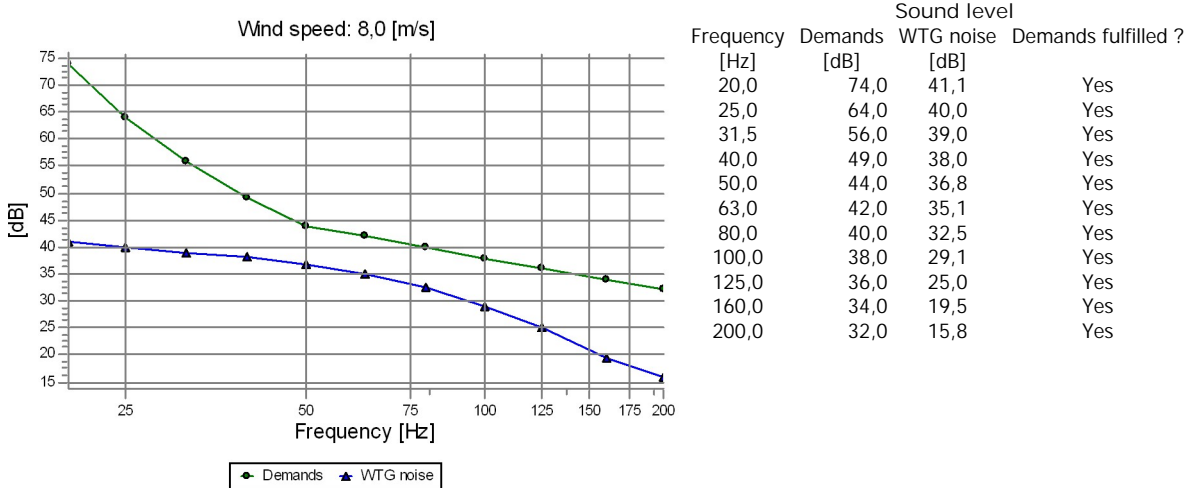
Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

9.5.2023

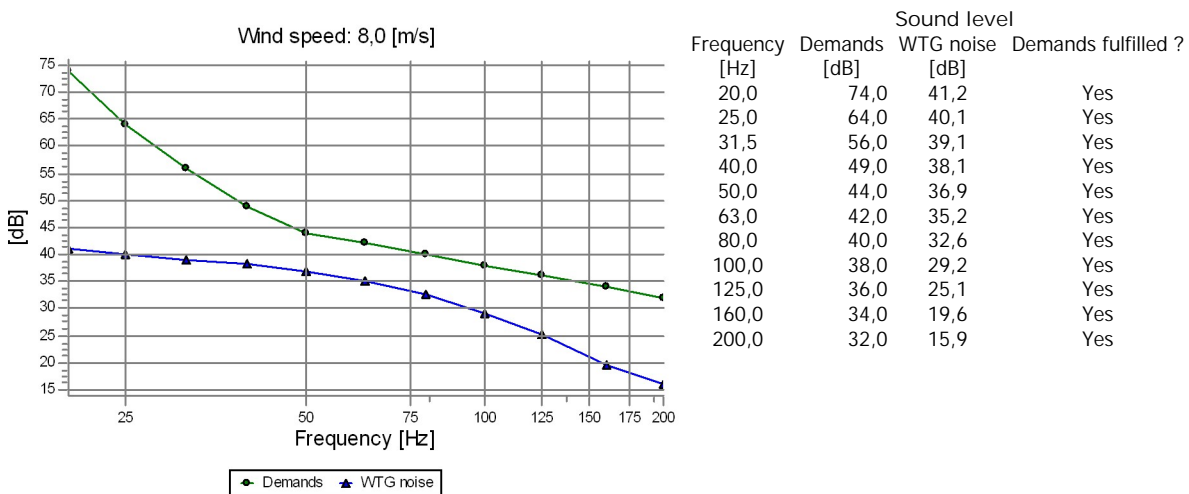
Liite 3. Matalataajuisen melun rakennuskohtaiset arvot - Hankevaihtoehto 1

DECIBEL - Detailed results, graphic

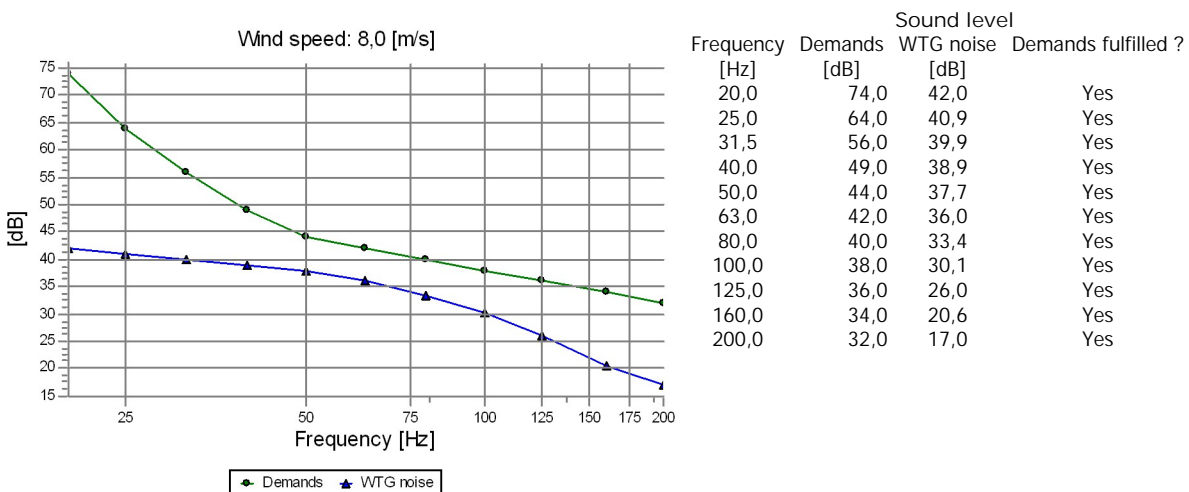
Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
A Lomarakennus A (Syvälahti)



B Asuinrakennus B (Syväänlahti)

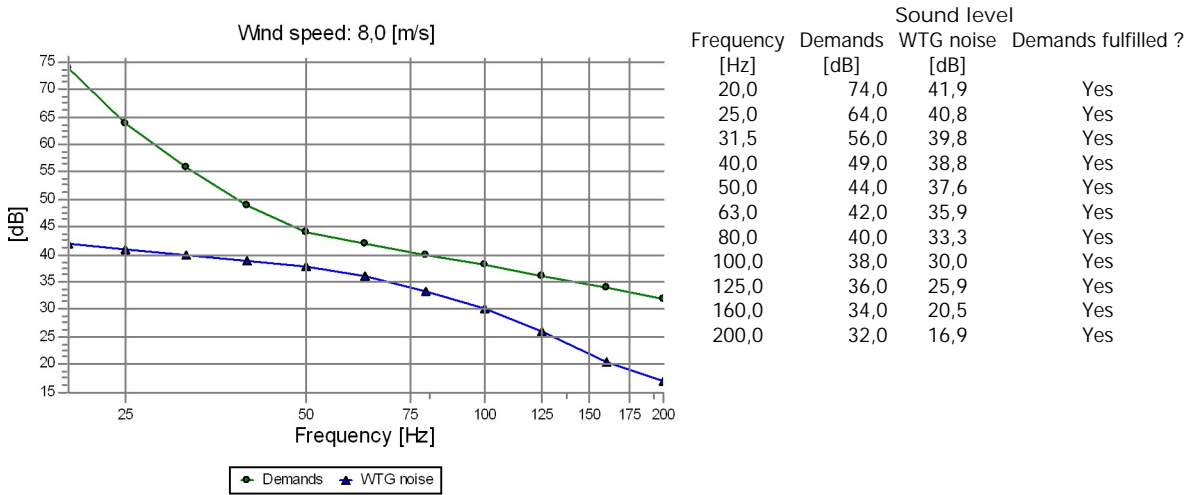


C Lomarakennus C (Mutalahti)

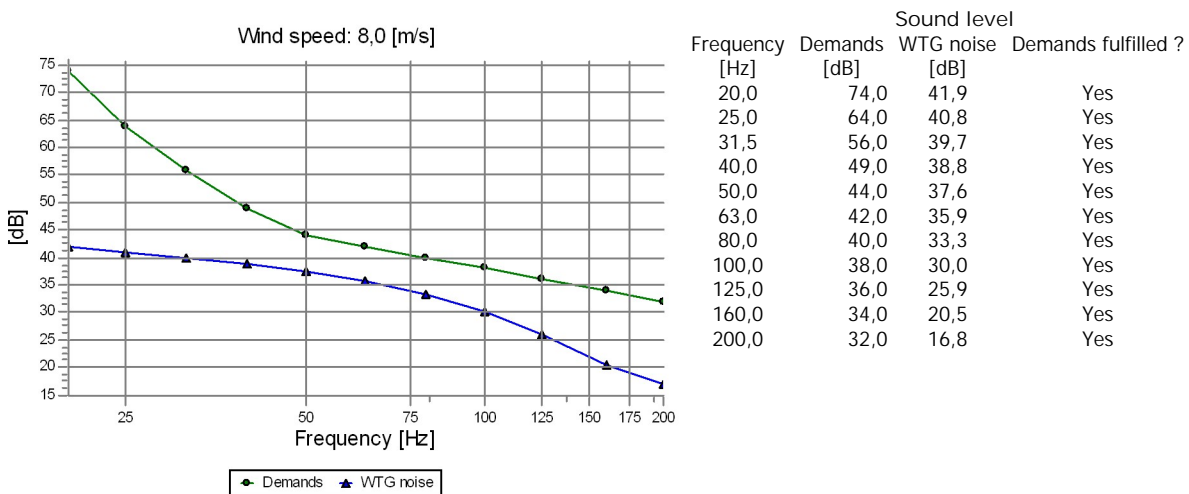


DECIBEL - Detailed results, graphic

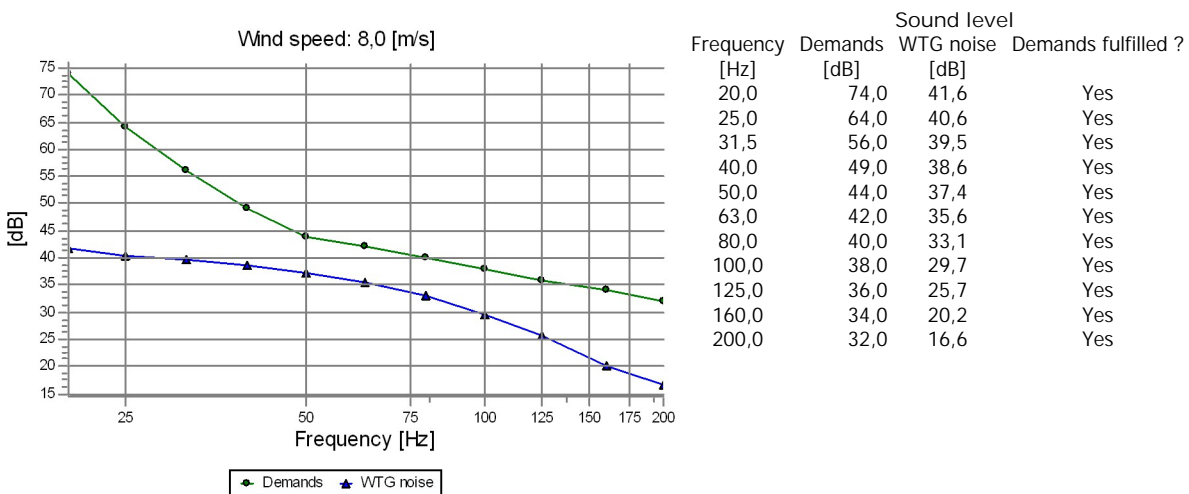
Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
D Lomarakennus D (Mutaniemi)



E Asuinrakennus E (Alanko)

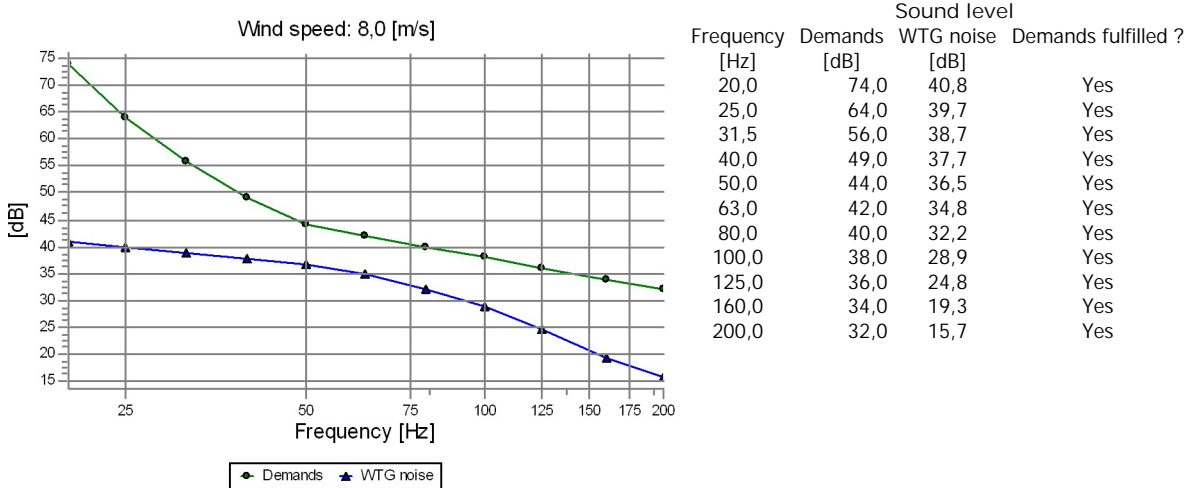


F Asuinrakennus F (Joensuu)

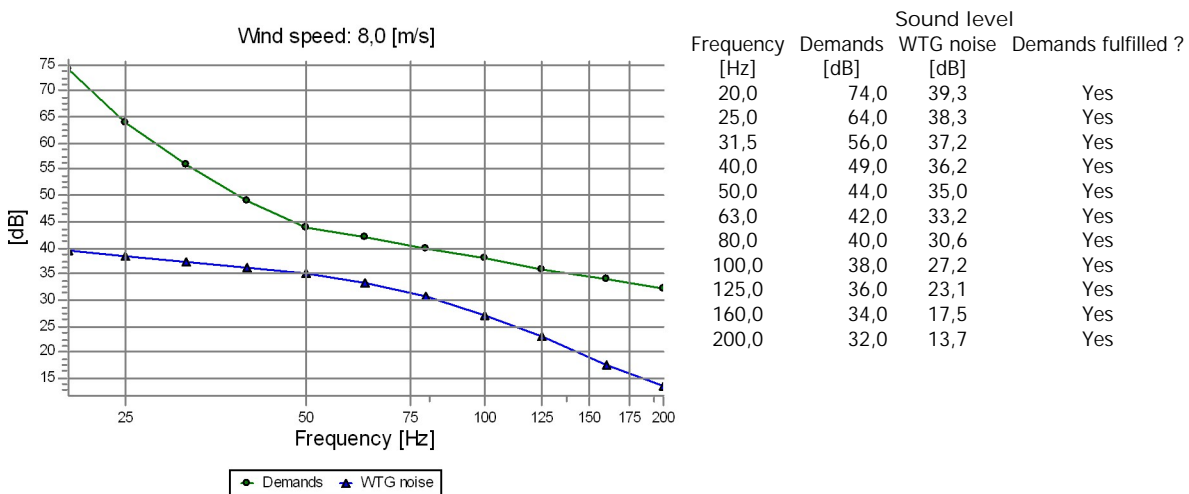


DECIBEL - Detailed results, graphic

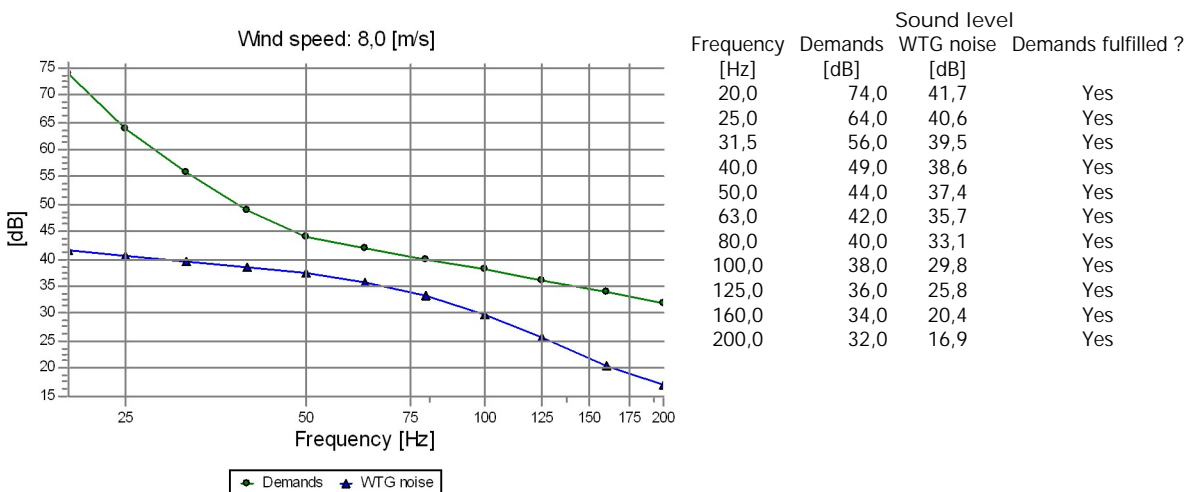
Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
G Asuinrakennus G (Heiniäho)



H Asuinrakennus H (Mäkelä)

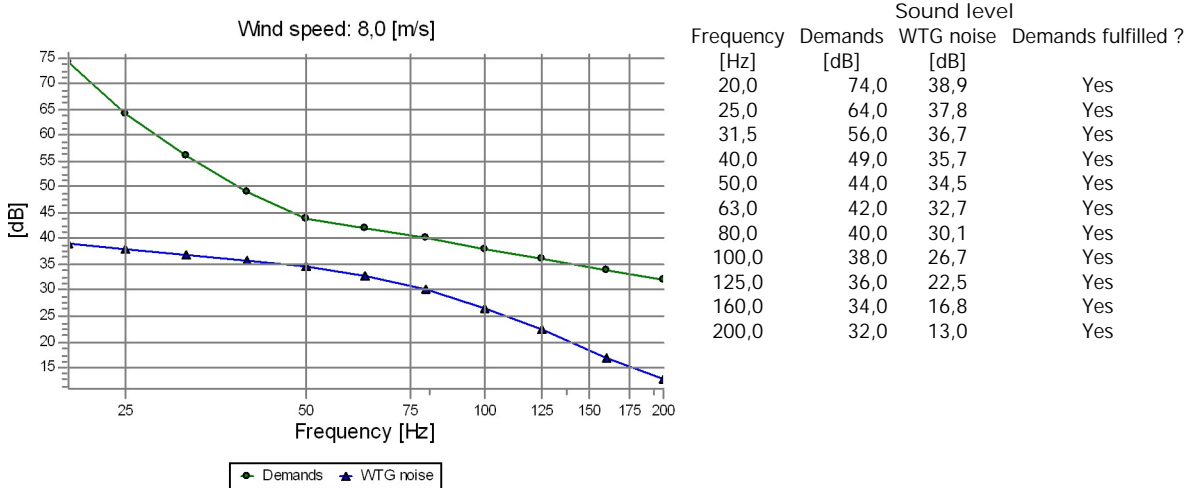


I Lomarakennus I

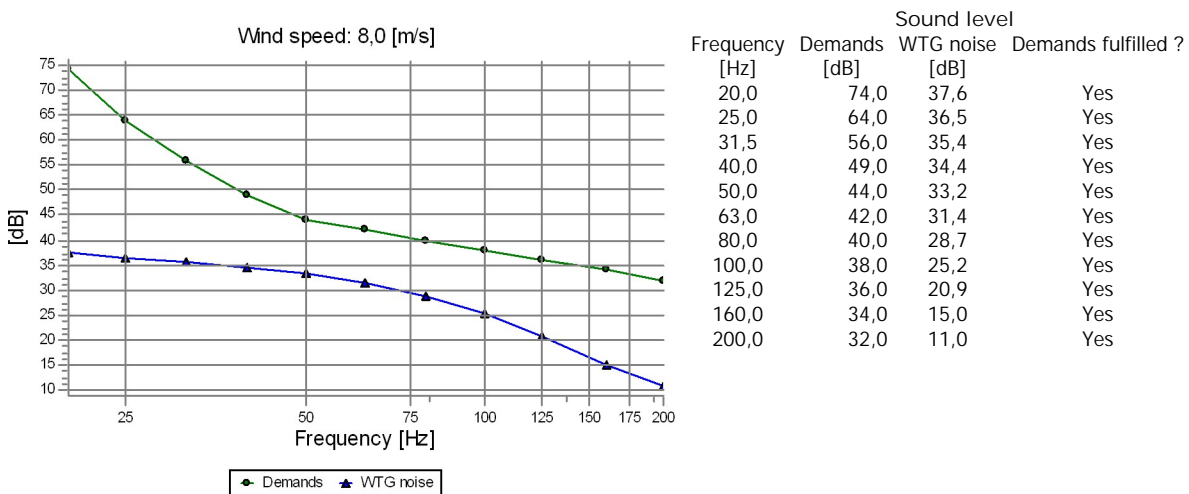


DECIBEL - Detailed results, graphic

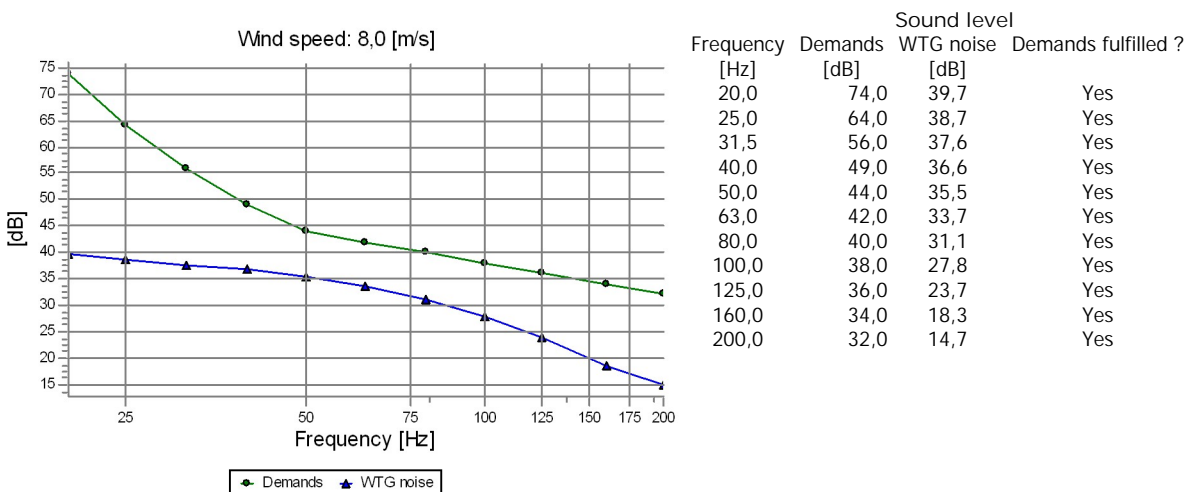
Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
J Lomarakenus J (Hautakaarto)



K Asuinrakennus K (Takalo)

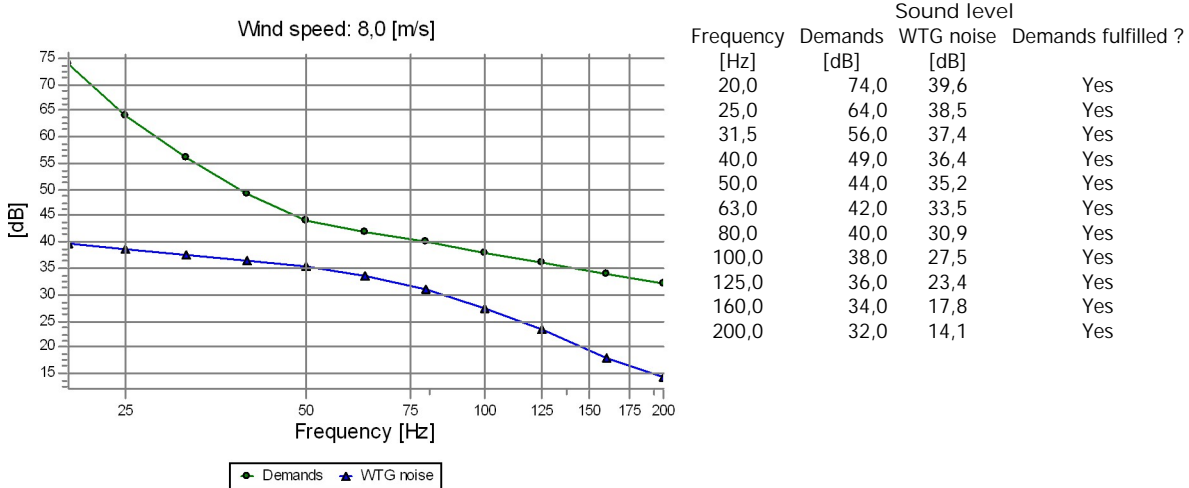


L Lomarakenus L (Haukijärvi)

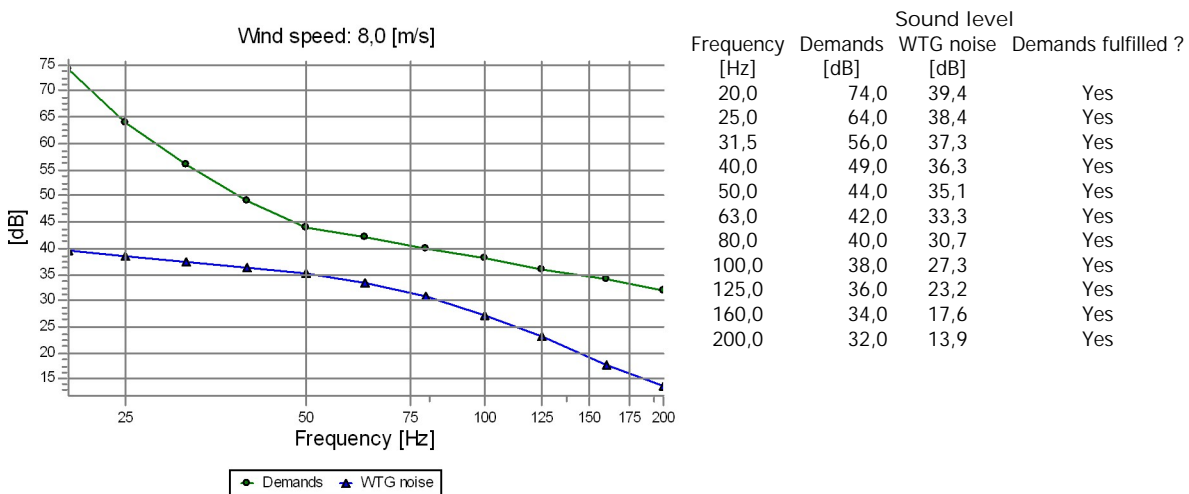


DECIBEL - Detailed results, graphic

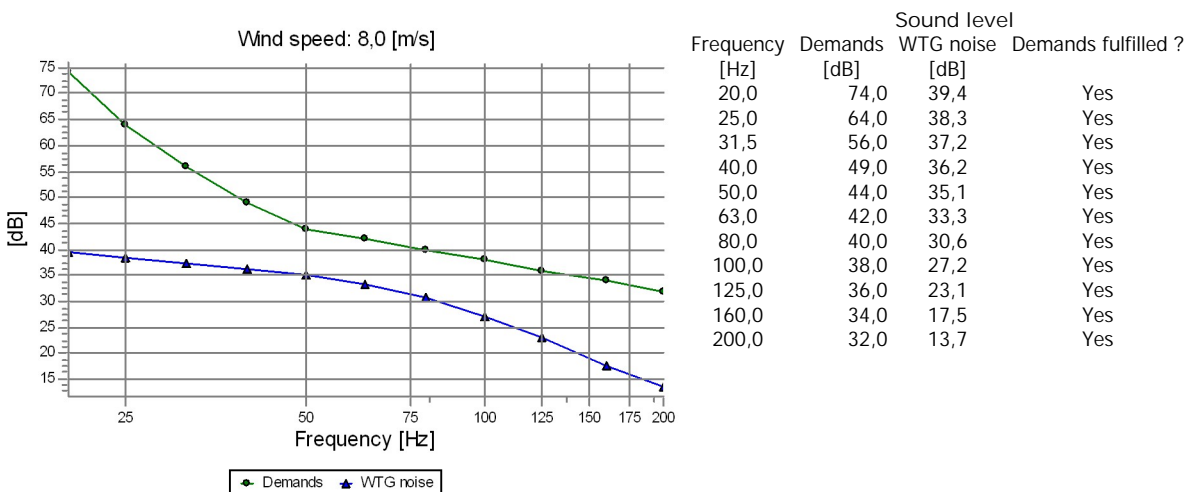
Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
M Lomarakennus M (Haukilahti)



N Lomarakennus N (Kuusela)



O Lomarakennus O (Kuusela)



Project:
Haarasuonkangas

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 16.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuankangas_V172-7,2MW_No_STE

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 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)

Low frequency calculation

dLsigma

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	200,0 Hz
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
7,6	8,3	9,2	10,3	11,5	13,0	14,8	16,8	18,8	21,1	22,8

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited
Manufacturer 8.7.2022 USER 8.5.2023 15.45
Based on Document no.: 0127-1584 V01.

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	102,8	60,4	66,1	71,5	76,7	81,5	85,8	89,5	92,6	95,2	97,2	98,6

Noise sensitive area: A Lomarakenus A (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STE

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 16.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STE

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 16.59/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_V172-7,2MW_No_STE

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Liite 4. Matalataajuisen melun rakennuskohtaiset arvot - Hankevaihtoehto 2

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE

...continued from previous page

Noise sensitive area				Most critical demand			Predicted sound level	
No.	Name	East	North	Z	Immission height	Frequency	Noise	WTG noise
				[m]	[m]	[Hz]	[dB]	[dB]
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	4,0	63,0	42,0	33,0
I	Lomarakennus I	510 890	7 175 161	155,0	4,0	63,0	42,0	35,6
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	4,0	63,0	42,0	32,2
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	4,0	63,0	42,0	30,9
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	4,0	50,0	44,0	27,5
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	4,0	63,0	42,0	27,5
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	4,0	63,0	42,0	28,0
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	4,0	63,0	42,0	28,1

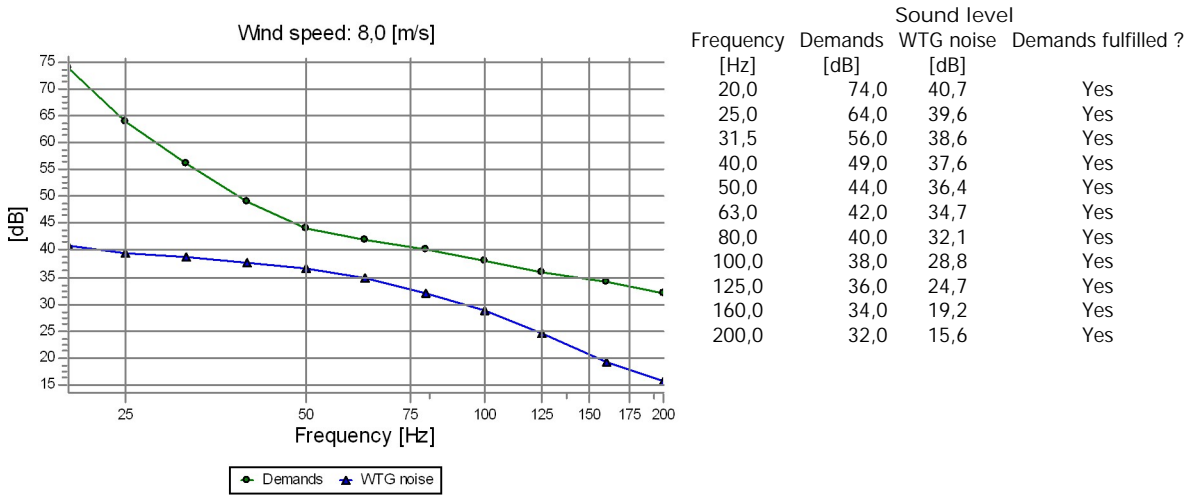
*)Spectral distribution, please see details in report "Detailed results"

Distances (m)

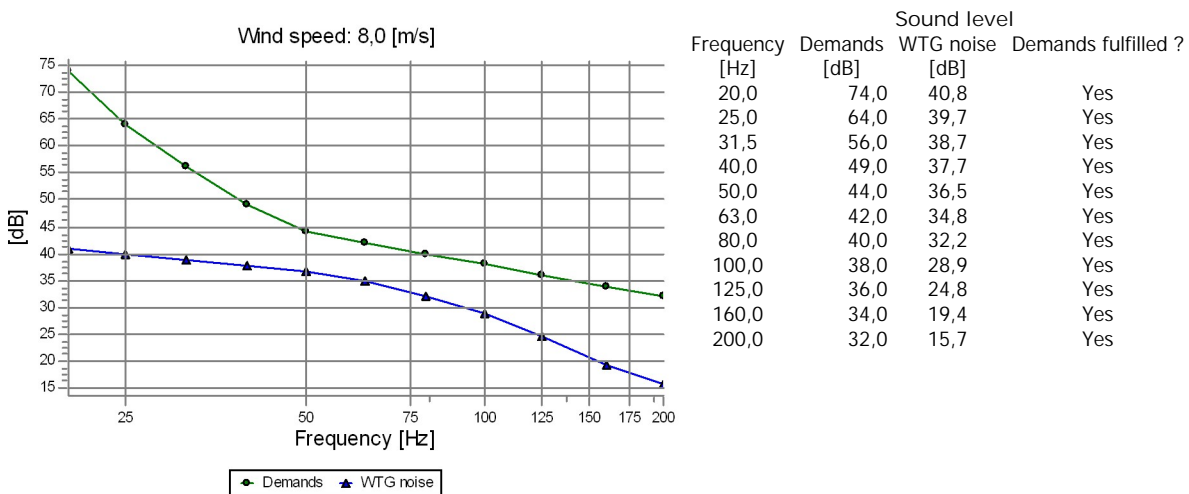
WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results, graphic

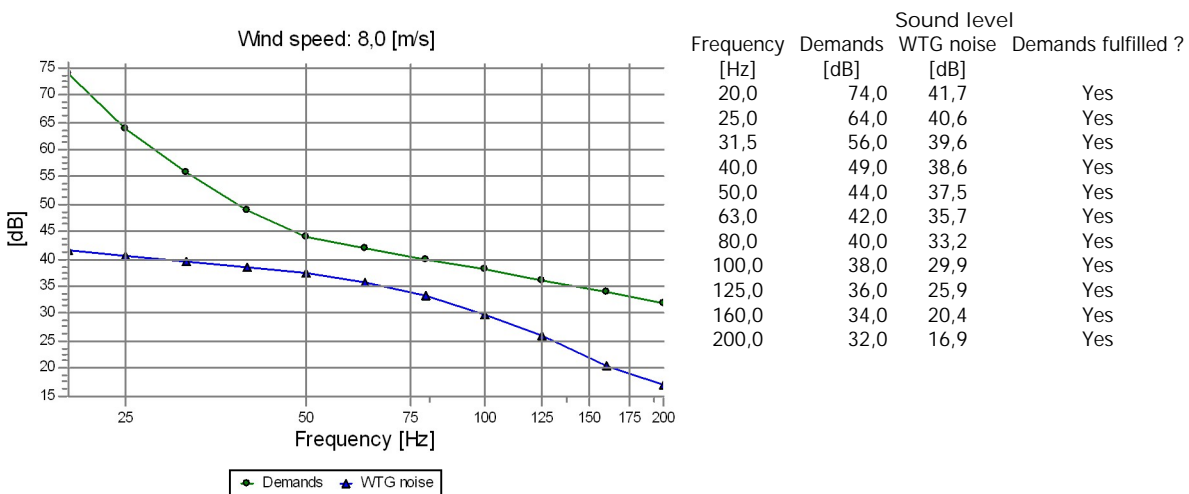
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
A Lomarakennus A (Syvälahti)



B Asuinrakennus B (Syväänlahti)

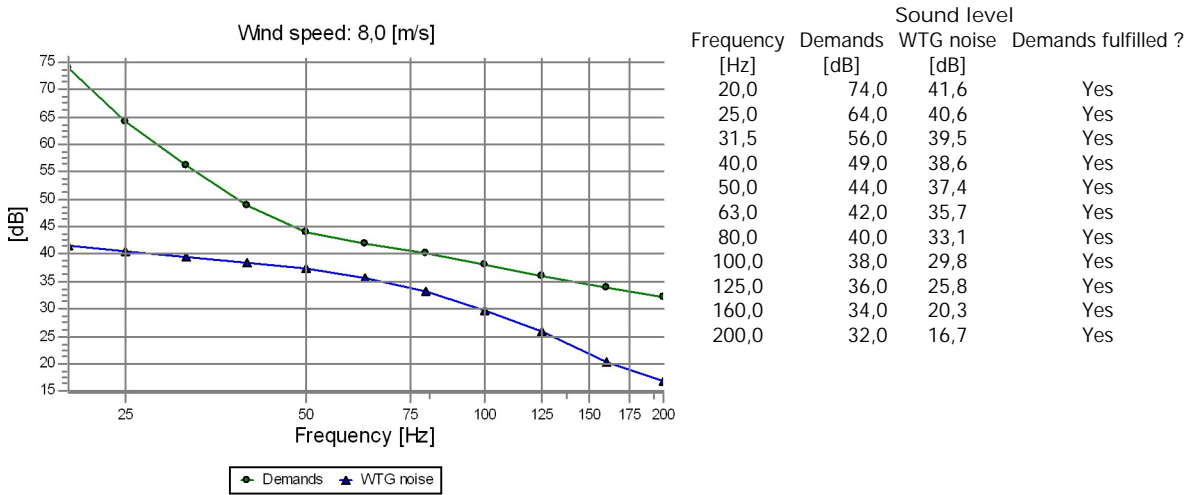


C Lomarakennus C (Mutalahti)

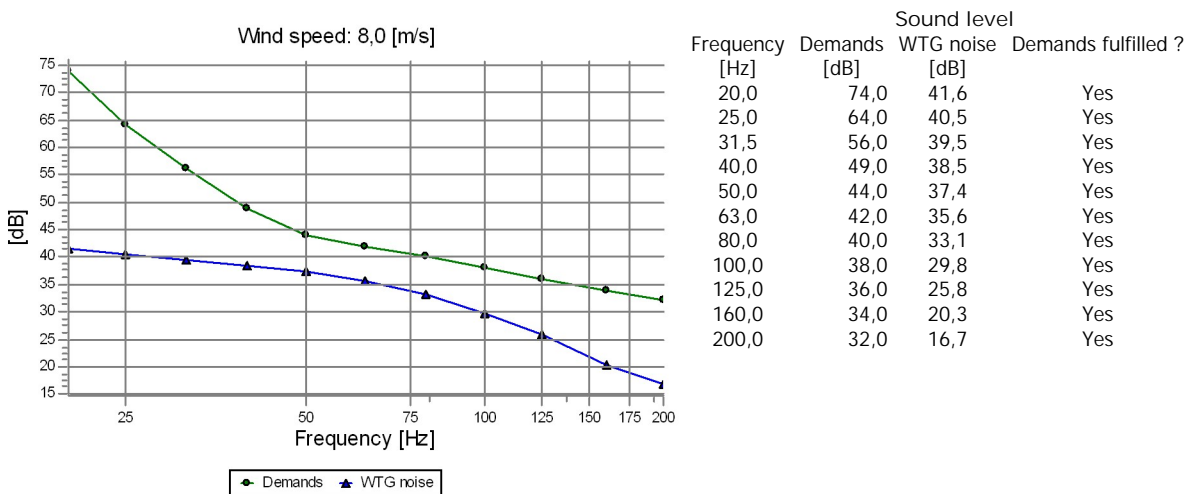


DECIBEL - Detailed results, graphic

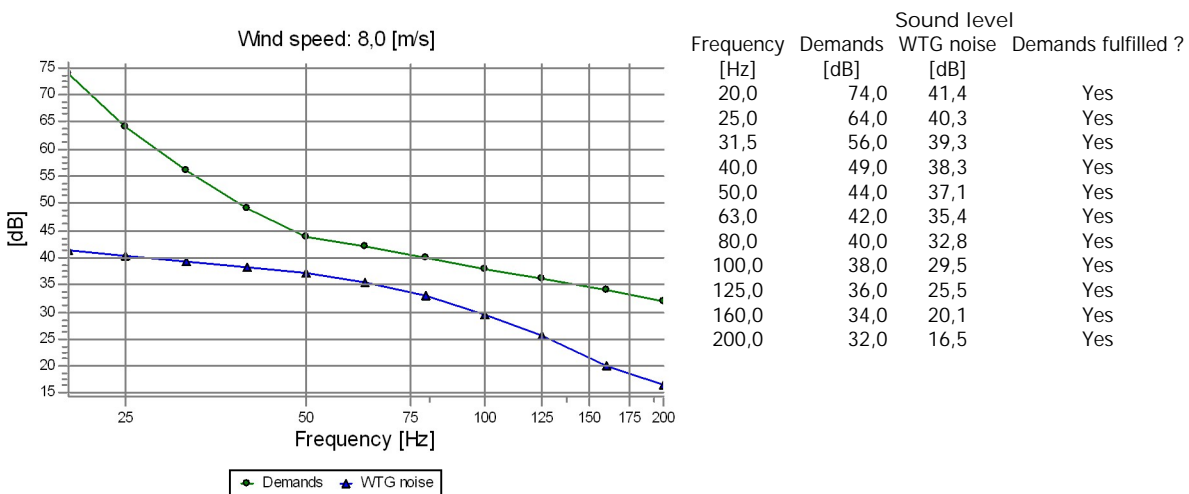
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
D Lomarakennus D (Mutaniemi)



E Asuinrakennus E (Alanko)

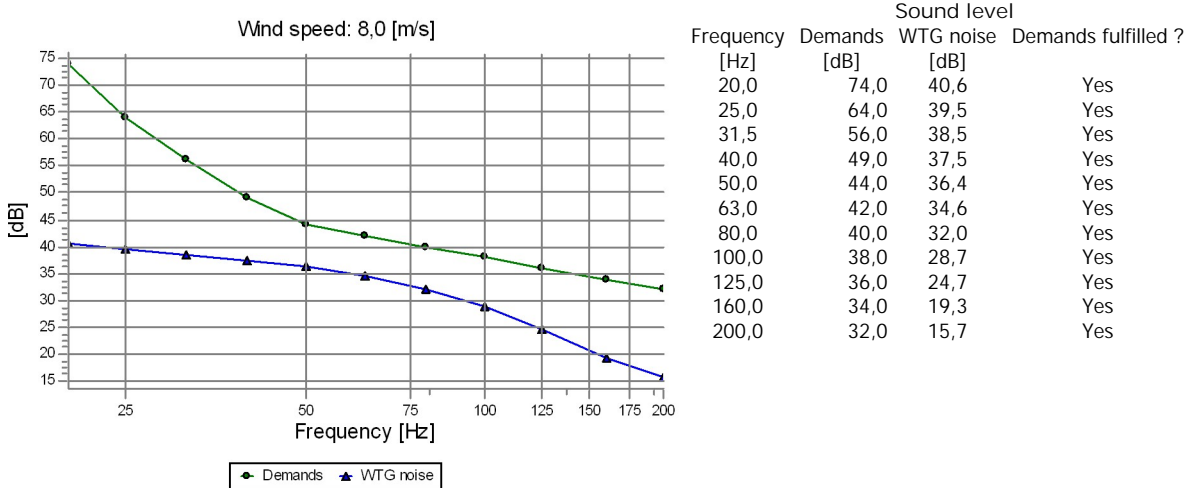


F Asuinrakennus F (Joensuu)

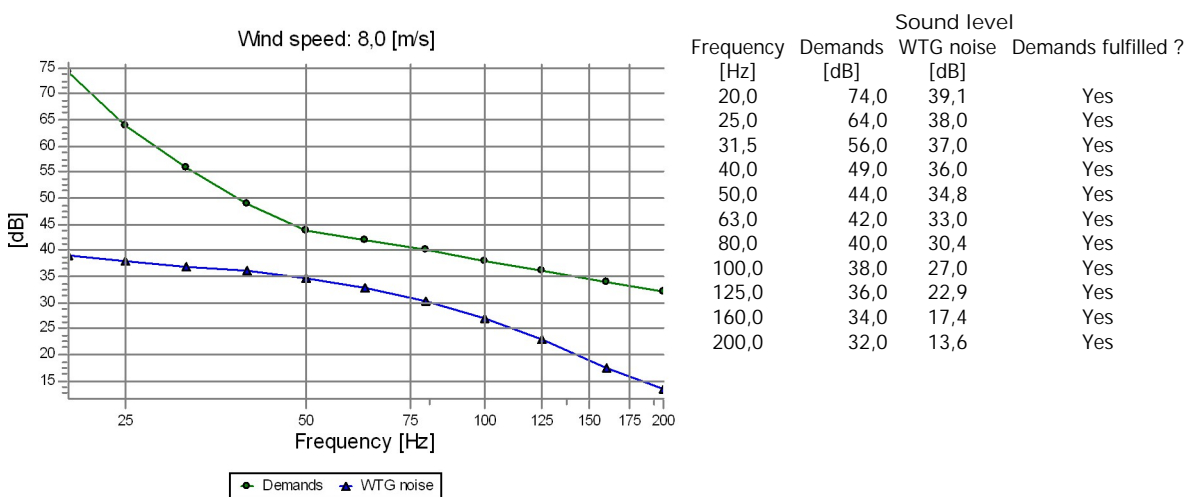


DECIBEL - Detailed results, graphic

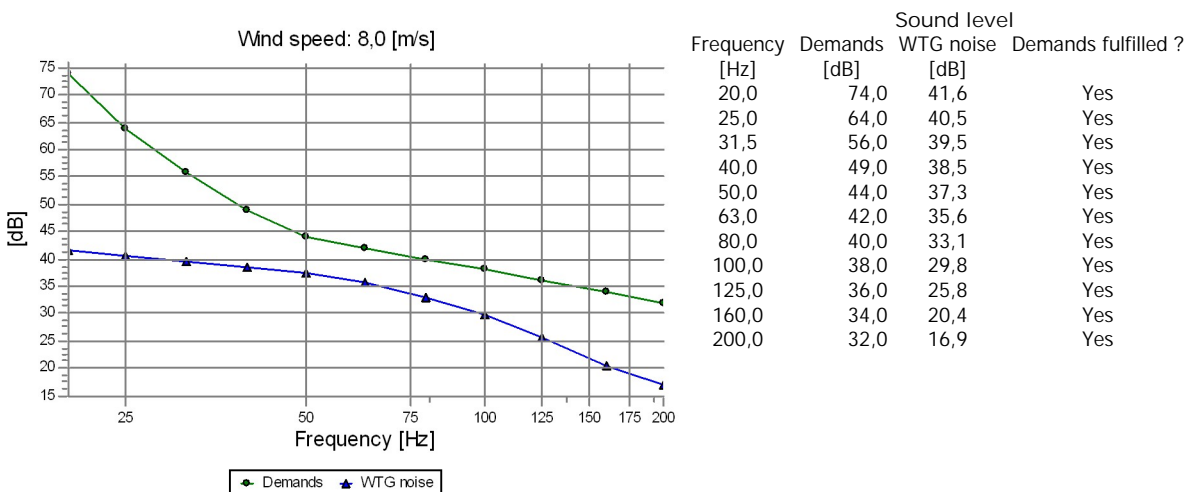
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
G Asuinrakennus G (Heiniäho)



H Asuinrakennus H (Mäkelä)

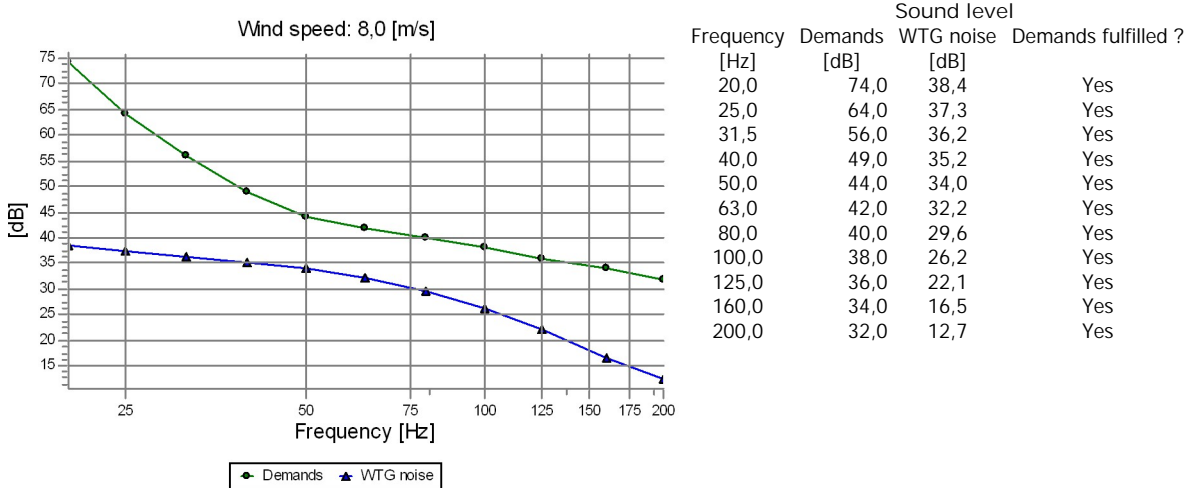


I Lomarakennus I

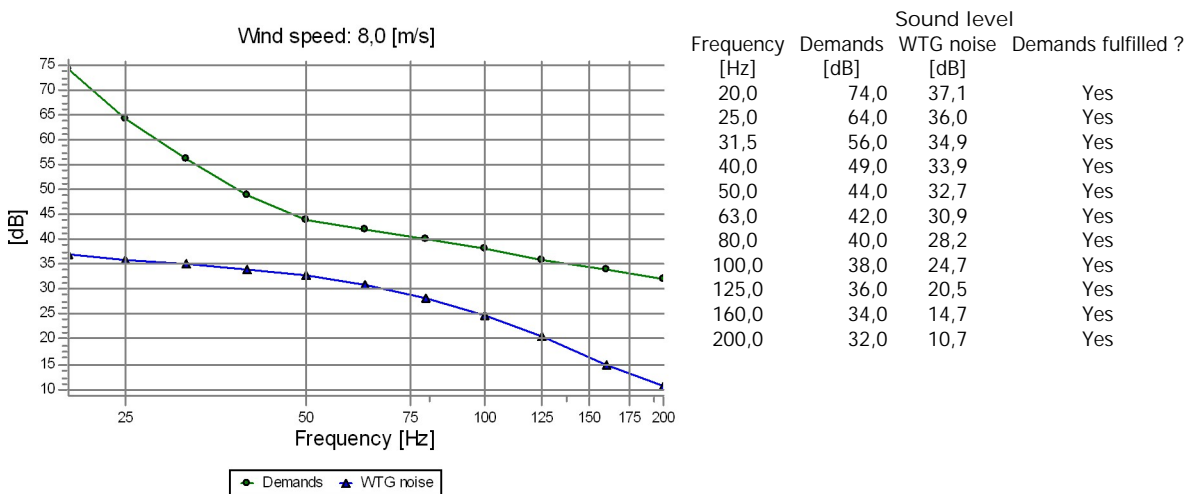


DECIBEL - Detailed results, graphic

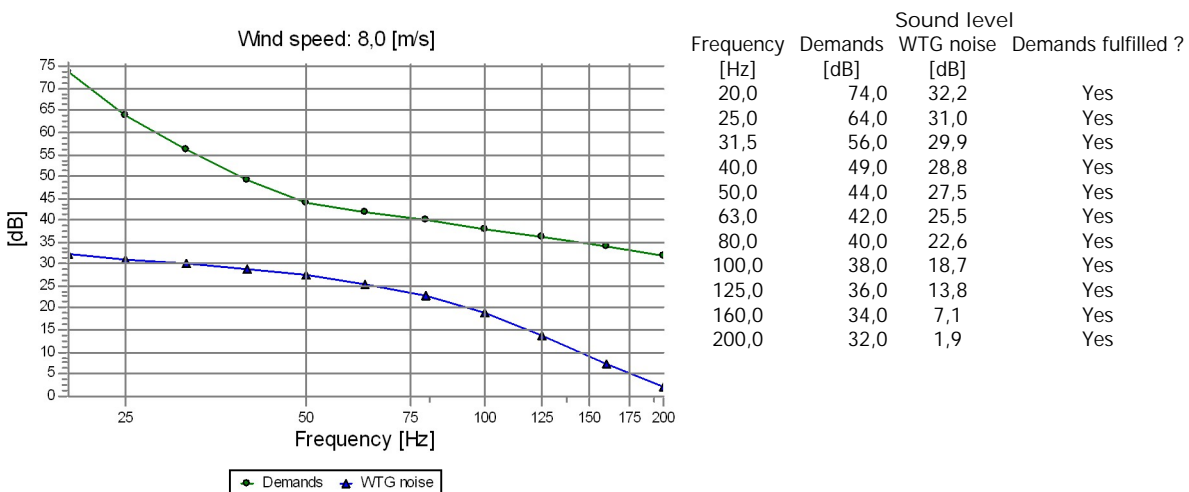
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
J Lomarakennus J (Hautakaarto)



K Asuinrakennus K (Takalo)

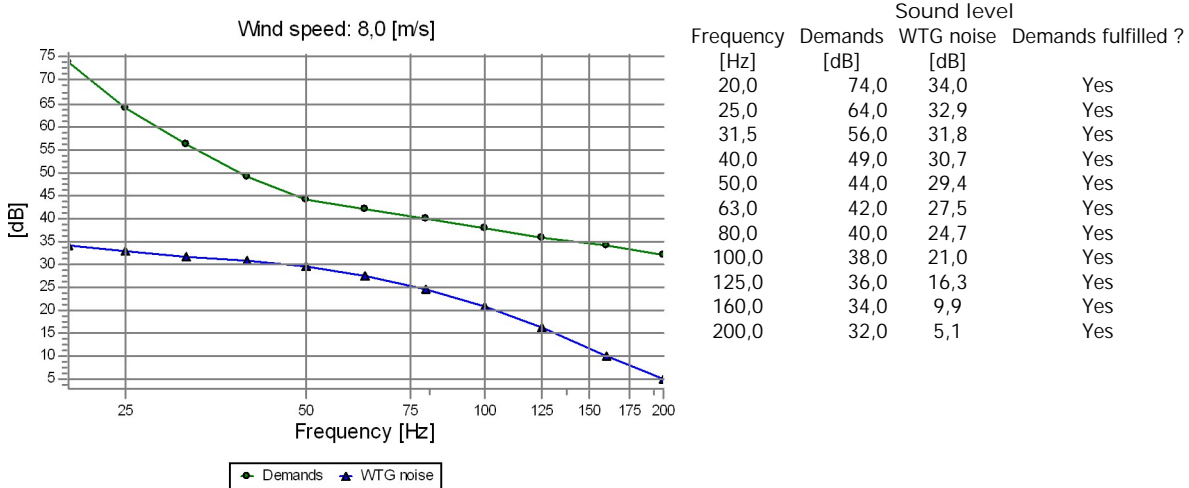


L Lomarakennus L (Haukijärvi)

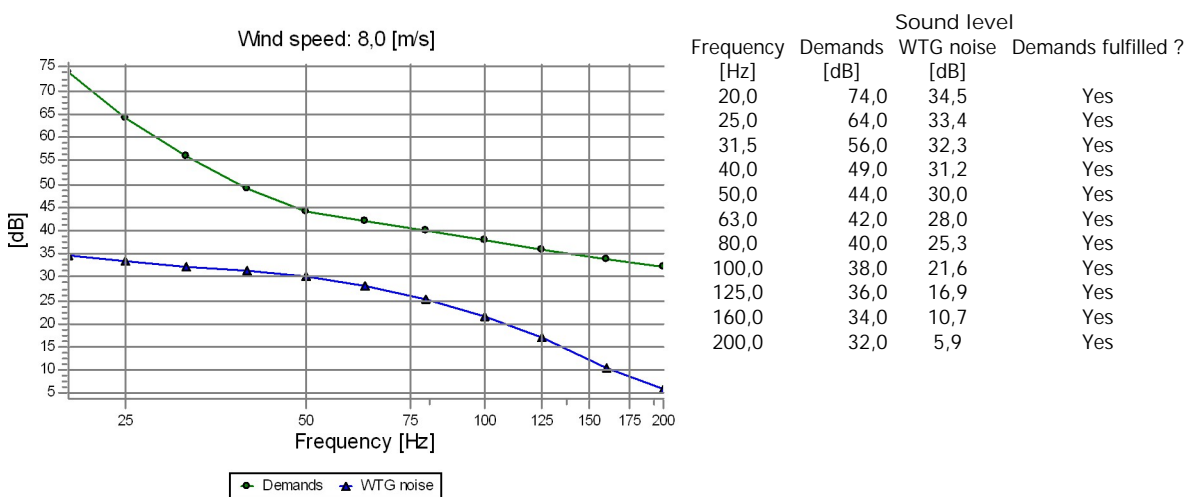


DECIBEL - Detailed results, graphic

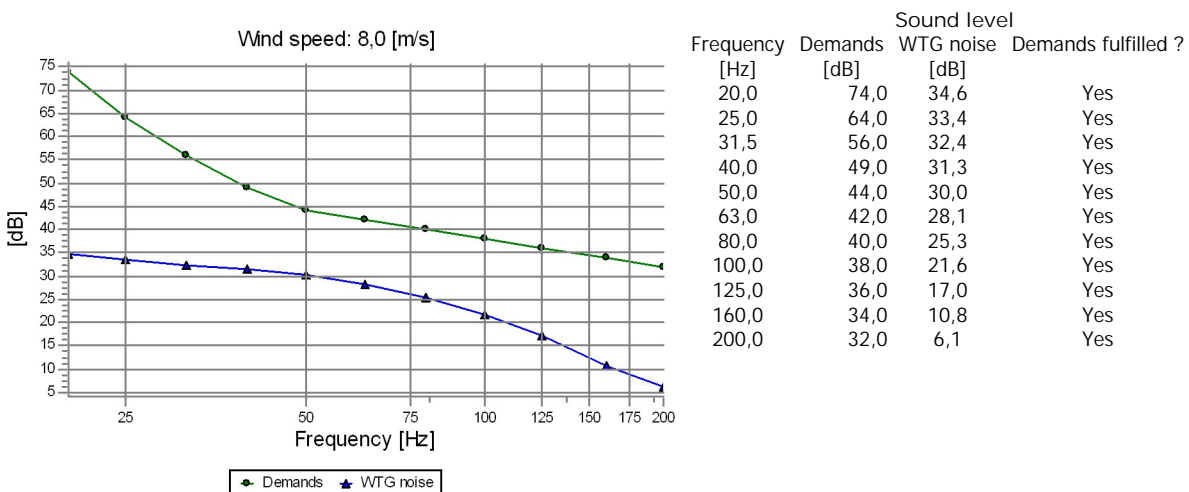
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STENoise calculation model: Finland Low frequency
M Lomarakenus M (Haukilahti)



N Lomarakenus N (Kuusela)



O Lomarakenus O (Kuusela)



DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 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)

Low frequency calculation

dLsigma

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	200,0 Hz
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
7,6	8,3	9,2	10,3	11,5	13,0	14,8	16,8	18,8	21,1	22,8

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited
Manufacturer 8.7.2022 USER 8.5.2023 15.45
Based on Document no.: 0127-1584 V01.

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	102,8	60,4	66,1	71,5	76,7	81,5	85,8	89,5	92,6	95,2	97,2	98,6

Noise sensitive area: A Lomarakenus A (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 17.09/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 17.09/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

9.5.2023

Liite 5. Varjostusmallinnuksen tulokset "Real Case, No Forest" - Hankevaihtoehto 1

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational hours are calculated from WTGs in calculation and wind distribution:

MERRA_N64,50_E027,335 (12)

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

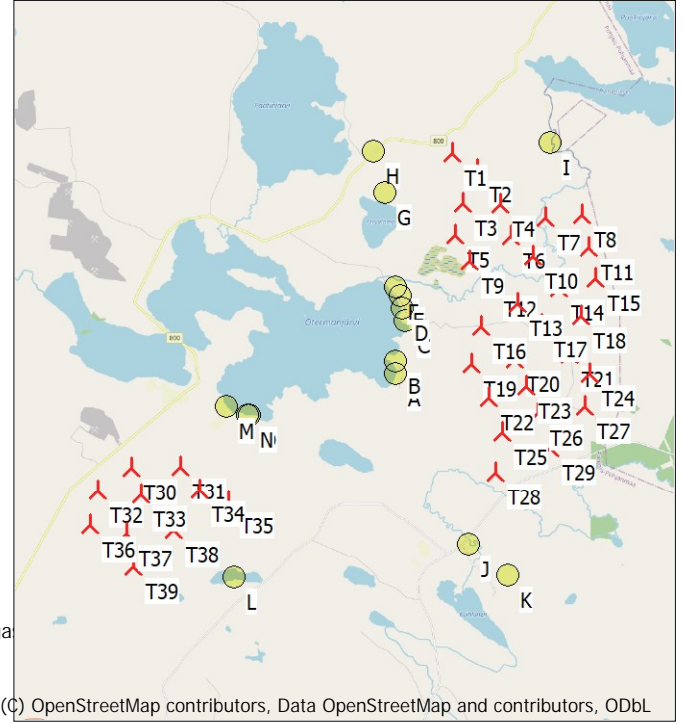
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Pyhäntä_Pilpankanga
Obstacles used in calculation
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
			[m]									
T1	508 282	7 174 861	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T10	510 426	7 172 148	146,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T11	511 902	7 172 395	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T12	509 346	7 171 412	143,2	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T13	510 056	7 170 927	146,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T14	511 130	7 171 298	148,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T15	512 122	7 171 560	159,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T16	509 073	7 170 275	147,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T17	510 668	7 170 368	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T18	511 731	7 170 576	165,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T19	508 820	7 169 317	148,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T2	508 948	7 174 439	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T20	509 941	7 169 425	149,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T21	511 434	7 169 585	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T22	509 256	7 168 427	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T23	510 283	7 168 708	149,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T24	511 959	7 169 067	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T25	509 625	7 167 494	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T26	510 589	7 167 991	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T27	511 839	7 168 207	148,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T28	509 456	7 166 427	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T29	510 920	7 167 074	142,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T3	508 557	7 173 555	151,9	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T30	499 777	7 166 541	137,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T31	501 112	7 166 571	140,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T32	498 884	7 165 924	140,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T33	500 060	7 165 826	146,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T34	501 577	7 165 939	141,7	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T35	502 368	7 165 645	147,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T36	498 706	7 164 985	147,2	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T37	499 643	7 164 765	154,4	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4

To be continued on next page...



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000
New WTG Shadow receptor

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM
			[m]									
T38	500 913	7 164 850	150,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T39	499 856	7 163 927	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T4	509 564	7 173 532	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T5	508 354	7 172 700	144,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T6	509 849	7 172 666	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T7	510 753	7 173 171	147,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T8	511 738	7 173 247	154,9	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T9	508 756	7 172 027	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Lomarakennus I	510 890	7 175 161	155,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Lomarakennus A (Syvälahti)	2:19
B	Asuinrakennus B (Syväänlahti)	1:59
C	Lomarakennus C (Mutalahti)	1:52
D	Lomarakennus D (Mutaniemi)	0:00
E	Asuinrakennus E (Alanko)	3:13
F	Asuinrakennus F (Joensuu)	0:00
G	Asuinrakennus G (Heiniäho)	5:39
H	Asuinrakennus H (Mäkelä)	0:00
I	Lomarakennus I	3:16
J	Lomarakennus J (Hautakaarto)	0:00
K	Asuinrakennus K (Takalo)	0:00
L	Lomarakennus L (Haukijärvi)	7:32
M	Lomarakennus M (Haukilahti)	1:51
N	Lomarakennus N (Kuusela)	0:00
O	Lomarakennus O (Kuusela)	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Expected [h/year]
T1	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (678)	3:54
T10	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (671)	0:00
T11	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (673)	0:00
T12	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (668)	0:00
T13	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (666)	0:00
T14	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (667)	0:00

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 10.51/3.5.584

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058

...continued from previous page

No.	Name	Expected [h/year]
T15	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (669)	0:00
T16	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (663)	1:52
T17	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (664)	0:00
T18	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (665)	0:00
T19	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (660)	4:18
T2	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (677)	1:37
T20	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (662)	0:00
T21	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (661)	0:00
T22	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (657)	0:00
T23	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (658)	0:00
T24	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (659)	0:00
T25	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (654)	0:00
T26	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (655)	0:00
T27	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (656)	0:00
T28	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (651)	0:00
T29	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (653)	0:00
T3	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (681)	1:44
T30	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (649)	0:00
T31	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (652)	1:51
T32	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (680)	0:00
T33	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (679)	0:00
T34	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (650)	0:00
T35	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (648)	0:00
T36	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (647)	0:00
T37	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (645)	0:00
T38	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (646)	7:32
T39	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (644)	0:00
T4	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (676)	0:00
T5	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (674)	0:00
T6	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (672)	0:00
T7	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (682)	1:35
T8	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (675)	0:00
T9	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (670)	3:13

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 10.51/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: B - Asuinrakennus B (Sylväänlahti)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	08.59	07.24	06.33	07.17 (T19)	04.44	03.00	02.37	04.10	05.49	07.18	07.55	09.34	
2	14.18	15.53	17.26	20.01	23	07.40 (T19)	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
3	10.11	08.53	07.17	06.25	24	07.41 (T19)	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
4	14.22	16.00	17.32	20.08	23	07.40 (T19)	21.43	23.28	23.51	22.17	20.26	18.37	15.48	14.22
5	10.09	08.50	07.14	06.22	22	07.17 (T19)	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
6	14.24	16.03	17.36	20.11	21	07.17 (T19)	21.50	23.34	23.47	22.10	20.18	18.30	15.42	14.18
7	10.08	08.47	07.10	06.18	18	07.38 (T19)	21.54	23.36	23.44	22.07	20.15	18.26	15.38	14.16
8	14.27	16.06	17.39	20.14	16	07.19 (T19)	21.57	23.39	23.42	22.03	20.11	18.22	15.35	14.15
9	10.06	08.43	07.07	06.11	12	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
10	14.29	16.10	17.42	20.17	4	07.24 (T19)	22.04	23.44	23.37	21.56	20.04	18.15	15.29	14.12
11	10.05	08.40	07.03	06.07	22	07.20 (T19)	22.07	23.47	23.34	21.52	20.00	18.12	15.25	14.10
12	14.32	16.13	17.45	20.20	21	07.18 (T19)	22.09	23.49	23.31	21.49	19.57	18.08	15.22	14.09
13	10.03	08.37	06.59	06.03	20	07.19 (T19)	22.11	23.49	23.31	21.49	19.57	18.08	15.22	14.09
14	14.34	16.17	17.48	20.23	19	07.19 (T19)	22.11	23.49	23.31	21.49	19.57	18.08	15.22	14.09
15	10.01	08.33	06.56	06.03	18	07.36 (T19)	22.15	23.36	23.44	22.07	20.15	18.26	15.38	14.16
16	14.37	16.20	17.51	20.26	17	07.36 (T19)	22.15	23.36	23.44	22.07	20.15	18.26	15.38	14.16
17	10.09	08.59	07.24	06.33	16	07.35 (T19)	22.15	23.39	23.42	22.03	20.11	18.22	15.35	14.15
18	14.40	16.24	17.54	20.29	15	07.35 (T19)	22.15	23.39	23.42	22.03	20.11	18.22	15.35	14.15
19	10.05	08.40	07.03	06.11	14	07.35 (T19)	22.15	23.39	23.42	22.03	20.11	18.22	15.35	14.15
20	14.43	16.17	17.48	20.23	13	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
21	10.03	08.37	06.59	06.03	12	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
22	14.44	16.30	18.00	20.36	11	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
23	10.09	08.59	07.24	06.33	10	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
24	14.45	16.31	18.01	20.37	9	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
25	10.05	08.40	07.03	06.11	8	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
26	14.46	16.32	18.02	20.38	7	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
27	10.01	08.33	06.56	06.03	6	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
28	14.47	16.33	18.03	20.39	5	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
29	10.09	08.59	07.24	06.33	4	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
30	14.48	16.34	18.04	20.40	3	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
31	10.05	08.40	07.03	06.11	2	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	127		
Total, worst case			109	163					277					
Sun reduction			0.36	0.43					0.32					
Oper. time red.			0.97	0.97					0.97					
Wind dir. red.			0.62	0.62					0.62					
Total reduction			0.22	0.26					0.19					
Total, real			24	42					54					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)



SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: C - Lomarakenus C (Mutilahti)
Assumptions for shadow calculations
Sunshine probability S (Average daily sunshine hours) [LULEA]

Table with 12 columns: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
Values: 0,60, 2,61, 4,18, 6,47, 8,80, 10,60, 9,50, 6,88, 4,22, 2,77, 1,22, 0,17

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

Main shadow calculation table with columns for months (January to December) and rows for days (1 to 31) and summary rows (Potential sun hours, Total, worst case, Sun reduction, Oper. time red., Wind dir. red., Total reduction, Total, real)

Table layout: For each day in each month the following matrix apply

Matrix with 4 columns: Day in month, Sun rise (hh:mm), Sun set (hh:mm), Minutes with flicker, First time (hh:mm) with flicker (WTG causing flicker first time), Last time (hh:mm) with flicker (WTG causing flicker last time)



SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: G - Asuinrakennus G (Heiniäho)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		
1	10.14	09.00	07.25	06.33	07.49 (T3)	04.44	05.23 (T1)	03.00
	14.17	15.52	17.26	20.02	6 07.55 (T3)	21.37	8 05.31 (T1)	23.22
2	10.13	08.57	07.21	06.29		04.40	05.20 (T1)	02.54
	14.19	15.56	17.29	20.05		21.40	13 05.33 (T1)	23.25
3	10.12	08.53	07.17	06.25		04.37	05.18 (T1)	02.51
	14.21	15.59	17.32	20.08		21.44	16 05.34 (T1)	23.29
4	10.10	08.50	07.14	06.22		04.33	05.17 (T1)	02.48
	14.23	16.03	17.35	20.11		21.47	18 05.35 (T1)	23.32
5	10.09	08.47	07.10	06.18		04.29	05.15 (T1)	02.46
	14.26	16.06	17.39	20.14		21.51	20 05.35 (T1)	23.35
6	10.07	08.44	07.07	06.14		04.26	05.14 (T1)	02.43
	14.28	16.10	17.42	20.17		21.54	22 05.36 (T1)	23.37
7	10.05	08.40	07.03	06.11		04.22	05.14 (T1)	02.41
	14.31	16.13	17.45	20.20		21.57	22 05.36 (T1)	23.40
8	10.04	08.37	07.00	06.07		04.19	05.13 (T1)	02.39
	14.34	16.16	17.48	20.23		22.01	23 05.36 (T1)	23.43
9	10.02	08.34	06.56	06.03		04.15	05.14 (T1)	02.37
	14.37	16.20	17.51	20.26		22.04	24 05.38 (T1)	23.45
10	10.00	08.30	06.52	06.00		04.12	05.14 (T1)	02.34
	14.39	16.23	17.54	20.29		22.08	24 05.38 (T1)	23.48
11	09.58	08.27	06.49	05.56		04.08	05.13 (T1)	02.33
	14.42	16.27	17.57	20.33		22.11	24 05.37 (T1)	23.50
12	09.55	08.24	06.45	05.52		04.05	05.13 (T1)	02.31
	14.45	16.30	18.00	20.36		22.15	24 05.37 (T1)	23.52
13	09.53	08.20	06.42	05.49		04.01	05.13 (T1)	02.29
	14.48	16.33	18.04	20.39		22.18	24 05.37 (T1)	23.54
14	09.51	08.17	06.38	05.45		03.58	05.13 (T1)	02.28
	14.52	16.37	18.07	20.42		22.21	23 05.36 (T1)	23.56
15	09.48	08.13	06.34	05.42		03.54	05.15 (T1)	02.27
	14.55	16.40	18.10	20.45		22.25	22 05.37 (T1)	23.58
16	09.46	08.10	06.31	05.38		03.51	05.15 (T1)	02.26
	14.58	16.44	18.13	20.48		22.28	21 05.36 (T1)	23.59
17	09.43	08.07	06.27	05.34		03.48	05.15 (T1)	02.25
	15.01	16.47	18.16	20.51		22.32	20 05.35 (T1)	00.01
18	09.41	08.03	06.24	06.56 (T3)	05.31	03.44	05.16 (T1)	02.24
	15.04	16.50	18.19	3 06.59 (T3)	20.55	22.35	19 05.35 (T1)	00.02
19	09.38	08.00	06.20	06.52 (T3)	05.27	03.41	05.17 (T1)	02.24
	15.08	16.54	18.22	10 07.02 (T3)	20.58	22.39	16 05.33 (T1)	00.03
20	09.35	07.56	06.16	06.49 (T3)	05.23	03.37	05.18 (T1)	02.23
	15.11	16.57	18.25	15 07.04 (T3)	21.01	22.42	15 05.33 (T1)	00.03
21	09.33	07.53	06.13	06.46 (T3)	05.20	03.34	05.19 (T1)	02.24
	15.14	17.00	18.28	19 07.05 (T3)	21.04	22.46	12 05.31 (T1)	00.04
22	09.30	07.49	06.09	06.44 (T3)	05.16	03.31	05.21 (T1)	02.24
	15.18	17.03	18.31	21 07.05 (T3)	21.08	22.49	8 05.29 (T1)	00.04
23	09.27	07.46	06.05	06.44 (T3)	05.12	03.27		02.24
	15.21	17.07	18.34	22 07.06 (T3)	21.11	22.52		00.04
24	09.24	07.42	06.02	06.43 (T3)	05.09	03.24		02.25
	15.25	17.10	18.37	23 07.06 (T3)	21.14	22.56		00.04
25	09.21	07.39	05.58	06.42 (T3)	05.05	03.21		02.26
	15.28	17.13	18.40	23 07.05 (T3)	21.17	22.59		00.03
26	09.18	07.35	05.54	06.43 (T3)	05.02	03.18		02.27
	15.31	17.16	18.43	22 07.05 (T3)	21.21	23.03		00.02
27	09.15	07.32	05.51	06.42 (T3)	04.58	03.15		02.29
	15.35	17.20	18.46	22 07.04 (T3)	21.24	23.06		00.01
28	09.12	07.28	05.47	06.43 (T3)	04.54	03.12		02.30
	15.38	17.23	18.49	21 07.04 (T3)	21.27	23.09		00.00
29	09.09		06.44	07.44 (T3)	04.51	03.08		02.32
	15.42		19.52	18 08.02 (T3)	21.30	23.13		23.59
30	09.06		06.40	07.44 (T3)	04.47	03.05		02.34
	15.45		19.55	16 08.00 (T3)	21.34	23.16		23.57
31	09.03		06.36	07.46 (T3)		03.02		
	15.49		19.59	13 07.59 (T3)		23.19		
Potential sun hours	163	235	363	454	577		639	
Total, worst case			248		6		418	
Sun reduction			0,36		0,43		0,47	
Oper. time red.			0,97		0,97		0,97	
Wind dir. red.			0,62		0,62		0,63	
Total reduction			0,21		0,26		0,29	
Total, real			53		2		120	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: G - Asuinrakennus G (Heiniäho)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.36	04.10	05.23 (T1)	05.49	07.18	07.55	09.35	
	23.56	22.25	24 05.47 (T1)	20.33	18.44	15.55	14.26	
2	02.38	04.13	05.23 (T1)	05.52	07.21	07.59	09.38	
	23.54	22.21	24 05.47 (T1)	20.30	18.40	15.51	14.24	
3	02.40	04.16	05.24 (T1)	05.55	07.24	08.02	09.41	
	23.52	22.18	23 05.47 (T1)	20.26	18.37	15.48	14.22	
4	02.43	04.20	05.24 (T1)	05.58	07.27	08.05	09.44	
	23.50	22.14	23 05.47 (T1)	20.22	18.33	15.45	14.20	
5	02.46	04.23	05.23 (T1)	06.01	07.30	08.09	09.46	
	23.48	22.11	23 05.46 (T1)	20.19	18.30	15.41	14.18	
6	02.48	04.26	05.24 (T1)	06.04	07.33	08.12	09.49	
	23.45	22.07	22 05.46 (T1)	20.15	18.26	15.38	14.16	
7	02.51	04.30	05.24 (T1)	06.07	07.36	08.15	09.52	
	23.43	22.03	22 05.46 (T1)	20.11	18.22	15.35	14.14	
8	02.54	04.33	05.25 (T1)	06.10	07.39	08.19	09.54	
	23.40	22.00	20 05.45 (T1)	20.08	18.19	15.32	14.12	
9	02.57	04.36	05.26 (T1)	06.13	07.42	08.22	09.57	
	23.38	21.56	18 05.44 (T1)	20.04	18.15	15.28	14.11	
10	03.00	04.40	05.27 (T1)	06.16	07.45	08.26	09.59	
	23.35	21.53	16 05.43 (T1)	20.00	18.12	15.25	14.10	
11	03.00	04.43	05.29 (T1)	06.19	07.48	08.29	10.01	
	23.32	21.49	12 05.41 (T1)	19.57	4 07.46 (T3)	18.08	15.22	14.08
12	03.03	04.46	05.32 (T1)	06.22	07.38 (T3)	07.52	08.32	10.03
	23.29	21.46	6 05.38 (T1)	19.53	12 07.50 (T3)	18.04	15.19	14.07
13	03.06	04.49	06.25	07.36 (T3)	07.55	08.36	10.05	
	23.27	21.42	19.49	16 07.52 (T3)	18.01	15.16	14.06	
14	03.09	04.53	06.28	07.34 (T3)	07.58	08.39	10.07	
	23.24	21.38	19.46	19 07.53 (T3)	17.57	15.13	14.05	
15	03.12	04.56	06.31	07.33 (T3)	08.01	08.43	10.09	
	23.21	21.35	19.42	21 07.54 (T3)	17.54	15.09	14.04	
16	03.16	04.59	06.34	07.32 (T3)	08.04	08.46	10.10	
	23.18	21.31	19.38	22 07.54 (T3)	17.50	15.06	14.04	
17	03.19	05.02	06.37	07.31 (T3)	08.07	08.49	10.12	
	23.14	21.28	19.35	22 07.53 (T3)	17.47	15.03	14.03	
18	03.22	05.06	06.40	07.30 (T3)	08.10	08.53	10.13	
	23.11	21.24	19.31	23 07.53 (T3)	17.43	15.00	14.03	
19	03.26	05.09	06.43	07.30 (T3)	08.13	08.56	10.14	
	23.08	21.20	19.28	23 07.53 (T3)	17.40	14.58	14.03	
20	03.29	05.12	06.46	07.30 (T3)	08.16	08.59	10.15	
	23.05	21.17	19.24	22 07.52 (T3)	17.36	14.55	14.03	
21	03.32	05.32 (T1)	05.15	06.49	07.30 (T3)	08.20	09.03	10.16
	23.02	5 05.37 (T1)	21.13	19.20	21 07.51 (T3)	17.33	14.52	14.03
22	03.36	05.30 (T1)	05.18	06.52	07.31 (T3)	08.23	09.06	10.17
	22.58	10 05.40 (T1)	21.10	19.17	19 07.50 (T3)	17.29	14.49	14.04
23	03.39	05.28 (T1)	05.21	06.55	07.32 (T3)	08.26	09.09	10.17
	22.55	13 05.41 (T1)	21.06	19.13	17 07.49 (T3)	17.26	14.46	14.04
24	03.42	05.28 (T1)	05.25	06.58	07.35 (T3)	08.29	09.13	10.17
	22.52	15 05.43 (T1)	21.02	19.09	12 07.47 (T3)	17.22	14.43	14.05
25	03.46	05.27 (T1)	05.28	07.01	07.38 (T3)	07.32	09.16	10.17
	22.48	18 05.45 (T1)	20.59	19.06	6 07.44 (T3)	16.19	14.41	14.06
26	03.49	05.26 (T1)	05.31	07.04	07.36	09.19	10.17	
	22.45	19 05.45 (T1)	20.55	19.02	16.15	14.38	14.07	
27	03.53	05.26 (T1)	05.34	07.06	07.39	09.22	10.17	
	22.42	20 05.46 (T1)	20.51	18.58	16.12	14.36	14.08	
28	03.56	05.25 (T1)	05.37	07.09	07.42	09.26	10.17	
	22.38	22 05.47 (T1)	20.48	18.55	16.08	14.33	14.09	
29	03.59	05.24 (T1)	05.40	07.12	07.45	09.29	10.16	
	22.35	23 05.47 (T1)	20.44	18.51	16.05	14.31	14.11	
30	04.03	05.24 (T1)	05.43	07.15	07.49	09.32	10.16	
	22.31	23 05.47 (T1)	20.40	18.48	16.02	14.28	14.13	
31	04.06	05.24 (T1)	05.46	07.18	07.52	09.35	10.15	
	22.28	24 05.48 (T1)	20.37	18.45	15.58	14.25	14.14	
Potential sun hours	619	513	394	303	193	127		
Total, worst case	192	233	259					
Sun reduction	0,48	0,42	0,32					
Oper. time red.	0,97	0,97	0,97					
Wind dir. red.	0,63	0,63	0,62					
Total reduction	0,29	0,25	0,19					
Total, real	55	59	50					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: I - Lomarakenus I

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.14	08.59	12.37 (T7)	07.24	06.32	04.43
	14.16	15.52	9 12.46 (T7)	17.26	20.01	21.37
2	10.13	08.56	07.21	17.26	06.29	04.40
	14.18	15.55	17.29	17.29	20.04	21.40
3	10.11	08.53	07.17	17.29	06.25	04.36
	14.21	15.59	17.32	17.32	20.07	21.44
4	10.10	08.50	07.14	17.32	06.21	04.33
	14.23	16.02	17.35	17.35	20.10	21.47
5	10.09	08.47	07.10	17.35	06.18	04.29
	14.25	16.06	17.38	6 17.01 (T2)	20.14	21.50
6	10.07	08.43	07.06	17.38	06.14	04.25
	14.28	16.09	17.41	6 17.01 (T2)	20.14	21.50
7	10.05	08.40	07.03	17.41	06.10	04.22
	14.30	16.13	17.44	12 17.04 (T2)	20.17	21.54
8	10.03	12.27 (T7)	08.37	17.44	06.10	04.22
	14.33	5 12.32 (T7)	16.16	17.44	06.10	04.22
9	10.01	12.26 (T7)	08.33	17.44	06.10	04.22
	14.36	16 12.42 (T7)	16.19	17.44	06.10	04.22
10	09.59	12.26 (T7)	08.30	17.44	06.10	04.22
	14.39	18 12.44 (T7)	16.23	17.44	06.10	04.22
11	09.57	12.26 (T7)	08.27	17.44	06.10	04.22
	14.42	19 12.45 (T7)	16.26	17.44	06.10	04.22
12	09.55	12.25 (T7)	08.23	17.44	06.10	04.22
	14.45	20 12.45 (T7)	16.30	17.44	06.10	04.22
13	09.53	12.26 (T7)	08.20	17.44	06.10	04.22
	14.48	20 12.46 (T7)	16.33	17.44	06.10	04.22
14	09.51	12.25 (T7)	08.17	17.44	06.10	04.22
	14.51	22 12.47 (T7)	16.36	17.44	06.10	04.22
15	09.48	12.26 (T7)	08.13	17.44	06.10	04.22
	14.54	22 12.48 (T7)	16.40	17.44	06.10	04.22
16	09.46	12.25 (T7)	08.10	17.44	06.10	04.22
	14.57	23 12.48 (T7)	16.43	17.44	06.10	04.22
17	09.43	12.25 (T7)	08.06	17.44	06.10	04.22
	15.01	24 12.49 (T7)	16.46	17.44	06.10	04.22
18	09.41	12.25 (T7)	08.03	17.44	06.10	04.22
	15.04	25 12.50 (T7)	16.50	17.44	06.10	04.22
19	09.38	12.25 (T7)	07.59	17.44	06.10	04.22
	15.07	25 12.50 (T7)	16.53	17.44	06.10	04.22
20	09.35	12.26 (T7)	07.56	17.44	06.10	04.22
	15.11	25 12.51 (T7)	16.56	17.44	06.10	04.22
21	09.32	12.26 (T7)	07.52	17.44	06.10	04.22
	15.14	25 12.51 (T7)	17.00	17.44	06.10	04.22
22	09.30	12.26 (T7)	07.49	17.44	06.10	04.22
	15.17	25 12.51 (T7)	17.03	17.44	06.10	04.22
23	09.27	12.27 (T7)	07.45	17.44	06.10	04.22
	15.21	25 12.52 (T7)	17.06	17.44	06.10	04.22
24	09.24	12.27 (T7)	07.42	17.44	06.10	04.22
	15.24	24 12.51 (T7)	17.09	17.44	06.10	04.22
25	09.21	12.28 (T7)	07.38	17.44	06.10	04.22
	15.28	24 12.52 (T7)	17.13	17.44	06.10	04.22
26	09.18	12.29 (T7)	07.35	17.44	06.10	04.22
	15.31	23 12.52 (T7)	17.16	17.44	06.10	04.22
27	09.15	12.29 (T7)	07.31	17.44	06.10	04.22
	15.34	22 12.51 (T7)	17.19	17.44	06.10	04.22
28	09.12	12.30 (T7)	07.28	17.44	06.10	04.22
	15.38	21 12.51 (T7)	17.22	17.44	06.10	04.22
29	09.09	12.31 (T7)	07.24	17.44	06.10	04.22
	15.41	19 12.50 (T7)	17.24	17.44	06.10	04.22
30	09.06	12.33 (T7)	07.20	17.44	06.10	04.22
	15.45	17 12.50 (T7)	17.26	17.44	06.10	04.22
31	09.03	12.34 (T7)	07.16	17.44	06.10	04.22
	15.48	14 12.48 (T7)	17.28	17.44	06.10	04.22
Potential sun hours	163	235	363	454	577	640
Total, worst case	503	9	250			
Sun reduction	0,11	0,31	0,36			
Oper. time red.	0,97	0,97	0,97			
Wind dir. red.	0,66	0,66	0,61			
Total reduction	0,07	0,20	0,22			
Total, real	37	2	54			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: I - Lomarakenus I

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.35	04.09	05.49	07.18	17.27 (T2) 07.55	09.35 12.08 (T7)
	23.56	22.24	20.33	18.44	22 17.49 (T2) 15.54	14.25 19 12.27 (T7)
2	02.37	04.12	05.52	07.21	17.26 (T2) 07.58	09.38 12.09 (T7)
	23.54	22.21	20.29	18.40	23 17.49 (T2) 15.51	14.23 18 12.27 (T7)
3	02.40	04.16	05.55	07.24	17.26 (T2) 08.02	09.41 12.10 (T7)
	23.52	22.17	20.26	18.36	22 17.48 (T2) 15.48	14.21 16 12.26 (T7)
4	02.42	04.19	05.58	07.27	17.26 (T2) 08.05	09.43 12.11 (T7)
	23.50	22.14	20.22	18.33	22 17.48 (T2) 15.44	14.19 6 12.17 (T7)
5	02.45	04.23	06.01	07.30	17.26 (T2) 08.08	09.46
	23.48	22.10	20.18	18.29	21 17.47 (T2) 15.41	14.17
6	02.48	04.26	06.04	07.33	17.27 (T2) 08.12	09.49
	23.45	22.07	20.15	18.26	18 17.45 (T2) 15.38	14.15
7	02.50	04.29	06.07	07.36	17.27 (T2) 08.15	09.52
	23.43	22.03	20.11	18.22	14 17.41 (T2) 15.34	14.14
8	02.53	04.33	06.10	07.39	17.30 (T2) 08.19	09.54
	23.40	22.00	20.07	18.18	8 17.38 (T2) 15.31	14.12
9	02.56	04.36	06.13	07.42	17.33 (T2) 08.22	09.56
	23.38	21.56	20.04	18.15	1 17.34 (T2) 15.28	14.10
10	02.59	04.39	06.16	07.45	08.25	12.07 (T7) 09.59
	23.35	21.53	20.00	18.11	15.25	10 12.17 (T7) 14.09
11	03.02	04.42	06.19	07.48	08.29	12.05 (T7) 10.01
	23.32	21.49	19.56	18.08	15.22	14 12.19 (T7) 14.08
12	03.02	04.46	06.22	07.51	08.32	12.04 (T7) 10.03
	23.29	21.45	19.53	18.04	15.18	17 12.21 (T7) 14.07
13	03.05	04.49	06.25	07.54	08.35	12.03 (T7) 10.05
	23.26	21.42	19.49	18.00	15.15	19 12.22 (T7) 14.06
14	03.09	04.52	06.28	07.57	08.39	12.03 (T7) 10.07
	23.23	21.38	19.45	17.57	15.12	21 12.24 (T7) 14.05
15	03.12	04.56	06.31	08.00	08.42	12.02 (T7) 10.09
	23.20	21.35	19.42	17.53	15.09	22 12.24 (T7) 14.04
16	03.15	04.59	06.34	08.04	08.46	12.02 (T7) 10.10
	23.17	21.31	19.38	17.50	15.06	23 12.25 (T7) 14.03
17	03.18	05.02	06.37	08.07	08.49	12.02 (T7) 10.12
	23.14	21.27	19.34	17.46	15.03	24 12.26 (T7) 14.03
18	03.22	05.05	06.40	08.10	08.52	12.01 (T7) 10.13
	23.11	21.24	19.31	17.43	15.00	24 12.25 (T7) 14.03
19	03.25	05.08	06.42	08.13	08.56	12.01 (T7) 10.14
	23.08	21.20	19.27	17.39	14.57	25 12.26 (T7) 14.02
20	03.28	05.12	06.45	08.16	08.59	12.01 (T7) 10.15
	23.05	21.17	19.24	17.36	14.54	25 12.26 (T7) 14.03
21	03.32	05.15	06.48	08.19	09.03	12.01 (T7) 10.16
	23.01	21.13	19.20	17.32	14.51	25 12.26 (T7) 14.03
22	03.35	05.18	06.51	08.22	09.06	12.02 (T7) 10.16
	22.58	21.09	19.16	17.29	14.48	25 12.27 (T7) 14.03
23	03.38	05.21	06.54	08.26	09.09	12.03 (T7) 10.17
	22.55	21.06	19.13	17.25	14.46	24 12.27 (T7) 14.04
24	03.42	05.24	06.57	08.29	09.13	12.03 (T7) 10.17
	22.52	21.02	19.09	17.22	14.43	24 12.27 (T7) 14.04
25	03.45	05.27	07.00	17.36 (T2) 07.32	09.16	12.04 (T7) 10.17
	22.48	20.58	19.05	9 17.45 (T2) 16.18	14.40	23 12.27 (T7) 14.05
26	03.49	05.30	07.03	17.33 (T2) 07.35	09.19	12.04 (T7) 10.17
	22.45	20.55	19.02	14 17.47 (T2) 16.15	14.38	24 12.28 (T7) 14.06
27	03.52	05.33	07.06	17.31 (T2) 07.39	09.22	12.04 (T7) 10.17
	22.41	20.51	18.58	17 17.48 (T2) 16.11	14.35	23 12.27 (T7) 14.08
28	03.55	05.37	07.09	17.29 (T2) 07.42	09.25	12.06 (T7) 10.17
	22.38	20.47	18.54	20 17.49 (T2) 16.08	14.33	22 12.28 (T7) 14.09
29	03.59	05.40	07.12	17.28 (T2) 07.45	09.29	12.06 (T7) 10.16
	22.35	20.44	18.51	21 17.49 (T2) 16.05	14.30	21 12.27 (T7) 14.10
30	04.02	05.43	07.15	17.27 (T2) 07.48	09.32	12.07 (T7) 10.16
	22.31	20.40	18.47	22 17.49 (T2) 16.01	14.28	20 12.27 (T7) 14.12
31	04.06	05.46		07.52		10.15
	22.28	20.37		15.58		14.14
Potential sun hours	619	513	394	303	192	126
Total, worst case			103	151	455	59
Sun reduction			0,32	0,28	0,19	0,04
Oper. time red.			0,97	0,97	0,97	0,97
Wind dir. red.			0,61	0,61	0,66	0,66
Total reduction			0,19	0,17	0,12	0,03
Total, real			20	26	56	2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 10.51/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: J - Lomarakenus J (Hautakaarto)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

Table with 12 columns for months (January to December) and 31 rows of data. Each cell contains a time value in hh:mm. Summary rows at the bottom include 'Potential sun hours', 'Total, worst case', 'Sun reduction', 'Oper. time red.', 'Wind dir. red.', 'Total reduction', and 'Total, real'.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 10.51/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: L - Lomarakenus L (Haukijärvi)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for each day (1-31) showing sun rise, sun set, and reduction values. Includes summary rows for 'Potential sun hours', 'Total, worst case', and 'Total, real'.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)



Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 10.51/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058Shadow receptor: M - Lomarakennus M (Haukilahdi)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

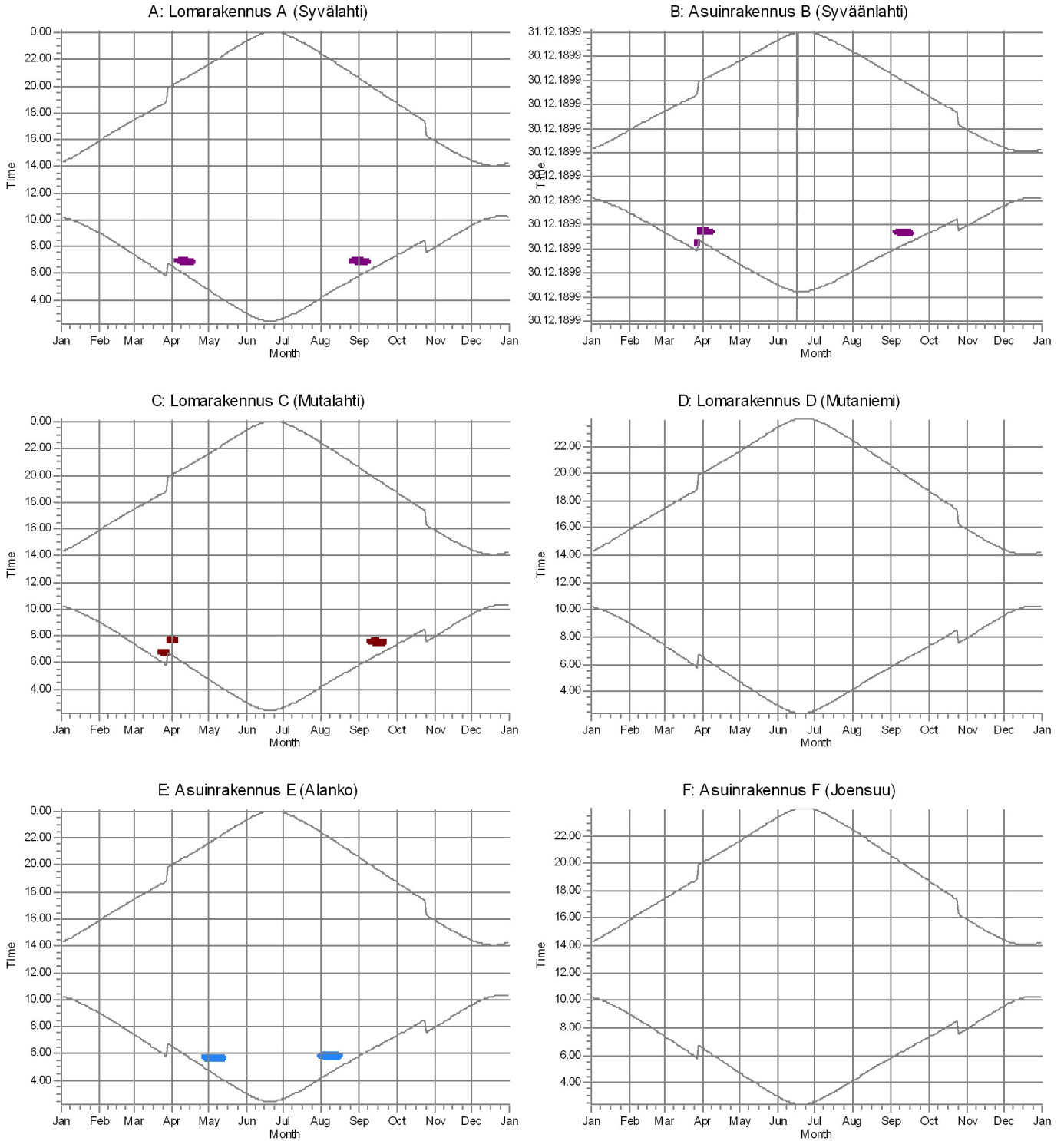
Table with columns for months (January to December) and rows for each day (1-31), showing sun rise, sun set, and various reduction factors.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058



WTGs

T16: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (663)

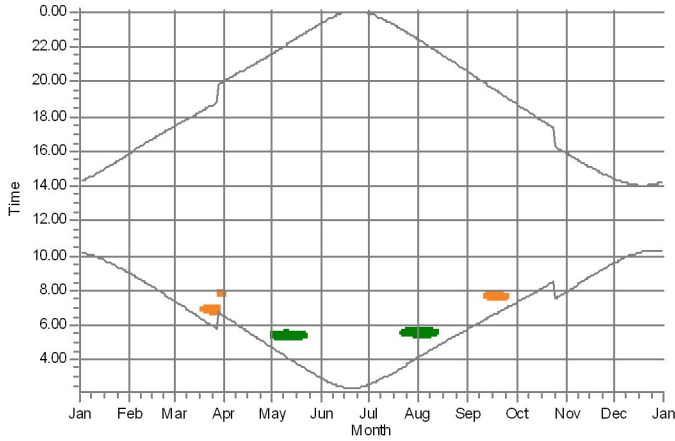
T19: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (660)

T9: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (670)

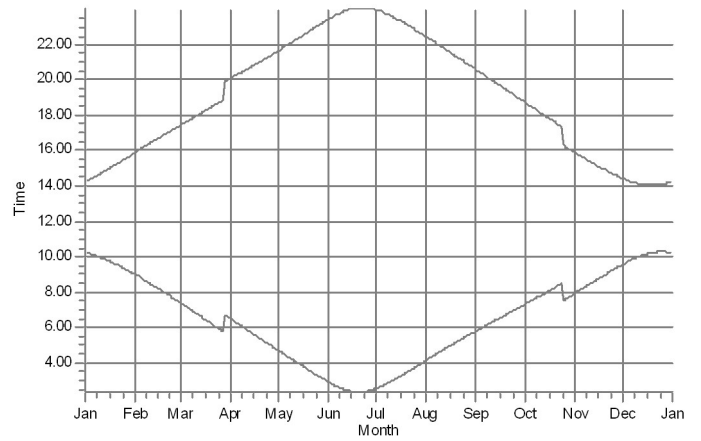
SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058

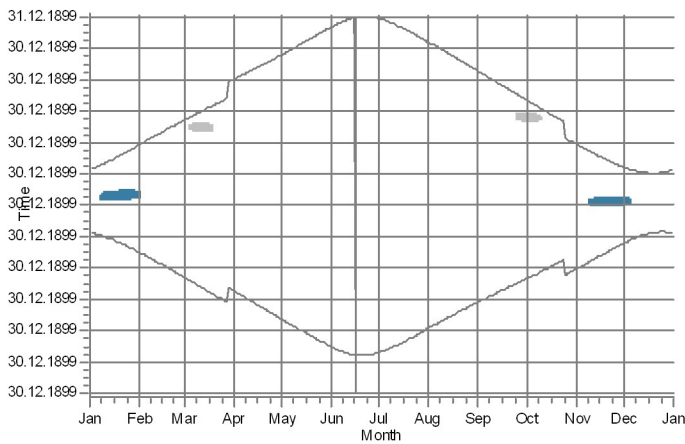
G: Asuinrakennus G (Heiniäho)



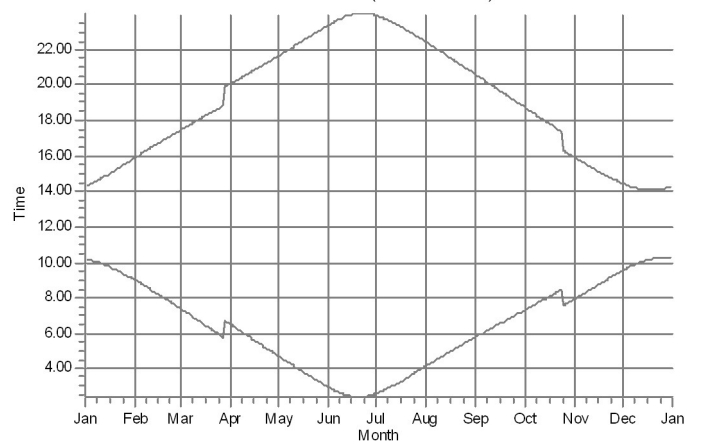
H: Asuinrakennus H (Mäkelä)



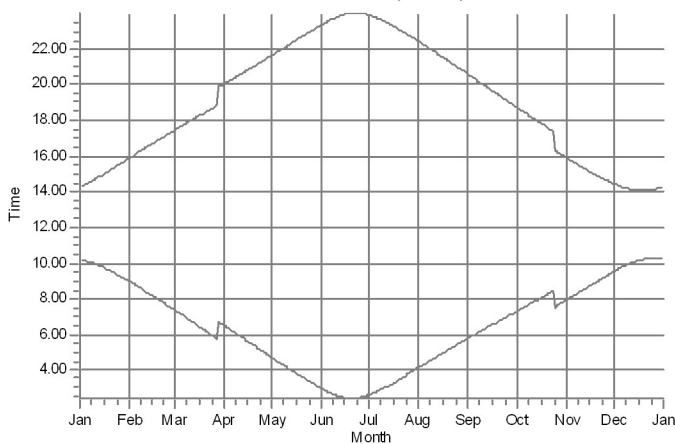
I: Lomarakennus I



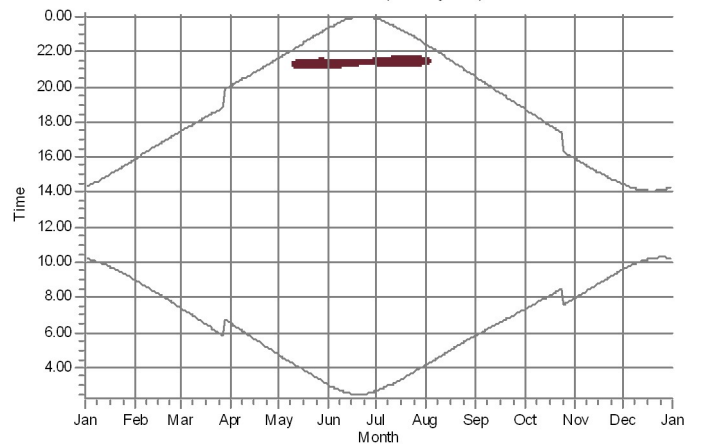
J: Lomarakennus J (Hautakaarto)



K: Asuinrakennus K (Takalo)



L: Lomarakennus L (Haukijärvi)

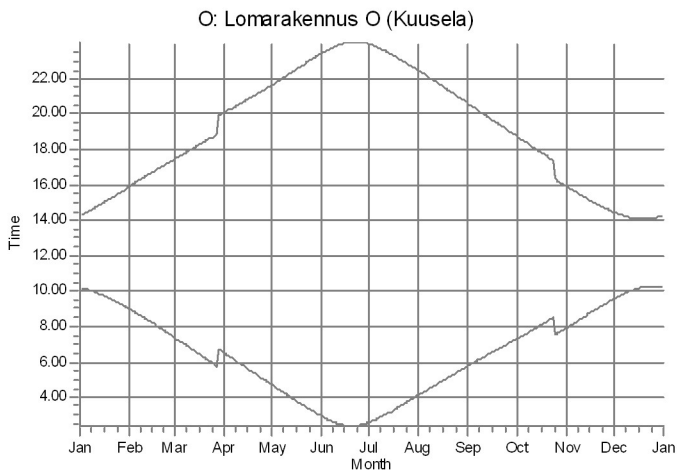
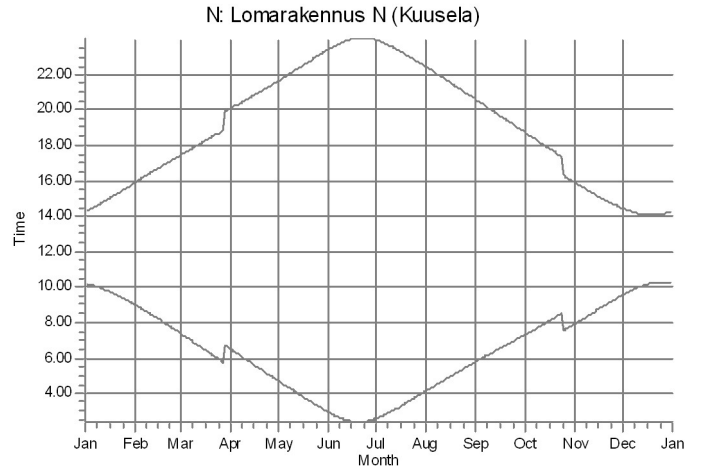
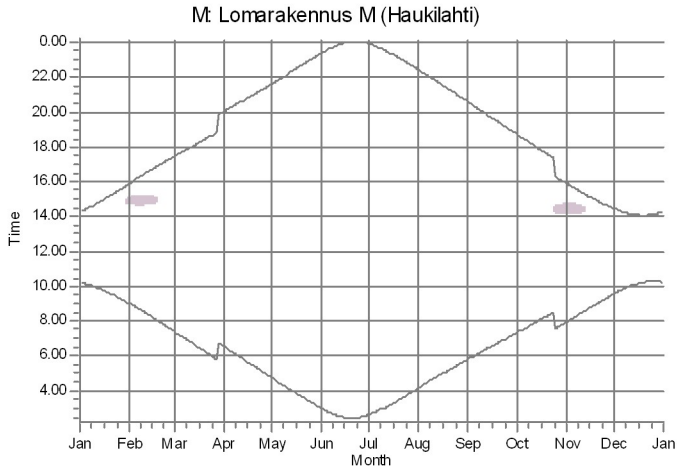


WTGs

- T1: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (678)
- T3: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (681)
- T7: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (682)
- T2: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (677)
- T3B: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (646)

SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058

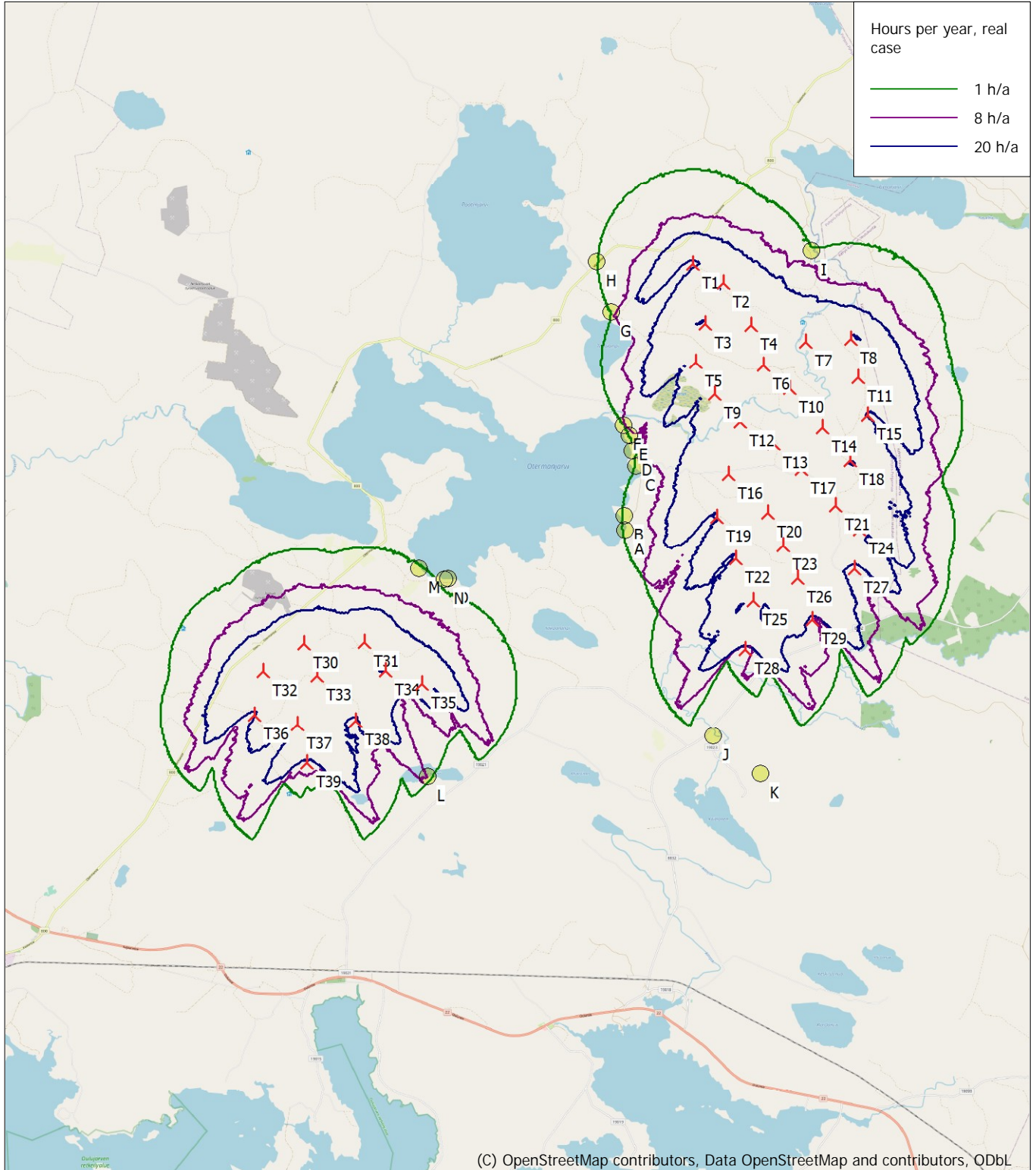


WTGs

T31: Generic RD200 7200 200.0 IQ1 hub: 200.0 m (TOT: 300.0 m) (652)

SHADOW - Map

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 504 420 North: 7 167 810

🚧 New WTG 📍 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas_0.wpo (2)

Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m

Liite 6. Varjostusmallinnuksen tulokset "Real Case, No Forest" - Hankevaihtoehto 2

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_N64,50_E027,335 (12)

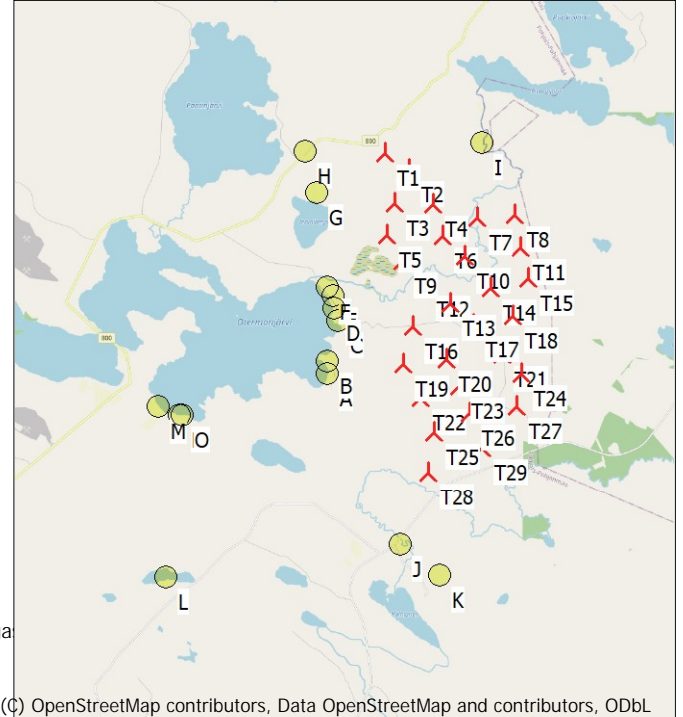
Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Pyhäntä_Pilpankanga
Obstacles used in calculation
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
			[m]									
T1	508 282	7 174 861	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T10	510 426	7 172 148	146,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T11	511 902	7 172 395	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T12	509 346	7 171 412	143,2	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T13	510 056	7 170 927	146,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T14	511 130	7 171 298	148,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T15	512 122	7 171 560	159,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T16	509 073	7 170 275	147,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T17	510 668	7 170 368	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T18	511 731	7 170 576	165,0	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T19	508 820	7 169 317	148,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T2	508 948	7 174 439	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T20	509 941	7 169 425	149,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T21	511 434	7 169 585	157,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T22	509 256	7 168 427	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T23	510 283	7 168 708	149,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T24	511 959	7 169 067	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T25	509 625	7 167 494	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T26	510 589	7 167 991	147,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T27	511 839	7 168 207	148,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T28	509 456	7 166 427	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T29	510 920	7 167 074	142,1	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T3	508 557	7 173 555	151,9	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T4	509 564	7 173 532	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T5	508 354	7 172 700	144,8	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T6	509 849	7 172 666	152,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T7	510 753	7 173 171	147,6	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T8	511 738	7 173 247	154,9	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T9	508 756	7 172 027	142,5	Generic RD200 7200 200.0 !O! h...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:200 000

▲ New WTG

● Shadow receptor

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Lomarakennus I	510 890	7 175 161	155,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Lomarakennus A (Syvälahti)	2:19
B	Asuinrakennus B (Syväänlahti)	1:59
C	Lomarakennus C (Mutalahti)	1:52
D	Lomarakennus D (Mutaniemi)	0:00
E	Asuinrakennus E (Alanko)	3:13
F	Asuinrakennus F (Joensuu)	0:00
G	Asuinrakennus G (Heiniäho)	5:39
H	Asuinrakennus H (Mäkelä)	0:00
I	Lomarakennus I	3:16
J	Lomarakennus J (Hautakaarto)	0:00
K	Asuinrakennus K (Takalo)	0:00
L	Lomarakennus L (Haukijärvi)	0:00
M	Lomarakennus M (Haukilahti)	0:00
N	Lomarakennus N (Kuusela)	0:00
O	Lomarakennus O (Kuusela)	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Expected [h/year]
T1	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (709)	3:54
T10	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (702)	0:00
T11	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (704)	0:00
T12	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (699)	0:00
T13	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (697)	0:00
T14	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (698)	0:00
T15	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (700)	0:00
T16	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (694)	1:52
T17	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (695)	0:00
T18	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (696)	0:00
T19	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (691)	4:18
T2	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (708)	1:37
T20	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (693)	0:00
T21	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (692)	0:00
T22	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (688)	0:00
T23	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (689)	0:00
T24	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (690)	0:00
T25	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (685)	0:00
T26	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (686)	0:00
T27	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (687)	0:00
T28	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (683)	0:00

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 15.00/3.5.584

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058

...continued from previous page

No.	Name	Expected [h/year]
T29	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (684)	0:00
T3	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (710)	1:44
T4	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (707)	0:00
T5	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (705)	0:00
T6	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (703)	0:00
T7	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (711)	1:35
T8	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (706)	0:00
T9	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (701)	3:13

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 15.00/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: A - Lomarakenus A (Sylvälähti)
 Sunshine probability S (Average daily sunshine hours) [LULEÅ]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	08.59	07.24	06.33	04.44	03.00	02.37	04.10	05.49	06.42 (T19)	07.18	07.55	09.34	
	14.18	15.53	17.26	20.01	21.37	23.21	23.55	22.24	20.33	23	07.05 (T19)	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.40	02.55	02.39	04.13	05.52	06.42 (T19)	07.21	07.58	09.37	
	14.20	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	23	07.05 (T19)	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.42	04.17	05.55	06.42 (T19)	07.24	08.02	09.40	
	14.22	16.00	17.32	20.08	21.43	23.28	23.51	22.17	20.26	22	07.04 (T19)	18.37	15.48	14.22
4	10.09	08.50	07.14	06.22	06.54 (T19)	04.33	02.49	02.44	05.58	06.41 (T19)	07.27	08.05	09.43	
	14.24	16.03	17.36	20.11	6	07.00 (T19)	21.47	23.31	20.22	22	07.03 (T19)	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	06.51 (T19)	04.30	02.47	02.47	06.01	06.42 (T19)	07.30	08.08	09.46	
	14.27	16.06	17.39	20.14	12	07.03 (T19)	21.50	23.34	20.18	20	07.02 (T19)	18.30	15.42	14.18
6	10.06	08.43	07.07	06.14	06.47 (T19)	04.26	02.44	02.49	06.04	06.43 (T19)	07.33	08.12	09.48	
	14.29	16.10	17.42	20.17	17	07.04 (T19)	21.54	23.36	20.15	17	07.00 (T19)	18.26	15.38	14.17
7	10.05	08.40	07.03	06.11	06.46 (T19)	04.23	02.42	02.52	06.07	06.46 (T19)	07.36	08.15	09.51	
	14.32	16.13	17.45	20.20	19	07.05 (T19)	21.57	23.39	20.11	12	06.58 (T19)	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	06.44 (T19)	04.19	02.40	02.55	06.10	06.49 (T19)	07.39	08.18	09.53	
	14.34	16.17	17.48	20.23	22	07.06 (T19)	22.00	23.42	20.08	7	06.56 (T19)	18.19	15.32	14.13
9	10.01	08.33	06.56	06.04	06.44 (T19)	04.16	02.38	02.58	06.13		07.42	08.22	09.56	
	14.37	16.20	17.51	20.26	22	07.06 (T19)	22.04	23.44	20.04		18.15	15.29	14.12	
10	09.59	08.30	06.52	06.00	06.43 (T19)	04.12	02.36	03.01	06.16		07.45	08.25	09.58	
	14.40	16.24	17.54	20.29	23	07.06 (T19)	22.07	23.47	20.00		18.12	15.25	14.10	
11	09.57	08.27	06.49	05.56	06.43 (T19)	04.09	02.34	03.01	06.19		07.48	08.29	10.00	
	14.43	16.27	17.57	20.32	23	07.06 (T19)	22.11	23.49	20.00		18.08	15.22	14.09	
12	09.55	08.23	06.45	05.53	06.42 (T19)	04.05	02.32	03.04	06.22		07.51	08.32	10.02	
	14.46	16.30	18.00	20.35	24	07.06 (T19)	22.14	23.51	20.00		18.05	15.19	14.08	
13	09.52	08.20	06.42	05.49	06.42 (T19)	04.02	02.30	03.07	06.25		07.54	08.35	10.04	
	14.49	16.34	18.04	20.39	24	07.06 (T19)	22.17	23.53	20.00		18.01	15.16	14.07	
14	09.50	08.17	06.38	05.45	06.42 (T19)	03.58	02.29	03.10	06.28		07.58	08.39	10.06	
	14.52	16.37	18.07	20.42	22	07.04 (T19)	22.21	23.55	20.00		18.01	15.13	14.06	
15	09.48	08.13	06.34	05.42	06.43 (T19)	03.55	02.28	03.13	06.31		08.01	08.42	10.08	
	14.55	16.40	18.10	20.45	21	07.04 (T19)	22.24	23.57	20.00		18.01	15.10	14.05	
16	09.45	08.10	06.31	05.38	06.43 (T19)	03.51	02.27	03.16	06.34		08.04	08.46	10.10	
	14.58	16.44	18.13	20.48	19	07.02 (T19)	22.28	23.58	20.00		18.01	15.07	14.05	
17	09.43	08.06	06.27	05.34	06.44 (T19)	03.48	02.26	03.20	06.37		08.07	08.49	10.11	
	15.02	16.47	18.16	20.51	17	07.01 (T19)	22.31	23.59	20.00		18.01	15.04	14.04	
18	09.40	08.03	06.23	05.31	06.46 (T19)	03.45	02.25	03.23	06.40		08.10	08.52	10.12	
	15.05	16.50	18.19	20.54	13	06.59 (T19)	22.35	00.00	20.00		18.01	15.01	14.04	
19	09.38	07.59	06.20	05.27	06.48 (T19)	03.41	02.25	03.26	06.43		08.13	08.56	10.13	
	15.08	16.54	18.22	20.58	8	06.56 (T19)	22.38	00.01	23.07		17.40	14.58	14.04	
20	09.35	07.56	06.16	05.24	03.38	02.25	03.30	05.12	06.46		08.16	08.59	10.14	
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24		17.36	14.55	14.04	
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.15	06.49		08.19	09.02	10.15	
	15.15	17.00	18.28	21.04	22.45	00.02	23.01	21.13	19.20		17.33	14.52	14.04	
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.19	06.52		08.23	09.06	10.16	
	15.18	17.04	18.31	21.07	22.48	00.03	22.58	21.09	19.17		17.29	14.49	14.05	
23	09.27	07.46	06.05	05.13	03.28	02.26	03.40	05.22	06.55		08.26	09.09	10.16	
	15.22	17.07	18.34	21.10	22.52	00.02	22.54	21.06	19.13		17.26	14.47	14.05	
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58		08.29	09.12	10.17	
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	9	07.00 (T19)	19.09	17.22	14.44	14.06
25	09.21	07.39	05.58	05.05	03.22	02.27	03.46	05.28	07.01		07.32	09.15	10.17	
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.58	14	07.02 (T19)	19.06	16.19	14.41	14.07
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03		07.35	09.19	10.17	
	15.32	17.16	18.43	21.20	23.02	00.01	22.45	20.55	17	07.04 (T19)	19.02	16.15	14.39	14.08
27	09.15	07.31	05.51	04.58	03.15	02.30	03.53	05.34	07.06		07.39	09.22	10.16	
	15.35	17.20	18.46	21.24	23.05	00.00	22.41	20.51	19	07.05 (T19)	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09		07.42	09.25	10.16	
	15.39	17.23	18.49	21.27	23.09	23.59	22.38	20.48	21	07.06 (T19)	18.55	16.09	14.34	14.10
29	09.09		06.44	04.51	03.09	02.33	04.00	05.40	07.12		07.45	09.28	10.16	
	15.42		19.52	21.30	23.12	23.58	22.34	20.44	22	07.05 (T19)	18.51	16.05	14.31	14.12
30	09.06		06.40	04.48	03.06	02.35	04.03	05.43	07.15		07.48	09.31	10.15	
	15.46		19.55	21.33	23.15	23.56	22.31	20.40	23	07.05 (T19)	18.48	16.02	14.29	14.13
31	09.02		06.36		03.03		04.07	05.46			07.52		10.14	
	15.49		19.58		23.18		22.27	20.37	23	07.05 (T19)	18.48	15.58	14.29	14.15
Potential sun hours	164	235	363	453	576	638	618	512	394		303	193	127	
Total, worst case				292					148		146			
Sun reduction				0.43					0.42		0.32			
Oper. time red.				0.97					0.97		0.97			
Wind dir. red.				0.62					0.62		0.62			
Total reduction				0.25					0.25		0.19			
Total, real				74					37		28			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 15.00/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: B - Asuinrakennus B (Sylväänlahti)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

Table with 12 columns (January-December) and 35 rows (Day 1-35). Includes summary rows for Potential sun hours, Total, worst case, Sun reduction, Oper. time red., Wind dir. red., Total reduction, and Total, real.

Table layout: For each day in each month the following matrix apply

Matrix with 4 columns: Day in month, Sun rise (hh:mm), Sun set (hh:mm), Minutes with flicker, First time (hh:mm) with flicker, Last time (hh:mm) with flicker, (WTG causing flicker first time), (WTG causing flicker last time)



Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 15.00/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: C - Lomarakenus C (Mutalahti)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

Table with 12 columns for months (January to December) and 31 rows for days. Each cell contains sun rise/set times and shadow reduction percentages. Summary rows at the bottom show total sun hours and reduction percentages.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)



SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: E - Asuinrakennus E (Alanko)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days of the month, listing sunrise/sunset times and shadow reduction data.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: G - Asuinrakennus G (Heiniaho)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June			
1	10.14	09.00	07.25	06.33	07.49 (T3)	04.44	05.23 (T1)	03.00	
	14.17	15.52	17.26	20.02	6 07.55 (T3)	21.37	8 05.31 (T1)	23.22	
2	10.13	08.57	07.21	06.29		04.40		05.20 (T1)	02.54
	14.19	15.56	17.29	20.05		21.40	13	05.33 (T1)	23.25
3	10.12	08.53	07.17	06.25		04.37		05.18 (T1)	02.51
	14.21	15.59	17.32	20.08		21.44	16	05.34 (T1)	23.29
4	10.10	08.50	07.14	06.22		04.33		05.17 (T1)	02.48
	14.23	16.03	17.35	20.11		21.47	18	05.35 (T1)	23.32
5	10.09	08.47	07.10	06.18		04.29		05.15 (T1)	02.46
	14.26	16.06	17.39	20.14		21.51	20	05.35 (T1)	23.35
6	10.07	08.44	07.07	06.14		04.26		05.14 (T1)	02.43
	14.28	16.10	17.42	20.17		21.54	22	05.36 (T1)	23.37
7	10.05	08.40	07.03	06.11		04.22		05.14 (T1)	02.41
	14.31	16.13	17.45	20.20		21.57	22	05.36 (T1)	23.40
8	10.04	08.37	07.00	06.07		04.19		05.13 (T1)	02.39
	14.34	16.16	17.48	20.23		22.01	23	05.36 (T1)	23.43
9	10.02	08.34	06.56	06.03		04.15		05.14 (T1)	02.37
	14.37	16.20	17.51	20.26		22.04	24	05.38 (T1)	23.45
10	10.00	08.30	06.52	06.00		04.12		05.14 (T1)	02.34
	14.39	16.23	17.54	20.29		22.08	24	05.38 (T1)	23.48
11	09.58	08.27	06.49	05.56		04.08		05.13 (T1)	02.33
	14.42	16.27	17.57	20.33		22.11	24	05.37 (T1)	23.50
12	09.55	08.24	06.45	05.52		04.05		05.13 (T1)	02.31
	14.45	16.30	18.00	20.36		22.15	24	05.37 (T1)	23.52
13	09.53	08.20	06.42	05.49		04.01		05.13 (T1)	02.29
	14.48	16.33	18.04	20.39		22.18	24	05.37 (T1)	23.54
14	09.51	08.17	06.38	05.45		03.58		05.13 (T1)	02.28
	14.52	16.37	18.07	20.42		22.21	23	05.36 (T1)	23.56
15	09.48	08.13	06.34	05.42		03.54		05.15 (T1)	02.27
	14.55	16.40	18.10	20.45		22.25	22	05.37 (T1)	23.58
16	09.46	08.10	06.31	05.38		03.51		05.15 (T1)	02.26
	14.58	16.44	18.13	20.48		22.28	21	05.36 (T1)	23.59
17	09.43	08.07	06.27	05.34		03.48		05.15 (T1)	02.25
	15.01	16.47	18.16	20.51		22.32	20	05.35 (T1)	00.01
18	09.41	08.03	06.24	06.56 (T3)	05.31	03.44		05.16 (T1)	02.24
	15.04	16.50	18.19	3 06.59 (T3)	20.55	22.35	19	05.35 (T1)	00.02
19	09.38	08.00	06.20	06.52 (T3)	05.27	03.41		05.17 (T1)	02.24
	15.08	16.54	18.22	10 07.02 (T3)	20.58	22.39	16	05.33 (T1)	00.03
20	09.35	07.56	06.16	06.49 (T3)	05.23	03.37		05.18 (T1)	02.23
	15.11	16.57	18.25	15 07.04 (T3)	21.01	22.42	15	05.33 (T1)	00.03
21	09.33	07.53	06.13	06.46 (T3)	05.20	03.34		05.19 (T1)	02.24
	15.14	17.00	18.28	19 07.05 (T3)	21.04	22.46	12	05.31 (T1)	00.04
22	09.30	07.49	06.09	06.44 (T3)	05.16	03.31		05.21 (T1)	02.24
	15.18	17.03	18.31	21 07.05 (T3)	21.08	22.49	8	05.29 (T1)	00.04
23	09.27	07.46	06.05	06.44 (T3)	05.12	03.27			02.24
	15.21	17.07	18.34	22 07.06 (T3)	21.11	22.52			00.04
24	09.24	07.42	06.02	06.43 (T3)	05.09	03.24			02.25
	15.25	17.10	18.37	23 07.06 (T3)	21.14	22.56			00.04
25	09.21	07.39	05.58	06.42 (T3)	05.05	03.21			02.26
	15.28	17.13	18.40	23 07.05 (T3)	21.17	22.59			00.03
26	09.18	07.35	05.54	06.43 (T3)	05.02	03.18			02.27
	15.31	17.16	18.43	22 07.05 (T3)	21.21	23.03			00.02
27	09.15	07.32	05.51	06.42 (T3)	04.58	03.15			02.29
	15.35	17.20	18.46	22 07.04 (T3)	21.24	23.06			00.01
28	09.12	07.28	05.47	06.43 (T3)	04.54	03.12			02.30
	15.38	17.23	18.49	21 07.04 (T3)	21.27	23.09			00.00
29	09.09		06.44	07.44 (T3)	04.51	03.08			02.32
	15.42		19.52	18 08.02 (T3)	21.30	23.13			23.59
30	09.06		06.40	07.44 (T3)	04.47	03.05			02.34
	15.45		19.55	16 08.00 (T3)	21.34	23.16			23.57
31	09.03		06.36	07.46 (T3)		03.02			
	15.49		19.59	13 07.59 (T3)		23.19			
Potential sun hours	163	235	363	454		577		639	
Total, worst case			248		6		418		
Sun reduction			0,36		0,43		0,47		
Oper. time red.			0,97		0,97		0,97		
Wind dir. red.			0,62		0,62		0,63		
Total reduction			0,21		0,26		0,29		
Total, real			53		2		120		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: G - Asuinrakennus G (Heiniaho)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.36	04.10	05.23 (T1)	05.49	07.18	07.55	09.35	
	23.56	22.25	24 05.47 (T1)	20.33	18.44	15.55	14.26	
2	02.38	04.13	05.23 (T1)	05.52	07.21	07.59	09.38	
	23.54	22.21	24 05.47 (T1)	20.30	18.40	15.51	14.24	
3	02.40	04.16	05.24 (T1)	05.55	07.24	08.02	09.41	
	23.52	22.18	23 05.47 (T1)	20.26	18.37	15.48	14.22	
4	02.43	04.20	05.24 (T1)	05.58	07.27	08.05	09.44	
	23.50	22.14	23 05.47 (T1)	20.22	18.33	15.45	14.20	
5	02.46	04.23	05.23 (T1)	06.01	07.30	08.09	09.46	
	23.48	22.11	23 05.46 (T1)	20.19	18.30	15.41	14.18	
6	02.48	04.26	05.24 (T1)	06.04	07.33	08.12	09.49	
	23.45	22.07	22 05.46 (T1)	20.15	18.26	15.38	14.16	
7	02.51	04.30	05.24 (T1)	06.07	07.36	08.15	09.52	
	23.43	22.03	22 05.46 (T1)	20.11	18.22	15.35	14.14	
8	02.54	04.33	05.25 (T1)	06.10	07.39	08.19	09.54	
	23.40	22.00	20 05.45 (T1)	20.08	18.19	15.32	14.12	
9	02.57	04.36	05.26 (T1)	06.13	07.42	08.22	09.57	
	23.38	21.56	18 05.44 (T1)	20.04	18.15	15.28	14.11	
10	03.00	04.40	05.27 (T1)	06.16	07.45	08.26	09.59	
	23.35	21.53	16 05.43 (T1)	20.00	18.12	15.25	14.10	
11	03.00	04.43	05.29 (T1)	06.19	07.48	08.29	10.01	
	23.32	21.49	12 05.41 (T1)	19.57	4 07.46 (T3)	18.08	15.22	14.08
12	03.03	04.46	05.32 (T1)	06.22	07.38 (T3)	07.52	08.32	10.03
	23.29	21.46	6 05.38 (T1)	19.53	12 07.50 (T3)	18.04	15.19	14.07
13	03.06	04.49	06.25	07.36 (T3)	07.55	08.36	10.05	
	23.27	21.42	19.49	16 07.52 (T3)	18.01	15.16	14.06	
14	03.09	04.53	06.28	07.34 (T3)	07.58	08.39	10.07	
	23.24	21.38	19.46	19 07.53 (T3)	17.57	15.13	14.05	
15	03.12	04.56	06.31	07.33 (T3)	08.01	08.43	10.09	
	23.21	21.35	19.42	21 07.54 (T3)	17.54	15.09	14.04	
16	03.16	04.59	06.34	07.32 (T3)	08.04	08.46	10.10	
	23.18	21.31	19.38	22 07.54 (T3)	17.50	15.06	14.04	
17	03.19	05.02	06.37	07.31 (T3)	08.07	08.49	10.12	
	23.14	21.28	19.35	22 07.53 (T3)	17.47	15.03	14.03	
18	03.22	05.06	06.40	07.30 (T3)	08.10	08.53	10.13	
	23.11	21.24	19.31	23 07.53 (T3)	17.43	15.00	14.03	
19	03.26	05.09	06.43	07.30 (T3)	08.13	08.56	10.14	
	23.08	21.20	19.28	23 07.53 (T3)	17.40	14.58	14.03	
20	03.29	05.12	06.46	07.30 (T3)	08.16	08.59	10.15	
	23.05	21.17	19.24	22 07.52 (T3)	17.36	14.55	14.03	
21	03.32	05.32 (T1)	05.15	06.49	07.30 (T3)	08.20	09.03	10.16
	23.02	5 05.37 (T1)	21.13	19.20	21 07.51 (T3)	17.33	14.52	14.03
22	03.36	05.30 (T1)	05.18	06.52	07.31 (T3)	08.23	09.06	10.17
	22.58	10 05.40 (T1)	21.10	19.17	19 07.50 (T3)	17.29	14.49	14.04
23	03.39	05.28 (T1)	05.21	06.55	07.32 (T3)	08.26	09.09	10.17
	22.55	13 05.41 (T1)	21.06	19.13	17 07.49 (T3)	17.26	14.46	14.04
24	03.42	05.28 (T1)	05.25	06.58	07.35 (T3)	08.29	09.13	10.17
	22.52	15 05.43 (T1)	21.02	19.09	12 07.47 (T3)	17.22	14.43	14.05
25	03.46	05.27 (T1)	05.28	07.01	07.38 (T3)	07.32	09.16	10.17
	22.48	18 05.45 (T1)	20.59	19.06	6 07.44 (T3)	16.19	14.41	14.06
26	03.49	05.26 (T1)	05.31	07.04	07.36	09.19	10.17	
	22.45	19 05.45 (T1)	20.55	19.02	16.15	14.38	14.07	
27	03.53	05.26 (T1)	05.34	07.06	07.39	09.22	10.17	
	22.42	20 05.46 (T1)	20.51	18.58	16.12	14.36	14.08	
28	03.56	05.25 (T1)	05.37	07.09	07.42	09.26	10.17	
	22.38	22 05.47 (T1)	20.48	18.55	16.08	14.33	14.09	
29	03.59	05.24 (T1)	05.40	07.12	07.45	09.29	10.16	
	22.35	23 05.47 (T1)	20.44	18.51	16.05	14.31	14.11	
30	04.03	05.24 (T1)	05.43	07.15	07.49	09.32	10.16	
	22.31	23 05.47 (T1)	20.40	18.48	16.02	14.28	14.13	
31	04.06	05.24 (T1)	05.46	07.18	07.52	09.35	10.15	
	22.28	24 05.48 (T1)	20.37	18.45	15.58	14.25	14.14	
Potential sun hours	619	513	394	303	193	127		
Total, worst case	192	233	259					
Sun reduction	0,48	0,42	0,32					
Oper. time red.	0,97	0,97	0,97					
Wind dir. red.	0,63	0,63	0,62					
Total reduction	0,29	0,25	0,19					
Total, real	55	59	50					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: H - Asuinrakennus H (Mäkelä)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEÅ]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.14 14.17	09.00 15.52	07.25 17.26	06.33 20.02	04.44 21.37	02.56 23.23	02.36 23.56	04.09 22.25	05.49 20.33	07.18 18.44	07.55 15.55	09.35 14.26
2	10.13 14.19	08.57 15.56	07.21 17.29	06.29 20.05	04.40 21.41	02.54 23.26	02.38 23.54	04.13 22.21	05.52 20.30	07.21 18.40	07.59 15.51	09.38 14.24
3	10.12 14.21	08.53 15.59	07.18 17.32	06.25 20.08	04.36 21.44	02.51 23.29	02.40 23.52	04.16 22.18	05.55 20.26	07.24 18.37	08.02 15.48	09.41 14.22
4	10.10 14.23	08.50 16.03	07.14 17.35	06.22 20.11	04.33 21.47	02.48 23.32	02.43 23.50	04.20 22.14	05.58 20.22	07.27 18.33	08.05 15.45	09.44 14.20
5	10.09 14.26	08.47 16.06	07.10 17.39	06.18 20.14	04.29 21.51	02.46 23.35	02.45 23.48	04.23 22.11	06.01 20.19	07.30 18.30	08.09 15.41	09.47 14.18
6	10.07 14.28	08.44 16.10	07.07 17.42	06.14 20.17	04.26 21.54	02.43 23.38	02.48 23.46	04.26 22.07	06.04 20.15	07.33 18.26	08.12 15.38	09.49 14.16
7	10.06 14.31	08.40 16.13	07.03 17.45	06.11 20.20	04.22 21.58	02.41 23.40	02.51 23.43	04.30 22.04	06.07 20.11	07.36 18.22	08.16 15.35	09.52 14.14
8	10.04 14.34	08.37 16.16	07.00 17.48	06.07 20.23	04.19 22.01	02.38 23.43	02.54 23.41	04.33 22.00	06.10 20.08	07.39 18.19	08.19 15.32	09.54 14.12
9	10.02 14.36	08.34 16.20	06.56 17.51	06.03 20.26	04.15 22.04	02.36 23.46	02.57 23.38	04.36 21.56	06.13 20.04	07.42 18.15	08.22 15.28	09.57 14.11
10	10.00 14.39	08.30 16.23	06.52 17.54	06.00 20.29	04.12 22.08	02.34 23.48	03.00 23.35	04.40 21.53	06.16 20.00	07.45 18.12	08.26 15.25	09.59 14.09
11	09.58 14.42	08.27 16.27	06.49 17.57	05.56 20.33	04.08 22.11	02.32 23.51	03.00 23.33	04.43 21.49	06.19 19.57	07.49 18.08	08.29 15.22	10.01 14.08
12	09.56 14.45	08.24 16.30	06.45 18.00	05.52 20.36	04.05 22.15	02.31 23.53	03.03 23.30	04.46 21.46	06.22 19.53	07.52 18.04	08.32 15.19	10.03 14.07
13	09.53 14.48	08.20 16.33	06.42 18.04	05.49 20.39	04.01 22.18	02.29 23.55	03.06 23.27	04.49 21.42	06.25 19.49	07.55 18.01	08.36 15.16	10.05 14.06
14	09.51 14.51	08.17 16.37	06.38 18.07	05.45 20.42	03.58 22.22	02.28 23.57	03.09 23.24	04.53 21.39	06.28 19.46	07.58 17.57	08.39 15.13	10.07 14.05
15	09.49 14.55	08.14 16.40	06.34 18.10	05.42 20.45	03.54 22.25	02.26 23.58	03.12 23.21	04.56 21.35	06.31 19.42	08.01 17.54	08.43 15.09	10.09 14.04
16	09.46 14.58	08.10 16.44	06.31 18.13	05.38 20.48	03.51 22.29	02.25 00.00	03.16 23.18	04.59 21.31	06.34 19.38	08.04 17.50	08.46 15.06	10.11 14.04
17	09.43 15.01	08.07 16.47	06.27 18.16	05.34 20.52	03.47 22.32	02.24 00.01	03.19 23.15	05.02 21.28	06.37 19.35	08.07 17.47	08.49 15.03	10.12 14.03
18	09.41 15.04	08.03 16.50	06.24 18.19	05.31 20.55	03.44 22.35	02.24 00.02	03.22 23.11	05.06 21.24	06.40 19.31	08.10 17.43	08.53 15.00	10.13 14.03
19	09.38 15.08	08.00 16.53	06.20 18.22	05.27 20.58	03.41 22.39	02.23 00.03	03.25 23.08	05.09 21.21	06.43 19.28	08.13 17.40	08.56 14.57	10.14 14.03
20	09.36 15.11	07.56 16.57	06.16 18.25	05.23 21.01	03.37 22.42	02.23 00.04	03.29 23.05	05.12 21.17	06.46 19.24	08.17 17.36	09.00 14.55	10.15 14.03
21	09.33 15.14	07.53 17.00	06.13 18.28	05.20 21.04	03.34 22.46	02.23 00.04	03.32 23.02	05.15 21.13	06.49 19.20	08.20 17.33	09.03 14.52	10.16 14.03
22	09.30 15.18	07.49 17.03	06.09 18.31	05.16 21.08	03.31 22.49	02.23 00.04	03.36 22.59	05.18 21.10	06.52 19.17	08.23 17.29	09.06 14.49	10.17 14.04
23	09.27 15.21	07.46 17.07	06.05 18.34	05.12 21.11	03.27 22.53	02.24 00.04	03.39 22.55	05.21 21.06	06.55 19.13	08.26 17.26	09.10 14.46	10.17 14.04
24	09.24 15.25	07.42 17.10	06.02 18.37	05.09 21.14	03.24 22.56	02.25 00.04	03.42 22.52	05.25 21.02	06.58 19.09	08.29 17.22	09.13 14.43	10.18 14.05
25	09.21 15.28	07.39 17.13	05.58 18.40	05.05 21.17	03.21 22.59	02.26 00.03	03.46 22.49	05.28 20.59	07.01 19.06	07.33 16.19	09.16 14.41	10.18 14.06
26	09.18 15.31	07.35 17.16	05.54 18.43	05.02 21.21	03.18 23.03	02.27 00.03	03.49 22.45	05.31 20.55	07.04 19.02	07.36 16.15	09.19 14.38	10.18 14.07
27	09.15 15.35	07.32 17.20	05.51 18.46	04.58 21.24	03.15 23.06	02.28 00.02	03.52 22.42	05.34 20.51	07.06 18.58	07.39 16.12	09.23 14.36	10.18 14.08
28	09.12 15.38	07.28 17.23	05.47 18.49	04.54 21.27	03.11 23.10	02.30 00.01	03.56 22.38	05.37 20.48	07.09 18.55	07.42 16.08	09.26 14.33	10.17 14.09
29	09.09 15.42		06.44 19.52	04.51 21.31	03.08 23.13	02.32 23.59	03.59 22.35	05.40 20.44	07.12 18.51	07.46 16.05	09.29 14.31	10.17 14.11
30	09.06 15.45		06.40 19.56	04.47 21.34	03.05 23.16	02.34 23.58	04.03 22.32	05.43 20.41	07.15 18.48	07.49 16.02	09.32 14.28	10.16 14.12
31	09.03 15.49		06.36 19.59		03.02 23.19		04.06 22.28	05.46 20.37		07.52 15.58		10.15 14.14
Potential sun hours	163	235	363	454	577	640	619	513	394	303	192	126
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) First time (hh:mm) with flicker (WTG causing flicker first time)
 Sun set (hh:mm) Minutes with flicker Last time (hh:mm) with flicker (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: I - Lomarakenus I

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.14	08.59	12.37 (T7)	07.24	06.32	04.43
	14.16	15.52	9 12.46 (T7)	17.26	20.01	21.37
2	10.13	08.56	07.21	17.26	06.29	04.40
	14.18	15.55	17.29	17.29	20.04	21.40
3	10.11	08.53	07.17	17.29	06.25	04.36
	14.21	15.59	17.32	17.32	20.07	21.44
4	10.10	08.50	07.14	17.32	06.21	04.33
	14.23	16.02	17.35	17.35	20.10	21.47
5	10.09	08.47	07.10	17.35	06.18	04.29
	14.25	16.06	17.38	6 17.01 (T2)	20.14	21.50
6	10.07	08.43	07.06	17.38	06.14	04.25
	14.28	16.09	17.41	6 17.01 (T2)	20.14	21.50
7	10.05	08.40	07.03	17.41	06.10	04.22
	14.30	16.13	17.44	12 17.04 (T2)	20.17	21.54
8	10.03	12.27 (T7)	08.37	17.44	06.10	04.22
	14.33	5 12.32 (T7)	16.16	17.44	06.10	04.22
9	10.01	12.26 (T7)	08.33	17.44	06.10	04.22
	14.36	16 12.42 (T7)	16.19	17.44	06.10	04.22
10	09.59	12.26 (T7)	08.30	17.44	06.10	04.22
	14.39	18 12.44 (T7)	16.23	17.44	06.10	04.22
11	09.57	12.26 (T7)	08.27	17.44	06.10	04.22
	14.42	19 12.45 (T7)	16.26	17.44	06.10	04.22
12	09.55	12.25 (T7)	08.23	17.44	06.10	04.22
	14.45	20 12.45 (T7)	16.30	17.44	06.10	04.22
13	09.53	12.26 (T7)	08.20	17.44	06.10	04.22
	14.48	20 12.46 (T7)	16.33	17.44	06.10	04.22
14	09.51	12.25 (T7)	08.17	17.44	06.10	04.22
	14.51	22 12.47 (T7)	16.36	17.44	06.10	04.22
15	09.48	12.26 (T7)	08.13	17.44	06.10	04.22
	14.54	22 12.48 (T7)	16.40	17.44	06.10	04.22
16	09.46	12.25 (T7)	08.10	17.44	06.10	04.22
	14.57	23 12.48 (T7)	16.43	17.44	06.10	04.22
17	09.43	12.25 (T7)	08.06	17.44	06.10	04.22
	15.01	24 12.49 (T7)	16.46	17.44	06.10	04.22
18	09.41	12.25 (T7)	08.03	17.44	06.10	04.22
	15.04	25 12.50 (T7)	16.50	17.44	06.10	04.22
19	09.38	12.25 (T7)	07.59	17.44	06.10	04.22
	15.07	25 12.50 (T7)	16.53	17.44	06.10	04.22
20	09.35	12.26 (T7)	07.56	17.44	06.10	04.22
	15.11	25 12.51 (T7)	16.56	17.44	06.10	04.22
21	09.32	12.26 (T7)	07.52	17.44	06.10	04.22
	15.14	25 12.51 (T7)	17.00	17.44	06.10	04.22
22	09.30	12.26 (T7)	07.49	17.44	06.10	04.22
	15.17	25 12.51 (T7)	17.03	17.44	06.10	04.22
23	09.27	12.27 (T7)	07.45	17.44	06.10	04.22
	15.21	25 12.52 (T7)	17.06	17.44	06.10	04.22
24	09.24	12.27 (T7)	07.42	17.44	06.10	04.22
	15.24	24 12.51 (T7)	17.09	17.44	06.10	04.22
25	09.21	12.28 (T7)	07.38	17.44	06.10	04.22
	15.28	24 12.52 (T7)	17.13	17.44	06.10	04.22
26	09.18	12.29 (T7)	07.35	17.44	06.10	04.22
	15.31	23 12.52 (T7)	17.16	17.44	06.10	04.22
27	09.15	12.29 (T7)	07.31	17.44	06.10	04.22
	15.34	22 12.51 (T7)	17.19	17.44	06.10	04.22
28	09.12	12.30 (T7)	07.28	17.44	06.10	04.22
	15.38	21 12.51 (T7)	17.22	17.44	06.10	04.22
29	09.09	12.31 (T7)	07.25	17.44	06.10	04.22
	15.41	19 12.50 (T7)	17.25	17.44	06.10	04.22
30	09.06	12.33 (T7)	07.21	17.44	06.10	04.22
	15.45	17 12.50 (T7)	17.28	17.44	06.10	04.22
31	09.03	12.34 (T7)	07.18	17.44	06.10	04.22
	15.48	14 12.48 (T7)	17.31	17.44	06.10	04.22
Potential sun hours	163	235	363	454	577	640
Total, worst case	503	9	250			
Sun reduction	0,11	0,31	0,36			
Oper. time red.	0,97	0,97	0,97			
Wind dir. red.	0,66	0,66	0,61			
Total reduction	0,07	0,20	0,22			
Total, real	37	2	54			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: I - Lomarakenus I

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	02.35	04.09	05.49	07.18	17.27 (T2) 07.55	09.35 12.08 (T7)
	23.56	22.24	20.33	18.44	22 17.49 (T2) 15.54	14.25 19 12.27 (T7)
2	02.37	04.12	05.52	07.21	17.26 (T2) 07.58	09.38 12.09 (T7)
	23.54	22.21	20.29	18.40	23 17.49 (T2) 15.51	14.23 18 12.27 (T7)
3	02.40	04.16	05.55	07.24	17.26 (T2) 08.02	09.41 12.10 (T7)
	23.52	22.17	20.26	18.36	22 17.48 (T2) 15.48	14.21 16 12.26 (T7)
4	02.42	04.19	05.58	07.27	17.26 (T2) 08.05	09.43 12.11 (T7)
	23.50	22.14	20.22	18.33	22 17.48 (T2) 15.44	14.19 6 12.17 (T7)
5	02.45	04.23	06.01	07.30	17.26 (T2) 08.08	09.46
	23.48	22.10	20.18	18.29	21 17.47 (T2) 15.41	14.17
6	02.48	04.26	06.04	07.33	17.27 (T2) 08.12	09.49
	23.45	22.07	20.15	18.26	18 17.45 (T2) 15.38	14.15
7	02.50	04.29	06.07	07.36	17.27 (T2) 08.15	09.52
	23.43	22.03	20.11	18.22	14 17.41 (T2) 15.34	14.14
8	02.53	04.33	06.10	07.39	17.30 (T2) 08.19	09.54
	23.40	22.00	20.07	18.18	8 17.38 (T2) 15.31	14.12
9	02.56	04.36	06.13	07.42	17.33 (T2) 08.22	09.56
	23.38	21.56	20.04	18.15	1 17.34 (T2) 15.28	14.10
10	02.59	04.39	06.16	07.45	08.25	12.07 (T7) 09.59
	23.35	21.53	20.00	18.11	15.25	10 12.17 (T7) 14.09
11	03.02	04.42	06.19	07.48	08.29	12.05 (T7) 10.01
	23.32	21.49	19.56	18.08	15.22	14 12.19 (T7) 14.08
12	03.02	04.46	06.22	07.51	08.32	12.04 (T7) 10.03
	23.29	21.45	19.53	18.04	15.18	17 12.21 (T7) 14.07
13	03.05	04.49	06.25	07.54	08.35	12.03 (T7) 10.05
	23.26	21.42	19.49	18.00	15.15	19 12.22 (T7) 14.06
14	03.09	04.52	06.28	07.57	08.39	12.03 (T7) 10.07
	23.23	21.38	19.45	17.57	15.12	21 12.24 (T7) 14.05
15	03.12	04.56	06.31	08.00	08.42	12.02 (T7) 10.09
	23.20	21.35	19.42	17.53	15.09	22 12.24 (T7) 14.04
16	03.15	04.59	06.34	08.04	08.46	12.02 (T7) 10.10
	23.17	21.31	19.38	17.50	15.06	23 12.25 (T7) 14.03
17	03.18	05.02	06.37	08.07	08.49	12.02 (T7) 10.12
	23.14	21.27	19.34	17.46	15.03	24 12.26 (T7) 14.03
18	03.22	05.05	06.40	08.10	08.52	12.01 (T7) 10.13
	23.11	21.24	19.31	17.43	15.00	24 12.25 (T7) 14.03
19	03.25	05.08	06.42	08.13	08.56	12.01 (T7) 10.14
	23.08	21.20	19.27	17.39	14.57	25 12.26 (T7) 14.02
20	03.28	05.12	06.45	08.16	08.59	12.01 (T7) 10.15
	23.05	21.17	19.24	17.36	14.54	25 12.26 (T7) 14.03
21	03.32	05.15	06.48	08.19	09.03	12.01 (T7) 10.16
	23.01	21.13	19.20	17.32	14.51	25 12.26 (T7) 14.03
22	03.35	05.18	06.51	08.22	09.06	12.02 (T7) 10.16
	22.58	21.09	19.16	17.29	14.48	25 12.27 (T7) 14.03
23	03.38	05.21	06.54	08.26	09.09	12.03 (T7) 10.17
	22.55	21.06	19.13	17.25	14.46	24 12.27 (T7) 14.04
24	03.42	05.24	06.57	08.29	09.13	12.03 (T7) 10.17
	22.52	21.02	19.09	17.22	14.43	24 12.27 (T7) 14.04
25	03.45	05.27	07.00	17.36 (T2) 07.32	09.16	12.04 (T7) 10.17
	22.48	20.58	19.05	9 17.45 (T2) 16.18	14.40	23 12.27 (T7) 14.05
26	03.49	05.30	07.03	17.33 (T2) 07.35	09.19	12.04 (T7) 10.17
	22.45	20.55	19.02	14 17.47 (T2) 16.15	14.38	24 12.28 (T7) 14.06
27	03.52	05.33	07.06	17.31 (T2) 07.39	09.22	12.04 (T7) 10.17
	22.41	20.51	18.58	17 17.48 (T2) 16.11	14.35	23 12.27 (T7) 14.08
28	03.55	05.37	07.09	17.29 (T2) 07.42	09.25	12.06 (T7) 10.17
	22.38	20.47	18.54	20 17.49 (T2) 16.08	14.33	22 12.28 (T7) 14.09
29	03.59	05.40	07.12	17.28 (T2) 07.45	09.29	12.06 (T7) 10.16
	22.35	20.44	18.51	21 17.49 (T2) 16.05	14.30	21 12.27 (T7) 14.10
30	04.02	05.43	07.15	17.27 (T2) 07.48	09.32	12.07 (T7) 10.16
	22.31	20.40	18.47	22 17.49 (T2) 16.01	14.28	20 12.27 (T7) 14.12
31	04.06	05.46		07.52		10.15
	22.28	20.37		15.58		14.14
Potential sun hours	619	513	394	303	192	126
Total, worst case			103	151	455	59
Sun reduction			0,32	0,28	0,19	0,04
Oper. time red.			0,97	0,97	0,97	0,97
Wind dir. red.			0,61	0,61	0,66	0,66
Total reduction			0,19	0,17	0,12	0,03
Total, real			20	26	56	2

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: J - Lomarakenus J (Hautakaarto)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Table with 12 columns (Jan-Dec) and 1 row of values: 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

Table with 13 columns (N, NNE, ENE, E, ESE, SSE, S, SSW, WSW, W, WNW, NNW, Sum) and 1 row of values: 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

Main data table with 31 rows (days) and 12 columns (months). Includes summary rows for Potential sun hours, Total, worst case, Sun reduction, Oper. time red., Wind dir. red., Total reduction, Total, real.

Table layout: For each day in each month the following matrix apply

Summary table with 4 columns: Day in month, Sun rise/set (hh:mm), Minutes with flicker, First/Last time (hh:mm) with flicker (WTG causing flicker first/last time).

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: K - Asuinrakennus K (Takalo)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1090 1047 879 802 699 632 8477

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	08.59	07.24	06.32	04.44	03.01	02.38	04.10	05.49	07.18	07.55	09.33
	14.18	15.53	17.26	20.01	21.36	23.20	23.53	22.23	20.33	18.44	15.55	14.27
2	10.11	08.56	07.20	06.29	04.41	02.55	02.40	04.14	05.52	07.21	07.58	09.36
	14.20	15.56	17.29	20.04	21.39	23.23	23.51	22.20	20.29	18.40	15.52	14.25
3	10.10	08.52	07.17	06.25	04.37	02.53	02.43	04.17	05.55	07.24	08.01	09.39
	14.22	16.00	17.32	20.07	21.43	23.26	23.49	22.16	20.25	18.37	15.48	14.23
4	10.08	08.49	07.13	06.22	04.33	02.50	02.45	04.20	05.58	07.27	08.04	09.42
	14.25	16.03	17.35	20.10	21.46	23.29	23.47	22.13	20.22	18.33	15.45	14.21
5	10.07	08.46	07.10	06.18	04.30	02.48	02.48	04.24	06.01	07.30	08.08	09.45
	14.27	16.07	17.39	20.13	21.50	23.32	23.45	22.09	20.18	18.29	15.42	14.19
6	10.05	08.43	07.06	06.14	04.26	02.45	02.50	04.27	06.04	07.33	08.11	09.47
	14.30	16.10	17.42	20.16	21.53	23.35	23.43	22.06	20.14	18.26	15.39	14.17
7	10.04	08.39	07.03	06.11	04.23	02.43	02.53	04.30	06.07	07.36	08.14	09.50
	14.32	16.13	17.45	20.20	21.56	23.38	23.41	22.02	20.11	18.22	15.35	14.15
8	10.02	08.36	06.59	06.07	04.19	02.41	02.56	04.34	06.10	07.39	08.18	09.52
	14.35	16.17	17.48	20.23	22.00	23.40	23.38	21.59	20.07	18.19	15.32	14.14
9	10.00	08.33	06.56	06.03	04.16	02.39	02.59	04.37	06.13	07.42	08.21	09.55
	14.38	16.20	17.51	20.26	22.03	23.43	23.36	21.55	20.04	18.15	15.29	14.12
10	09.58	08.30	06.52	06.00	04.12	02.37	03.02	04.40	06.16	07.45	08.25	09.57
	14.40	16.24	17.54	20.29	22.06	23.45	23.33	21.52	20.00	18.11	15.26	14.11
11	09.56	08.26	06.48	05.56	04.09	02.35	03.02	04.43	06.19	07.48	08.28	09.59
	14.43	16.27	17.57	20.32	22.10	23.47	23.30	21.48	19.56	18.08	15.22	14.10
12	09.54	08.23	06.45	05.53	04.05	02.33	03.05	04.47	06.22	07.51	08.31	10.01
	14.46	16.30	18.00	20.35	22.13	23.50	23.27	21.45	19.53	18.04	15.19	14.08
13	09.52	08.19	06.41	05.49	04.02	02.32	03.08	04.50	06.25	07.54	08.35	10.03
	14.49	16.34	18.03	20.38	22.17	23.52	23.25	21.41	19.49	18.01	15.16	14.07
14	09.49	08.16	06.38	05.45	03.59	02.30	03.11	04.53	06.28	07.57	08.38	10.05
	14.52	16.37	18.06	20.41	22.20	23.53	23.22	21.38	19.45	17.57	15.13	14.07
15	09.47	08.13	06.34	05.42	03.55	02.29	03.14	04.56	06.31	08.00	08.41	10.07
	14.56	16.40	18.09	20.44	22.24	23.55	23.19	21.34	19.42	17.54	15.10	14.06
16	09.44	08.09	06.30	05.38	03.52	02.28	03.17	05.00	06.34	08.03	08.45	10.08
	14.59	16.44	18.13	20.48	22.27	23.56	23.16	21.30	19.38	17.50	15.07	14.05
17	09.42	08.06	06.27	05.34	03.48	02.27	03.20	05.03	06.37	08.06	08.48	10.10
	15.02	16.47	18.16	20.51	22.30	23.58	23.13	21.27	19.34	17.47	15.04	14.05
18	09.39	08.02	06.23	05.31	03.45	02.27	03.24	05.06	06.40	08.10	08.52	10.11
	15.05	16.50	18.19	20.54	22.34	23.59	23.10	21.23	19.31	17.43	15.01	14.05
19	09.37	07.59	06.20	05.27	03.42	02.26	03.27	05.09	06.43	08.13	08.55	10.12
	15.09	16.54	18.22	20.57	22.37	00.00	03.06	05.12	06.46	08.16	08.58	10.13
20	09.34	07.56	06.16	05.24	03.38	02.26	03.30	05.12	06.46	08.16	08.58	10.13
	15.12	16.57	18.25	21.00	22.41	00.00	03.03	05.16	06.49	08.19	09.02	10.14
21	09.31	07.52	06.12	05.20	03.35	02.26	03.33	05.15	06.49	08.19	09.02	10.14
	15.15	17.00	18.28	21.04	22.44	00.01	03.00	05.12	06.49	08.19	09.02	10.14
22	09.29	07.49	06.09	05.16	03.32	02.26	03.37	05.19	06.51	08.22	09.05	10.15
	15.19	17.03	18.31	21.07	22.47	00.01	03.03	05.16	06.51	08.22	09.05	10.15
23	09.26	07.45	06.05	05.13	03.29	02.27	03.40	05.22	06.54	08.25	09.08	10.15
	15.22	17.07	18.34	21.10	22.51	00.01	03.03	05.15	06.49	08.19	09.02	10.14
24	09.23	07.42	06.02	05.09	03.25	02.28	03.43	05.25	06.57	08.29	09.11	10.15
	15.25	17.10	18.37	21.13	22.54	00.00	03.03	05.15	06.49	08.19	09.02	10.14
25	09.20	07.38	05.58	05.06	03.22	02.29	03.47	05.28	06.70	07.32	08.15	10.15
	15.29	17.13	18.40	21.16	22.58	00.00	03.03	05.15	06.49	08.19	09.02	10.14
26	09.17	07.35	05.54	05.02	03.19	02.30	03.50	05.31	07.03	07.35	08.18	10.15
	15.32	17.16	18.43	21.20	23.01	00.00	03.03	05.15	06.49	08.19	09.02	10.14
27	09.14	07.31	05.51	04.58	03.16	02.31	03.53	05.34	07.06	07.38	08.21	10.15
	15.36	17.20	18.46	21.23	23.04	00.00	03.03	05.15	06.49	08.19	09.02	10.14
28	09.11	07.28	05.47	04.55	03.13	02.33	03.57	05.37	07.09	07.41	08.24	10.15
	15.39	17.23	18.49	21.26	23.07	00.00	03.03	05.15	06.49	08.19	09.02	10.14
29	09.08		06.43	04.51	03.10	02.34	04.00	05.40	07.12	07.45	08.27	10.15
	15.42		19.52	21.30	23.11	23.56	22.34	20.43	18.51	16.05	14.32	14.12
30	09.05		06.40	04.48	03.07	02.36	04.04	05.43	07.15	07.48	08.30	10.14
	15.46		19.55	21.33	23.14	23.55	22.30	20.40	18.47	16.02	14.29	14.14
31	09.02		06.36		03.04		04.07	05.46		07.51		10.13
	15.49		19.58		23.17		22.27	20.36		15.58		14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 15.00/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: L - Lomarakenus L (Haukijärvi)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	08.59	07.25	06.33	04.45	03.02	02.39	04.11	05.50	07.19	07.55	09.34
	14.19	15.53	17.27	20.02	21.37	23.21	23.54	22.24	20.33	18.44	15.56	14.28
2	10.12	08.56	07.21	06.29	04.41	02.56	02.41	04.14	05.53	07.22	07.58	09.37
	14.21	15.57	17.30	20.05	21.40	23.24	23.52	22.20	20.30	18.41	15.52	14.25
3	10.10	08.53	07.18	06.26	04.38	02.53	02.43	04.18	05.56	07.25	08.02	09.40
	14.23	16.00	17.33	20.08	21.43	23.27	23.50	22.17	20.26	18.37	15.49	14.23
4	10.09	08.50	07.14	06.22	04.34	02.51	02.46	04.21	05.59	07.28	08.05	09.43
	14.25	16.04	17.36	20.11	21.47	23.30	23.48	22.13	20.22	18.34	15.46	14.21
5	10.08	08.47	07.10	06.19	04.31	02.48	02.48	04.24	06.02	07.31	08.08	09.45
	14.28	16.07	17.39	20.14	21.50	23.33	23.46	22.10	20.19	18.30	15.42	14.19
6	10.06	08.43	07.07	06.15	04.27	02.46	02.51	04.28	06.05	07.34	08.12	09.48
	14.30	16.11	17.42	20.17	21.54	23.36	23.44	22.06	20.15	18.26	15.39	14.18
7	10.04	08.40	07.03	06.11	04.23	02.44	02.54	04.31	06.08	07.37	08.15	09.51
	14.33	16.14	17.45	20.20	21.57	23.38	23.41	22.03	20.11	18.23	15.36	14.16
8	10.02	08.37	07.00	06.08	04.20	02.41	02.56	04.34	06.11	07.40	08.18	09.53
	14.36	16.17	17.48	20.23	22.00	23.41	23.39	21.59	20.08	18.19	15.33	14.14
9	10.01	08.33	06.56	06.04	04.16	02.39	02.59	04.37	06.14	07.43	08.22	09.55
	14.38	16.21	17.52	20.26	22.04	23.43	23.36	21.56	20.04	18.16	15.29	14.13
10	09.59	08.30	06.53	06.00	04.13	02.37	03.02	04.41	06.17	07.46	08.25	09.58
	14.41	16.24	17.55	20.29	22.07	23.46	23.33	21.52	20.00	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.10	02.35	03.02	04.44	06.20	07.49	08.29	10.00
	14.44	16.28	17.58	20.33	22.10	23.48	23.31	21.49	19.57	18.09	15.23	14.10
12	09.54	08.23	06.45	05.53	04.06	02.34	03.05	04.47	06.23	07.52	08.32	10.02
	14.47	16.31	18.01	20.36	22.14	23.50	23.28	21.45	19.53	18.05	15.20	14.09
13	09.52	08.20	06.42	05.50	04.03	02.32	03.08	04.51	06.26	07.55	08.35	10.04
	14.50	16.34	18.04	20.39	22.17	23.52	23.25	21.42	19.50	18.01	15.17	14.08
14	09.50	08.17	06.38	05.46	03.59	02.31	03.11	04.54	06.29	07.58	08.39	10.06
	14.53	16.38	18.07	20.42	22.21	23.54	23.22	21.38	19.46	17.58	15.14	14.07
15	09.47	08.13	06.35	05.42	03.56	02.30	03.14	04.57	06.32	08.01	08.42	10.07
	14.56	16.41	18.10	20.45	22.24	23.56	23.19	21.35	19.42	17.54	15.11	14.06
16	09.45	08.10	06.31	05.39	03.52	02.29	03.18	05.00	06.34	08.04	08.45	10.09
	14.59	16.44	18.13	20.48	22.28	23.57	23.16	21.31	19.39	17.51	15.08	14.06
17	09.43	08.06	06.27	05.35	03.49	02.28	03.21	05.03	06.37	08.07	08.49	10.10
	15.03	16.48	18.16	20.51	22.31	23.58	23.13	21.27	19.35	17.47	15.05	14.06
18	09.40	08.03	06.24	05.31	03.46	02.27	03.24	05.07	06.40	08.10	08.52	10.12
	15.06	16.51	18.19	20.55	22.34	23.59	23.10	21.24	19.31	17.44	15.02	14.05
19	09.37	08.00	06.20	05.28	03.42	02.27	03.27	05.10	06.43	08.13	08.55	10.13
	15.09	16.54	18.22	20.58	22.38	00.00	23.07	21.20	19.28	17.40	14.59	14.05
20	09.35	07.56	06.17	05.24	03.39	02.27	03.31	05.13	06.46	08.16	08.59	10.14
	15.12	16.58	18.25	21.01	22.41	00.01	23.04	21.17	19.24	17.37	14.56	14.05
21	09.32	07.53	06.13	05.21	03.36	02.27	03.34	05.16	06.49	08.20	09.02	10.15
	15.16	17.01	18.28	21.04	22.45	00.01	23.01	21.13	19.21	17.33	14.53	14.05
22	09.29	07.49	06.09	05.17	03.32	02.27	03.37	05.19	06.52	08.23	09.05	10.15
	15.19	17.04	18.31	21.07	22.48	00.01	22.57	21.09	19.17	17.30	14.50	14.06
23	09.26	07.46	06.06	05.13	03.29	02.28	03.41	05.22	06.55	08.26	09.09	10.16
	15.23	17.07	18.34	21.11	22.51	00.01	22.54	21.06	19.13	17.26	14.48	14.06
24	09.23	07.42	06.02	05.10	03.26	02.28	03.44	05.25	06.58	08.29	09.12	10.16
	15.26	17.11	18.37	21.14	22.55	00.01	22.51	21.02	19.10	17.23	14.45	14.07
25	09.21	07.39	05.58	05.06	03.23	02.29	03.47	05.28	07.01	07.32	09.15	10.16
	15.29	17.14	18.40	21.17	22.58	00.01	22.48	20.59	19.06	16.19	14.42	14.08
26	09.18	07.35	05.55	05.03	03.20	02.30	03.51	05.32	07.04	07.36	09.18	10.16
	15.33	17.17	18.44	21.20	23.01	00.00	22.44	20.55	19.02	16.16	14.40	14.09
27	09.15	07.32	05.51	04.59	03.17	02.32	03.54	05.35	07.07	07.39	09.22	10.16
	15.36	17.20	18.47	21.24	23.05	23.59	22.41	20.51	18.59	16.13	14.37	14.10
28	09.12	07.28	05.48	04.55	03.13	02.33	03.57	05.38	07.10	07.42	09.25	10.16
	15.40	17.23	18.50	21.27	23.08	23.58	22.38	20.48	18.55	16.09	14.35	14.12
29	09.09		06.44	04.52	03.10	02.35	04.01	05.41	07.13	07.45	09.28	10.15
	15.43		19.53	21.30	23.11	23.57	22.34	20.44	18.52	16.06	14.32	14.13
30	09.06		06.40	04.48	03.07	02.37	04.04	05.44	07.16	07.49	09.31	10.14
	15.46		19.56	21.33	23.15	23.55	22.31	20.40	18.48	16.02	14.30	14.15
31	09.02		06.37		03.05		04.08	05.47		07.52		10.14
	15.50		19.59		23.18		22.27	20.37		15.59		14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: M - Lomarakennus M (Haukilahhti)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13 14.18	09.00 15.53	07.25 17.26	06.33 20.02	04.44 21.37	03.01 23.22	02.38 23.55	04.10 22.24	05.50 20.33	07.19 18.44	07.55 15.55	09.35 14.27
2	10.12 14.20	08.56 15.57	07.21 17.30	06.29 20.05	04.41 21.40	02.55 23.25	02.40 23.53	04.14 22.21	05.53 20.30	07.22 18.41	07.59 15.52	09.37 14.25
3	10.11 14.22	08.53 16.00	07.18 17.33	06.26 20.08	04.37 21.44	02.53 23.28	02.42 23.51	04.17 22.17	05.56 20.26	07.25 18.37	08.02 15.49	09.40 14.23
4	10.10 14.25	08.50 16.03	07.14 17.36	06.22 20.11	04.34 21.47	02.50 23.31	02.45 23.49	04.21 22.14	05.59 20.22	07.28 18.34	08.05 15.45	09.43 14.21
5	10.08 14.27	08.47 16.07	07.11 17.39	06.18 20.14	04.30 21.51	02.47 23.34	02.47 23.47	04.24 22.10	06.02 20.19	07.31 18.30	08.09 15.42	09.46 14.19
6	10.07 14.30	08.44 16.10	07.07 17.42	06.15 20.17	04.27 21.54	02.45 23.37	02.50 23.44	04.27 22.07	06.05 20.15	07.34 18.26	08.12 15.39	09.49 14.17
7	10.05 14.32	08.40 16.14	07.03 17.45	06.11 20.20	04.23 21.57	02.43 23.39	02.53 23.42	04.31 22.03	06.08 20.12	07.37 18.23	08.15 15.36	09.51 14.15
8	10.03 14.35	08.37 16.17	07.00 17.48	06.08 20.23	04.20 22.01	02.40 23.42	02.55 23.40	04.34 22.00	06.11 20.08	07.40 18.19	08.19 15.32	09.54 14.14
9	10.01 14.38	08.34 16.21	06.56 17.52	06.04 20.26	04.16 22.04	02.38 23.44	02.58 23.37	04.37 21.56	06.14 20.04	07.43 18.16	08.22 15.29	09.56 14.12
10	09.59 14.41	08.30 16.24	06.53 17.55	06.00 20.30	04.13 22.08	02.36 23.47	03.01 23.34	04.40 21.53	06.17 20.01	07.46 18.12	08.26 15.26	09.58 14.11
11	09.57 14.43	08.27 16.27	06.49 17.58	05.57 20.33	04.09 22.11	02.34 23.49	03.01 23.32	04.44 21.49	06.20 19.57	07.49 18.08	08.29 15.23	10.01 14.09
12	09.55 14.46	08.24 16.31	06.45 18.01	05.53 20.36	04.06 22.14	02.33 23.51	03.04 23.29	04.47 21.46	06.23 19.53	07.52 18.05	08.32 15.20	10.03 14.08
13	09.53 14.49	08.20 16.34	06.42 18.04	05.49 20.39	04.02 22.18	02.31 23.53	03.07 23.26	04.50 21.42	06.26 19.50	07.55 18.01	08.36 15.16	10.05 14.07
14	09.50 14.53	08.17 16.37	06.38 18.07	05.46 20.42	03.59 22.21	02.30 23.55	03.11 23.23	04.53 21.38	06.29 19.46	07.58 17.58	08.39 15.13	10.07 14.06
15	09.48 14.56	08.14 16.41	06.35 18.10	05.42 20.45	03.55 22.25	02.28 23.57	03.14 23.20	04.57 21.35	06.31 19.42	08.01 17.54	08.42 15.10	10.08 14.06
16	09.46 14.59	08.10 16.44	06.31 18.13	05.38 20.48	03.52 22.28	02.27 23.58	03.17 23.17	05.00 21.31	06.34 19.39	08.04 17.51	08.46 15.07	10.10 14.05
17	09.43 15.02	08.07 16.47	06.27 18.16	05.35 20.52	03.49 22.32	02.27 23.00	03.20 23.14	05.03 21.28	06.37 19.35	08.07 17.47	08.49 15.04	10.11 14.05
18	09.40 15.05	08.03 16.51	06.24 18.19	05.31 20.55	03.45 22.35	02.26 23.01	03.23 23.11	05.06 21.24	06.40 19.31	08.10 17.44	08.53 15.01	10.12 14.05
19	09.38 15.09	08.00 16.54	06.20 18.22	05.28 20.58	03.42 22.38	02.26 23.00	03.27 23.08	05.09 21.20	06.43 19.28	08.13 17.40	08.56 14.58	10.14 14.04
20	09.35 15.12	07.56 16.57	06.17 18.25	05.24 21.01	03.38 22.42	02.25 23.02	03.30 23.04	05.13 21.17	06.46 19.24	08.17 17.37	08.59 14.56	10.15 14.04
21	09.32 15.15	07.53 17.01	06.13 18.28	05.20 21.04	03.35 22.45	02.25 23.00	03.33 23.01	05.16 21.13	06.49 19.21	08.20 17.33	09.03 14.53	10.15 14.05
22	09.30 15.19	07.49 17.04	06.09 18.31	05.17 21.08	03.32 22.49	02.26 23.03	03.37 22.58	05.19 21.10	06.52 19.17	08.23 17.30	09.06 14.50	10.16 14.05
23	09.27 15.22	07.46 17.07	06.06 18.34	05.13 21.11	03.29 22.52	02.26 23.00	03.40 22.55	05.22 21.06	06.55 19.13	08.26 17.26	09.09 14.47	10.16 14.06
24	09.24 15.25	07.42 17.10	06.02 18.37	05.10 21.14	03.25 22.55	02.27 23.00	03.43 22.51	05.25 21.02	06.58 19.10	08.29 17.23	09.13 14.44	10.17 14.06
25	09.21 15.29	07.39 17.14	05.58 18.41	05.06 21.17	03.22 22.59	02.28 23.00	03.47 22.48	05.28 20.59	07.01 19.06	07.33 16.19	09.16 14.42	10.17 14.07
26	09.18 15.32	07.35 17.17	05.55 18.44	05.02 21.21	03.19 23.02	02.29 23.00	03.50 22.45	05.31 20.55	07.04 19.02	07.36 16.16	09.19 14.39	10.17 14.08
27	09.15 15.36	07.32 17.20	05.51 18.47	04.59 21.24	03.16 23.06	02.30 23.00	03.54 22.41	05.34 20.52	07.07 18.59	07.39 16.12	09.22 14.37	10.17 14.09
28	09.12 15.39	07.28 17.23	05.48 18.50	04.55 21.27	03.13 23.09	02.32 23.59	03.57 22.38	05.38 20.48	07.10 18.55	07.42 16.09	09.25 14.34	10.16 14.11
29	09.09 15.43		06.44 19.53	04.52 21.30	03.10 23.12	02.34 23.58	04.00 22.35	05.41 20.44	07.13 18.52	07.46 16.06	09.28 14.32	10.16 14.12
30	09.06 15.46		06.40 19.56	04.48 21.34	03.07 23.15	02.36 23.56	04.04 22.31	05.44 20.41	07.16 18.48	07.49 16.02	09.32 14.29	10.15 14.14
31	09.03 15.50		06.37 19.59		03.04 23.19		04.07 22.28	05.47 20.37		07.52 15.59		10.14 14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: N - Lomarakenus N (Kuusela)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.31	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.08	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.52	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.41	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.05
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.26	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	17.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.52	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058Shadow receptor: O - Lomarakenus O (Kuusela)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 522 412 474 534 566 820 1 090 1 047 879 802 699 632 8 477

Idle start wind speed: Cut in wind speed from power curve

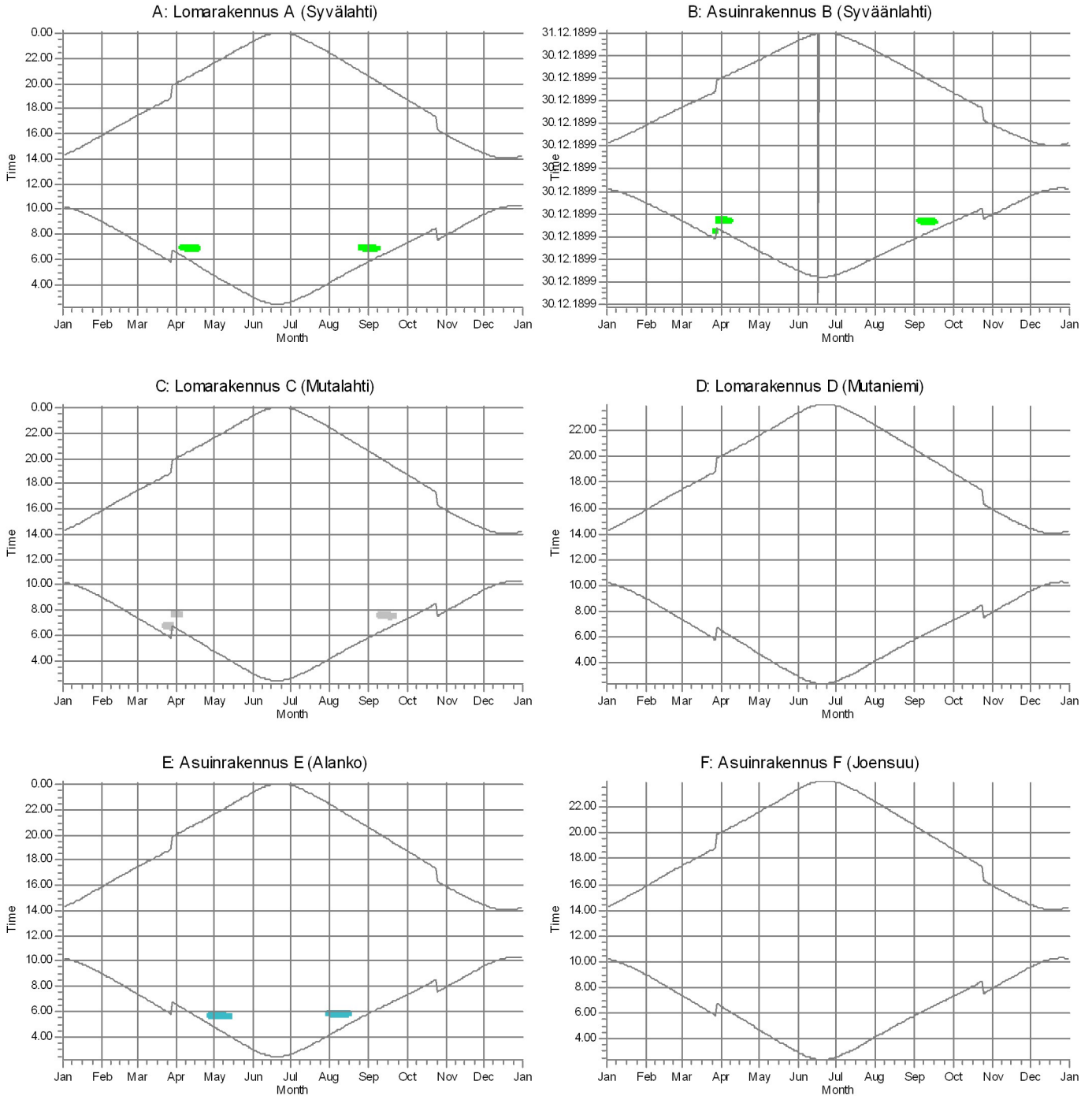
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.30	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.07	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.51	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.40	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.04
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.51	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058



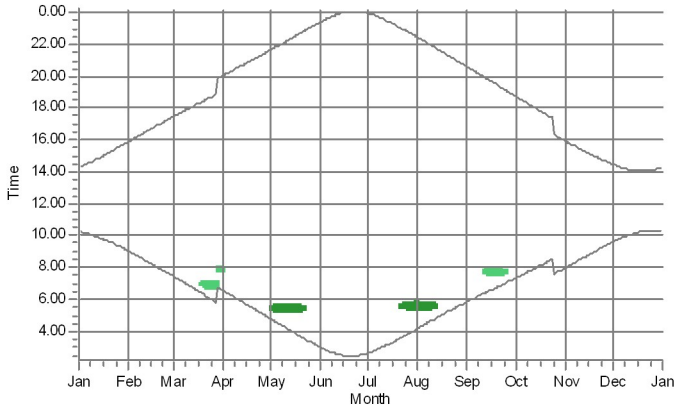
WTGs

T19: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (691) T16: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (694) T9: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (701)

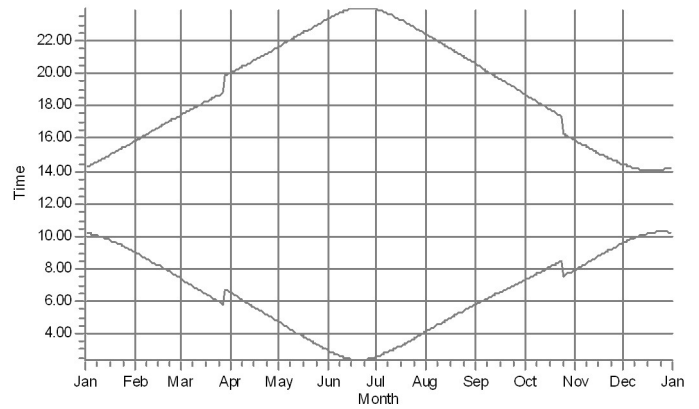
SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058

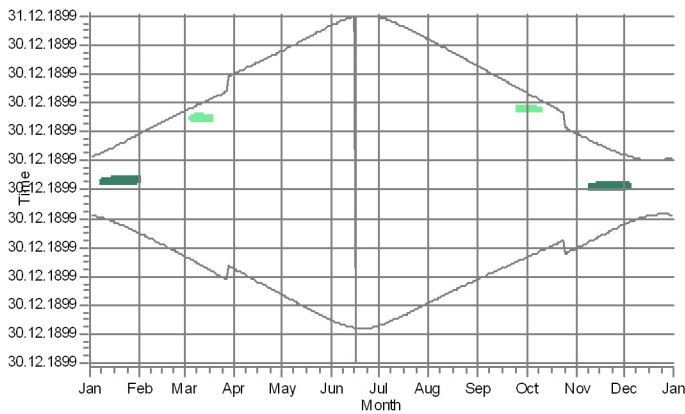
G: Asuinrakennus G (Heiniäho)



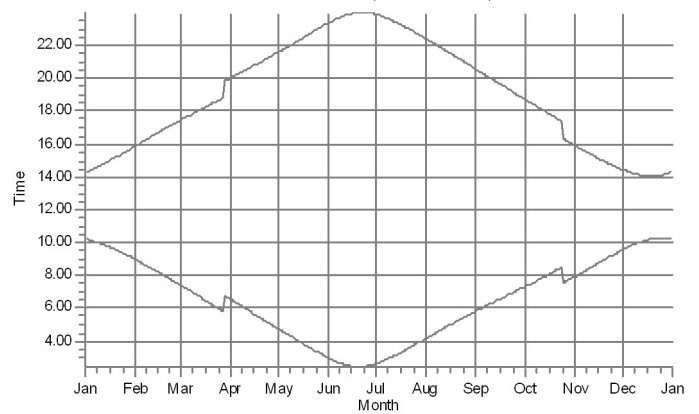
H: Asuinrakennus H (Mäkelä)



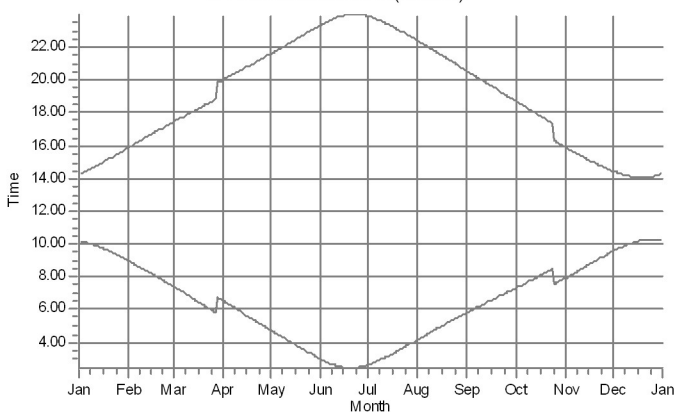
I: Lomarakennus I



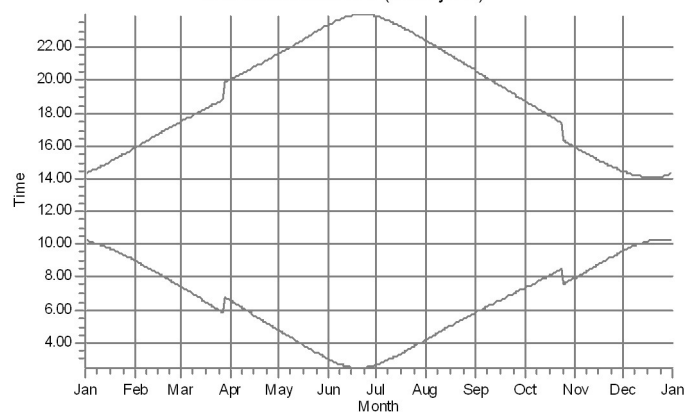
J: Lomarakennus J (Hautakaarto)



K: Asuinrakennus K (Takalo)



L: Lomarakennus L (Haukijärvi)

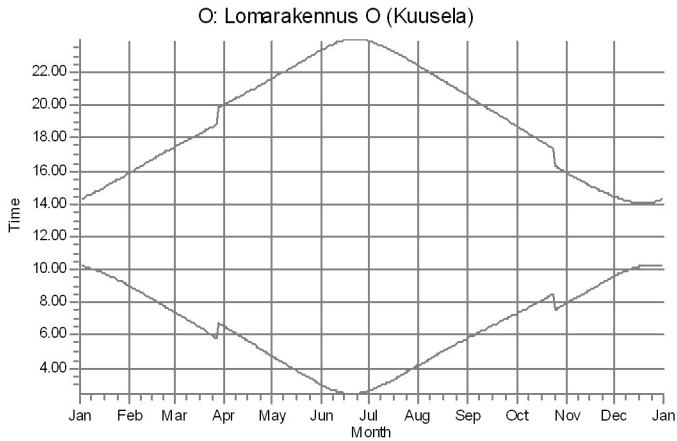
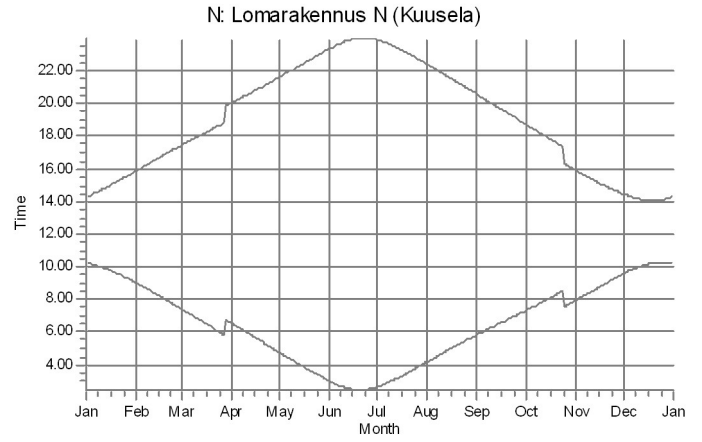
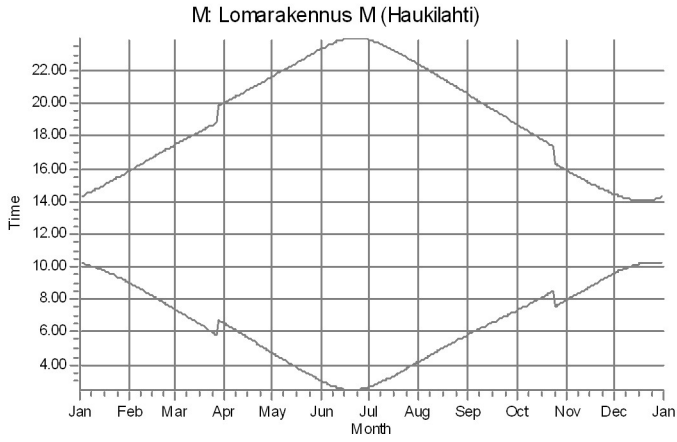


WTGs

	T2: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (708)		T3: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (710)
	T1: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (709)		T7: Generic RD200 7200 200.0 IOI hub: 200.0 m (TOT: 300.0 m) (711)

SHADOW - Calendar, graphical

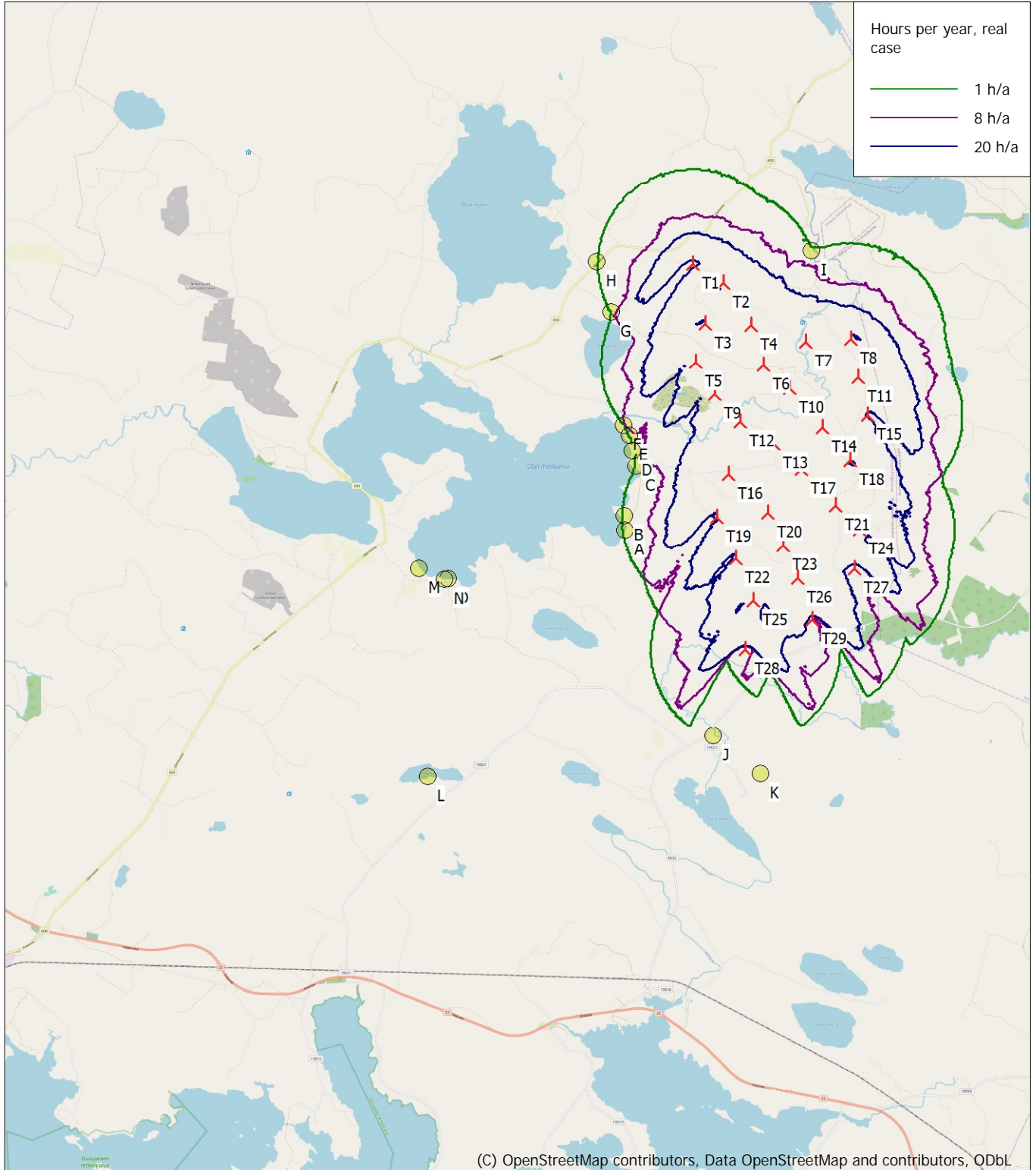
Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058



WTGs

SHADOW - Map

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058



0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:125 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 504 420 North: 7 167 810

🚧 New WTG 📍 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas_0.wpo (2)

Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m

Liite 7. Melun yhteismallinnuksen tulokset VE1

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

...continued from previous page

Table with columns: East, North, Z, Row data/Description, WTG type, Valid, Manufact., Type-generator, Power, rated, Rotor diameter, Hub height, Noise data, Creator, Name, Wind speed, LwA,ref

Calculation Results

Sound level

Noise sensitive area

Table with columns: No., Name, East, North, Z, Immission height, Demands Noise, Sound level From WTGs, Distance to noise demand

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
93	8694	8953	9734	10056	10375	10636	12990	14113	13174	4047	2717	9588	11445	10855	10798
94	9275	9533	10304	10625	10942	11203	13544	14665	13629	4631	3301	10070	12019	11430	11374
95	9632	9884	10629	10946	11259	11520	13834	14949	13779	5054	3725	10542	12458	11868	11811
96	10061	10304	11009	11321	11627	11888	14159	15266	13911	5590	4269	11168	13012	12419	12361
97	8164	8414	9156	9474	9788	10049	12373	13492	12475	3695	2393	9541	11121	10526	10467
98	8690	8936	9660	9975	10286	10547	12850	13964	12822	4242	2936	10030	11669	11074	11015
99	9303	9547	10254	10567	10875	11135	13417	14526	13260	4869	3557	10585	12295	11701	11642
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T30	7471	7562	8247	8343	8473	8491	9912	10547	14064	9214	10427	3990	3016	3392	3457
T31	6218	6329	7083	7206	7365	7407	9035	9767	13015	7925	9160	3257	2008	2230	2287
T32	8524	8625	9327	9426	9559	9577	10974	11585	15148	9983	11150	4286	4102	4465	4529
T33	7483	7604	8370	8495	8652	8692	10268	10962	14297	8804	9978	3287	3257	3517	3575
T34	6090	6237	7081	7239	7429	7498	9295	10091	13106	7329	8532	2492	2361	2390	2431
T35	5598	5775	6697	6886	7105	7201	9163	10026	12774	6497	7692	2024	2541	2363	2381
T36	9070	9195	9964	10087	10240	10276	11785	12434	15875	10073	11178	4031	4817	5107	5166
T37	8353	8499	9327	9472	9649	9704	11362	12078	15316	9129	10222	3077	4335	4532	4584
T38	7241	7409	8296	8468	8669	8747	10571	11364	14348	7862	8970	2006	3614	3666	3706
T39	8639	8809	9699	9869	10067	10142	11920	12682	15746	8932	9956	2662	4913	5026	5070
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas 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 Lomarakenus A (Syvälahti)

Wind speed: 8,0 m/s

WTG

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]
1	14 841	14 843	4,53	108,9	0,00	94,43	-	-	0,00	0,00	-
10	17 232	17 233	2,64	108,9	0,00	95,73	-	-	0,00	0,00	-
100	9 485	9 487	4,99	106,0	0,00	90,54	-	-	0,00	0,00	-
101	10 019	10 021	4,33	106,0	0,00	91,02	-	-	0,00	0,00	-
102	8 745	8 747	5,97	106,0	0,00	89,84	-	-	0,00	0,00	-
103	8 012	8 015	7,02	106,0	0,00	89,08	-	-	0,00	0,00	-
104	7 332	7 334	8,09	106,0	0,00	88,31	-	-	0,00	0,00	-
105	7 264	7 266	8,20	106,0	0,00	88,23	-	-	0,00	0,00	-
106	6 650	6 653	9,25	106,0	0,00	87,46	-	-	0,00	0,00	-
107	7 868	7 870	7,24	106,0	0,00	88,92	-	-	0,00	0,00	-
108	8 760	8 762	5,95	106,0	0,00	89,85	-	-	0,00	0,00	-
109	7 965	7 967	7,09	106,0	0,00	89,03	-	-	0,00	0,00	-
11	16 785	16 786	2,98	108,9	0,00	95,50	-	-	0,00	0,00	-
110	8 450	8 452	6,38	106,0	0,00	89,54	-	-	0,00	0,00	-
111	5 792	5 795	10,89	106,0	0,00	86,26	-	-	0,00	0,00	-
112	6 696	6 698	9,17	106,0	0,00	87,52	-	-	0,00	0,00	-
12	16 716	16 717	3,06	108,9	0,00	95,46	-	-	0,00	0,00	-
13	17 797	17 798	2,24	108,9	0,00	96,01	-	-	0,00	0,00	-
14	19 986	19 988	0,76	108,9	0,00	97,02	-	-	0,00	0,00	-
15	17 585	17 587	2,40	108,9	0,00	95,90	-	-	0,00	0,00	-
16	18 564	18 566	1,70	108,9	0,00	96,37	-	-	0,00	0,00	-
17	18 634	18 636	1,66	108,9	0,00	96,41	-	-	0,00	0,00	-
18	19 479	19 480	1,11	108,9	0,00	96,79	-	-	0,00	0,00	-
19	19 633	19 634	0,99	108,9	0,00	96,86	-	-	0,00	0,00	-
2	15 625	15 627	3,88	108,9	0,00	94,88	-	-	0,00	0,00	-
20	21 146	21 147	0,03	108,9	0,00	97,51	-	-	0,00	0,00	-
21	20 039	20 041	0,72	108,9	0,00	97,04	-	-	0,00	0,00	-
22	21 801	21 802	-0,34	108,9	0,00	97,77	-	-	0,00	0,00	-
23	21 818	21 820	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
24	19 052	19 053	1,37	108,9	0,00	96,60	-	-	0,00	0,00	-
25	21 363	21 364	-0,10	108,9	0,00	97,59	-	-	0,00	0,00	-
26	22 677	22 678	-0,88	108,9	0,00	98,11	-	-	0,00	0,00	-
27	22 360	22 361	-0,69	108,9	0,00	97,99	-	-	0,00	0,00	-
28	20 882	20 884	0,19	108,9	0,00	97,40	-	-	0,00	0,00	-
29	20 297	20 298	0,56	108,9	0,00	97,15	-	-	0,00	0,00	-
3	15 627	15 629	3,87	108,9	0,00	94,88	-	-	0,00	0,00	-
30	18 129	18 131	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
31	20 570	20 571	0,39	108,9	0,00	97,27	-	-	0,00	0,00	-
4	16 498	16 500	3,19	108,9	0,00	95,35	-	-	0,00	0,00	-
5	17 439	17 441	2,49	108,9	0,00	95,83	-	-	0,00	0,00	-
6	15 344	15 346	4,10	108,9	0,00	94,72	-	-	0,00	0,00	-
7	15 707	15 708	3,82	108,9	0,00	94,92	-	-	0,00	0,00	-
71	11 839	11 841	2,30	106,0	0,00	92,47	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
72	11 301	11 302	2,87	106,0	0,00	92,06	-	-	0,00	0,00	-
73	10 704	10 706	3,52	106,0	0,00	91,59	-	-	0,00	0,00	-
74	12 280	12 281	1,86	106,0	0,00	92,78	-	-	0,00	0,00	-
75	12 868	12 870	1,29	106,0	0,00	93,19	-	-	0,00	0,00	-
76	13 535	13 536	0,67	106,0	0,00	93,63	-	-	0,00	0,00	-
77	12 280	12 281	1,86	106,0	0,00	92,78	-	-	0,00	0,00	-
78	13 397	13 398	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
79	14 038	14 039	0,23	106,0	0,00	93,95	-	-	0,00	0,00	-
8	16 261	16 262	3,38	108,9	0,00	95,22	-	-	0,00	0,00	-
80	12 592	12 593	1,55	106,0	0,00	93,00	-	-	0,00	0,00	-
81	11 494	11 496	2,66	106,0	0,00	92,21	-	-	0,00	0,00	-
82	10 603	10 605	3,64	106,0	0,00	91,51	-	-	0,00	0,00	-
83	10 505	10 507	3,75	106,0	0,00	91,43	-	-	0,00	0,00	-
84	11 721	11 723	2,43	106,0	0,00	92,38	-	-	0,00	0,00	-
85	11 329	11 330	2,84	106,0	0,00	92,08	-	-	0,00	0,00	-
86	8 996	8 998	5,63	106,0	0,00	90,08	-	-	0,00	0,00	-
87	8 413	8 415	6,44	106,0	0,00	89,50	-	-	0,00	0,00	-
88	7 276	7 278	8,18	106,0	0,00	88,24	-	-	0,00	0,00	-
89	6 548	6 550	9,44	106,0	0,00	87,33	-	-	0,00	0,00	-
9	18 381	18 383	1,83	108,9	0,00	96,29	-	-	0,00	0,00	-
90	6 013	6 016	10,44	106,0	0,00	86,59	-	-	0,00	0,00	-
91	6 757	6 760	9,06	106,0	0,00	87,60	-	-	0,00	0,00	-
92	7 770	7 772	7,39	106,0	0,00	88,81	-	-	0,00	0,00	-
93	8 694	8 695	6,04	106,0	0,00	89,79	-	-	0,00	0,00	-
94	9 275	9 277	5,26	106,0	0,00	90,35	-	-	0,00	0,00	-
95	9 632	9 634	4,82	106,0	0,00	90,68	-	-	0,00	0,00	-
96	10 061	10 062	4,28	106,0	0,00	91,05	-	-	0,00	0,00	-
97	8 164	8 166	6,80	106,0	0,00	89,24	-	-	0,00	0,00	-
98	8 690	8 692	6,05	106,0	0,00	89,78	-	-	0,00	0,00	-
99	9 303	9 305	5,22	106,0	0,00	90,37	-	-	0,00	0,00	-
T1	6 000	6 004	15,94	110,1	0,00	86,57	-	-	0,00	0,00	-
T10	4 760	4 765	19,09	110,1	0,00	84,56	-	-	0,00	0,00	-
T11	6 091	6 094	15,72	110,1	0,00	86,70	-	-	0,00	0,00	-
T12	3 465	3 471	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T13	3 747	3 753	22,28	110,1	0,00	82,49	-	-	0,00	0,00	-
T14	4 867	4 872	18,79	110,1	0,00	84,75	-	-	0,00	0,00	-
T15	5 872	5 876	16,22	110,1	0,00	86,38	-	-	0,00	0,00	-
T16	2 570	2 579	27,10	110,1	0,00	79,23	-	-	0,00	0,00	-
T17	4 073	4 079	21,18	110,1	0,00	83,21	-	-	0,00	0,00	-
T18	5 148	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T19	2 022	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 802	5 806	16,39	110,1	0,00	86,28	-	-	0,00	0,00	-
T20	3 148	3 155	24,55	110,1	0,00	80,98	-	-	0,00	0,00	-
T21	4 649	4 654	19,41	110,1	0,00	84,36	-	-	0,00	0,00	-
T22	2 516	2 525	27,37	110,1	0,00	79,04	-	-	0,00	0,00	-
T23	3 482	3 489	23,24	110,1	0,00	81,85	-	-	0,00	0,00	-
T24	5 142	5 147	18,04	110,1	0,00	85,23	-	-	0,00	0,00	-
T25	3 207	3 214	24,31	110,1	0,00	81,14	-	-	0,00	0,00	-
T26	3 916	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	5 092	5 096	18,18	110,1	0,00	85,14	-	-	0,00	0,00	-
T28	3 716	3 722	22,40	110,1	0,00	82,42	-	-	0,00	0,00	-
T29	4 551	4 556	19,70	110,1	0,00	84,17	-	-	0,00	0,00	-
T3	4 836	4 841	18,88	110,1	0,00	84,70	-	-	0,00	0,00	-
T30	7 471	7 474	14,30	110,1	0,00	88,47	-	-	0,00	0,00	-
T31	6 218	6 221	16,54	110,1	0,00	86,88	-	-	0,00	0,00	-
T32	8 524	8 527	12,64	110,1	0,00	89,62	-	-	0,00	0,00	-
T33	7 483	7 486	14,22	110,1	0,00	88,49	-	-	0,00	0,00	-
T34	6 090	6 094	16,75	110,1	0,00	86,70	-	-	0,00	0,00	-
T35	5 598	5 602	17,68	110,1	0,00	85,97	-	-	0,00	0,00	-
T36	9 070	9 072	11,80	110,1	0,00	90,15	-	-	0,00	0,00	-
T37	8 353	8 356	12,79	110,1	0,00	89,44	-	-	0,00	0,00	-
T38	7 241	7 245	14,37	110,1	0,00	88,20	-	-	0,00	0,00	-
T39	8 639	8 641	12,15	110,1	0,00	89,73	-	-	0,00	0,00	-
T4	5 263	5 268	17,73	110,1	0,00	85,43	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T5	3 967	3 973	21,53	110,1	0,00	82,98	-	-	0,00	0,00	-
T6	4 724	4 729	19,19	110,1	0,00	84,50	-	-	0,00	0,00	-
T7	5 704	5 708	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T8	6 472	6 476	14,87	110,1	0,00	87,23	-	-	0,00	0,00	-
T9	3 559	3 565	22,96	110,1	0,00	82,04	-	-	0,00	0,00	-
Sum			37,42								

- Data undefined due to calculation with octave data

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Wind speed: 8,0 m/s

WTG

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]
1	15 043	15 045	4,36	108,9	0,00	94,55	-	-	0,00	0,00	-
10	17 467	17 468	2,47	108,9	0,00	95,84	-	-	0,00	0,00	-
100	9 710	9 712	4,70	106,0	0,00	90,75	-	-	0,00	0,00	-
101	10 237	10 238	4,07	106,0	0,00	91,20	-	-	0,00	0,00	-
102	8 978	8 980	5,65	106,0	0,00	90,07	-	-	0,00	0,00	-
103	8 247	8 249	6,68	106,0	0,00	89,33	-	-	0,00	0,00	-
104	7 570	7 572	7,71	106,0	0,00	88,58	-	-	0,00	0,00	-
105	7 483	7 485	7,84	106,0	0,00	88,48	-	-	0,00	0,00	-
106	6 875	6 877	8,86	106,0	0,00	87,75	-	-	0,00	0,00	-
107	8 076	8 078	6,93	106,0	0,00	89,15	-	-	0,00	0,00	-
108	8 953	8 955	5,69	106,0	0,00	90,04	-	-	0,00	0,00	-
109	8 152	8 154	6,82	106,0	0,00	89,23	-	-	0,00	0,00	-
11	17 040	17 041	2,79	108,9	0,00	95,63	-	-	0,00	0,00	-
110	8 631	8 633	6,13	106,0	0,00	89,72	-	-	0,00	0,00	-
111	5 996	5 998	10,48	106,0	0,00	86,56	-	-	0,00	0,00	-
112	6 896	6 899	8,82	106,0	0,00	87,78	-	-	0,00	0,00	-
12	16 987	16 988	2,86	108,9	0,00	95,60	-	-	0,00	0,00	-
13	18 053	18 054	2,06	108,9	0,00	96,13	-	-	0,00	0,00	-
14	20 215	20 216	0,61	108,9	0,00	97,11	-	-	0,00	0,00	-
15	17 853	17 855	2,20	108,9	0,00	96,04	-	-	0,00	0,00	-
16	18 829	18 830	1,52	108,9	0,00	96,50	-	-	0,00	0,00	-
17	18 887	18 889	1,49	108,9	0,00	96,52	-	-	0,00	0,00	-
18	19 729	19 731	0,94	108,9	0,00	96,90	-	-	0,00	0,00	-
19	19 898	19 899	0,81	108,9	0,00	96,98	-	-	0,00	0,00	-
2	15 815	15 817	3,72	108,9	0,00	94,98	-	-	0,00	0,00	-
20	21 401	21 403	-0,12	108,9	0,00	97,61	-	-	0,00	0,00	-
21	20 281	20 282	0,57	108,9	0,00	97,14	-	-	0,00	0,00	-
22	22 049	22 050	-0,49	108,9	0,00	97,87	-	-	0,00	0,00	-
23	22 054	22 056	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
24	19 290	19 291	1,21	108,9	0,00	96,71	-	-	0,00	0,00	-
25	21 587	21 588	-0,24	108,9	0,00	97,68	-	-	0,00	0,00	-
26	22 919	22 920	-1,01	108,9	0,00	98,20	-	-	0,00	0,00	-
27	22 587	22 588	-0,82	108,9	0,00	98,08	-	-	0,00	0,00	-
28	21 122	21 123	0,05	108,9	0,00	97,50	-	-	0,00	0,00	-
29	20 549	20 550	0,40	108,9	0,00	97,26	-	-	0,00	0,00	-
3	15 848	15 850	3,70	108,9	0,00	95,00	-	-	0,00	0,00	-
30	18 367	18 369	1,84	108,9	0,00	96,28	-	-	0,00	0,00	-
31	20 789	20 791	0,25	108,9	0,00	97,36	-	-	0,00	0,00	-
4	16 718	16 720	3,03	108,9	0,00	95,46	-	-	0,00	0,00	-
5	17 658	17 660	2,34	108,9	0,00	95,94	-	-	0,00	0,00	-
6	15 583	15 585	3,91	108,9	0,00	94,85	-	-	0,00	0,00	-
7	15 962	15 963	3,62	108,9	0,00	95,06	-	-	0,00	0,00	-
71	12 081	12 082	2,06	106,0	0,00	92,64	-	-	0,00	0,00	-
72	11 543	11 545	2,61	106,0	0,00	92,25	-	-	0,00	0,00	-
73	10 950	10 952	3,25	106,0	0,00	91,79	-	-	0,00	0,00	-
74	12 516	12 517	1,63	106,0	0,00	92,95	-	-	0,00	0,00	-
75	13 096	13 097	1,08	106,0	0,00	93,34	-	-	0,00	0,00	-
76	13 755	13 756	0,48	106,0	0,00	93,77	-	-	0,00	0,00	-
77	12 501	12 503	1,64	106,0	0,00	92,94	-	-	0,00	0,00	-
78	13 605	13 606	0,61	106,0	0,00	93,67	-	-	0,00	0,00	-
79	14 245	14 247	0,05	106,0	0,00	94,07	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
8	16 497	16 499	3,19	108,9	0,00	95,35	-	-	0,00	0,00	-
80	12 802	12 803	1,35	106,0	0,00	93,15	-	-	0,00	0,00	-
81	11 712	11 713	2,43	106,0	0,00	92,37	-	-	0,00	0,00	-
82	10 836	10 838	3,38	106,0	0,00	91,70	-	-	0,00	0,00	-
83	10 726	10 728	3,50	106,0	0,00	91,61	-	-	0,00	0,00	-
84	11 925	11 926	2,24	106,0	0,00	92,53	-	-	0,00	0,00	-
85	11 526	11 527	2,63	106,0	0,00	92,23	-	-	0,00	0,00	-
86	9 149	9 151	5,42	106,0	0,00	90,23	-	-	0,00	0,00	-
87	8 572	8 574	6,21	106,0	0,00	89,66	-	-	0,00	0,00	-
88	7 444	7 447	7,91	106,0	0,00	88,44	-	-	0,00	0,00	-
89	6 718	6 721	9,13	106,0	0,00	87,55	-	-	0,00	0,00	-
9	18 607	18 609	1,67	108,9	0,00	96,39	-	-	0,00	0,00	-
90	6 186	6 189	10,11	106,0	0,00	86,83	-	-	0,00	0,00	-
91	6 905	6 908	8,80	106,0	0,00	87,79	-	-	0,00	0,00	-
92	7 923	7 925	7,16	106,0	0,00	88,98	-	-	0,00	0,00	-
93	8 953	8 954	5,69	106,0	0,00	90,04	-	-	0,00	0,00	-
94	9 533	9 534	4,93	106,0	0,00	90,59	-	-	0,00	0,00	-
95	9 884	9 886	4,50	106,0	0,00	90,90	-	-	0,00	0,00	-
96	10 304	10 306	3,99	106,0	0,00	91,26	-	-	0,00	0,00	-
97	8 414	8 416	6,44	106,0	0,00	89,50	-	-	0,00	0,00	-
98	8 936	8 938	5,71	106,0	0,00	90,02	-	-	0,00	0,00	-
99	9 547	9 548	4,91	106,0	0,00	90,60	-	-	0,00	0,00	-
T1	5 708	5 712	16,64	110,1	0,00	86,14	-	-	0,00	0,00	-
T10	4 581	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T11	5 943	5 947	16,06	110,1	0,00	86,49	-	-	0,00	0,00	-
T12	3 277	3 284	24,03	110,1	0,00	81,33	-	-	0,00	0,00	-
T13	3 619	3 625	22,74	110,1	0,00	82,19	-	-	0,00	0,00	-
T14	4 750	4 755	19,12	110,1	0,00	84,54	-	-	0,00	0,00	-
T15	5 764	5 769	16,48	110,1	0,00	86,22	-	-	0,00	0,00	-
T16	2 455	2 465	27,67	110,1	0,00	78,84	-	-	0,00	0,00	-
T17	4 001	4 007	21,42	110,1	0,00	83,06	-	-	0,00	0,00	-
T18	5 082	5 088	18,20	110,1	0,00	85,13	-	-	0,00	0,00	-
T19	2 021	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 525	5 530	17,06	110,1	0,00	85,85	-	-	0,00	0,00	-
T20	3 143	3 151	24,56	110,1	0,00	80,97	-	-	0,00	0,00	-
T21	4 641	4 646	19,43	110,1	0,00	84,34	-	-	0,00	0,00	-
T22	2 624	2 633	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T23	3 542	3 549	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T24	5 168	5 172	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T25	3 380	3 387	23,63	110,1	0,00	81,60	-	-	0,00	0,00	-
T26	4 026	4 032	21,34	110,1	0,00	83,11	-	-	0,00	0,00	-
T27	5 168	5 173	17,97	110,1	0,00	85,27	-	-	0,00	0,00	-
T28	3 949	3 955	21,59	110,1	0,00	82,94	-	-	0,00	0,00	-
T29	4 707	4 712	19,24	110,1	0,00	84,46	-	-	0,00	0,00	-
T3	4 558	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T30	7 562	7 565	13,56	110,1	0,00	88,58	-	-	0,00	0,00	-
T31	6 329	6 333	15,61	110,1	0,00	87,03	-	-	0,00	0,00	-
T32	8 625	8 627	11,91	110,1	0,00	89,72	-	-	0,00	0,00	-
T33	7 604	7 607	13,28	110,1	0,00	88,62	-	-	0,00	0,00	-
T34	6 237	6 240	15,86	110,1	0,00	86,90	-	-	0,00	0,00	-
T35	5 775	5 779	16,94	110,1	0,00	86,24	-	-	0,00	0,00	-
T36	9 195	9 197	10,89	110,1	0,00	90,27	-	-	0,00	0,00	-
T37	8 499	8 502	12,02	110,1	0,00	89,59	-	-	0,00	0,00	-
T38	7 409	7 412	13,75	110,1	0,00	88,40	-	-	0,00	0,00	-
T39	8 809	8 812	11,59	110,1	0,00	89,90	-	-	0,00	0,00	-
T4	5 014	5 019	18,39	110,1	0,00	85,01	-	-	0,00	0,00	-
T5	3 694	3 700	22,47	110,1	0,00	82,36	-	-	0,00	0,00	-
T6	4 506	4 511	19,83	110,1	0,00	84,09	-	-	0,00	0,00	-
T7	5 500	5 504	17,12	110,1	0,00	85,81	-	-	0,00	0,00	-
T8	6 292	6 296	15,27	110,1	0,00	86,98	-	-	0,00	0,00	-
T9	3 317	3 323	23,88	110,1	0,00	81,43	-	-	0,00	0,00	-
Sum			37,48								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: C Lomarakennus C (Mutalahti)

Wind speed: 8,0 m/s

WTG

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]
1	15 555	15 557	3,93	108,9	0,00	94,84	-	-	0,00	0,00	-
10	18 116	18 118	2,17	108,9	0,00	96,16	-	-	0,00	0,00	-
100	10 340	10 341	4,11	106,0	0,00	91,29	-	-	0,00	0,00	-
101	10 830	10 831	3,49	106,0	0,00	91,69	-	-	0,00	0,00	-
102	9 643	9 645	5,03	106,0	0,00	90,69	-	-	0,00	0,00	-
103	8 925	8 927	6,00	106,0	0,00	90,01	-	-	0,00	0,00	-
104	8 265	8 267	6,96	106,0	0,00	89,35	-	-	0,00	0,00	-
105	8 101	8 103	7,07	106,0	0,00	89,17	-	-	0,00	0,00	-
106	7 521	7 523	8,03	106,0	0,00	88,53	-	-	0,00	0,00	-
107	8 648	8 650	6,21	106,0	0,00	89,74	-	-	0,00	0,00	-
108	9 454	9 456	5,03	106,0	0,00	90,51	-	-	0,00	0,00	-
109	8 636	8 638	6,12	106,0	0,00	89,73	-	-	0,00	0,00	-
11	17 781	17 783	2,55	108,9	0,00	96,00	-	-	0,00	0,00	-
110	9 089	9 091	5,50	106,0	0,00	90,17	-	-	0,00	0,00	-
111	6 570	6 573	9,54	106,0	0,00	87,36	-	-	0,00	0,00	-
112	7 446	7 448	7,99	106,0	0,00	88,44	-	-	0,00	0,00	-
12	17 809	17 810	2,63	108,9	0,00	96,01	-	-	0,00	0,00	-
13	18 799	18 800	1,83	108,9	0,00	96,48	-	-	0,00	0,00	-
14	20 832	20 833	0,32	108,9	0,00	97,38	-	-	0,00	0,00	-
15	18 659	18 660	2,01	108,9	0,00	96,42	-	-	0,00	0,00	-
16	19 614	19 615	1,34	108,9	0,00	96,85	-	-	0,00	0,00	-
17	19 618	19 619	1,26	108,9	0,00	96,85	-	-	0,00	0,00	-
18	20 447	20 448	0,73	108,9	0,00	97,21	-	-	0,00	0,00	-
19	20 682	20 683	0,64	108,9	0,00	97,31	-	-	0,00	0,00	-
2	16 273	16 275	3,37	108,9	0,00	95,23	-	-	0,00	0,00	-
20	22 141	22 142	-0,32	108,9	0,00	97,90	-	-	0,00	0,00	-
21	20 958	20 959	0,32	108,9	0,00	97,43	-	-	0,00	0,00	-
22	22 754	22 755	-0,72	108,9	0,00	98,14	-	-	0,00	0,00	-
23	22 702	22 703	-0,77	108,9	0,00	98,12	-	-	0,00	0,00	-
24	19 950	19 951	0,93	108,9	0,00	97,00	-	-	0,00	0,00	-
25	22 180	22 181	-0,52	108,9	0,00	97,92	-	-	0,00	0,00	-
26	23 596	23 597	-1,24	108,9	0,00	98,46	-	-	0,00	0,00	-
27	23 193	23 195	-1,10	108,9	0,00	98,31	-	-	0,00	0,00	-
28	21 786	21 787	-0,21	108,9	0,00	97,76	-	-	0,00	0,00	-
29	21 271	21 272	0,19	108,9	0,00	97,56	-	-	0,00	0,00	-
3	16 441	16 443	3,32	108,9	0,00	95,32	-	-	0,00	0,00	-
30	19 031	19 032	1,55	108,9	0,00	96,59	-	-	0,00	0,00	-
31	21 364	21 366	-0,06	108,9	0,00	97,59	-	-	0,00	0,00	-
4	17 304	17 306	2,68	108,9	0,00	95,76	-	-	0,00	0,00	-
5	18 238	18 240	1,99	108,9	0,00	96,22	-	-	0,00	0,00	-
6	16 254	16 256	3,59	108,9	0,00	95,22	-	-	0,00	0,00	-
7	16 705	16 706	3,35	108,9	0,00	95,46	-	-	0,00	0,00	-
71	12 772	12 773	1,62	106,0	0,00	93,13	-	-	0,00	0,00	-
72	12 239	12 240	2,15	106,0	0,00	92,76	-	-	0,00	0,00	-
73	11 665	11 666	2,77	106,0	0,00	92,34	-	-	0,00	0,00	-
74	13 179	13 180	1,19	106,0	0,00	93,40	-	-	0,00	0,00	-
75	13 721	13 722	0,64	106,0	0,00	93,75	-	-	0,00	0,00	-
76	14 347	14 348	0,05	106,0	0,00	94,14	-	-	0,00	0,00	-
77	13 102	13 103	1,17	106,0	0,00	93,35	-	-	0,00	0,00	-
78	14 145	14 146	0,14	106,0	0,00	94,01	-	-	0,00	0,00	-
79	14 782	14 784	-0,40	106,0	0,00	94,40	-	-	0,00	0,00	-
8	17 156	17 158	2,88	108,9	0,00	95,69	-	-	0,00	0,00	-
80	13 353	13 354	0,86	106,0	0,00	93,51	-	-	0,00	0,00	-
81	12 299	12 300	1,93	106,0	0,00	92,80	-	-	0,00	0,00	-
82	11 492	11 494	2,86	106,0	0,00	92,21	-	-	0,00	0,00	-
83	11 335	11 336	2,96	106,0	0,00	92,09	-	-	0,00	0,00	-
84	12 453	12 454	1,69	106,0	0,00	92,91	-	-	0,00	0,00	-
85	12 030	12 032	2,11	106,0	0,00	92,61	-	-	0,00	0,00	-
86	9 491	9 493	4,98	106,0	0,00	90,55	-	-	0,00	0,00	-
87	8 943	8 945	5,70	106,0	0,00	90,03	-	-	0,00	0,00	-
88	7 863	7 865	7,25	106,0	0,00	88,91	-	-	0,00	0,00	-
89	7 154	7 156	8,38	106,0	0,00	88,09	-	-	0,00	0,00	-
9	19 214	19 215	1,35	108,9	0,00	96,67	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

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]
90	6 641	6 643	9,27	106,0	0,00	87,45	-	-	0,00	0,00	-
91	7 253	7 255	8,22	106,0	0,00	88,21	-	-	0,00	0,00	-
92	8 276	8 279	6,63	106,0	0,00	89,36	-	-	0,00	0,00	-
93	9 734	9 735	5,10	106,0	0,00	90,77	-	-	0,00	0,00	-
94	10 304	10 306	4,39	106,0	0,00	91,26	-	-	0,00	0,00	-
95	10 629	10 630	3,96	106,0	0,00	91,53	-	-	0,00	0,00	-
96	11 009	11 010	3,47	106,0	0,00	91,84	-	-	0,00	0,00	-
97	9 156	9 158	5,79	106,0	0,00	90,24	-	-	0,00	0,00	-
98	9 660	9 662	5,10	106,0	0,00	90,70	-	-	0,00	0,00	-
99	10 254	10 256	4,35	106,0	0,00	91,22	-	-	0,00	0,00	-
T1	4 594	4 600	19,57	110,1	0,00	84,25	-	-	0,00	0,00	-
T10	3 787	3 794	22,14	110,1	0,00	82,58	-	-	0,00	0,00	-
T11	5 236	5 240	17,80	110,1	0,00	85,39	-	-	0,00	0,00	-
T12	2 497	2 506	27,46	110,1	0,00	78,98	-	-	0,00	0,00	-
T13	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T14	4 173	4 179	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T15	5 198	5 203	17,89	110,1	0,00	85,33	-	-	0,00	0,00	-
T16	2 032	2 044	29,96	110,1	0,00	77,21	-	-	0,00	0,00	-
T17	3 622	3 629	22,73	110,1	0,00	82,19	-	-	0,00	0,00	-
T18	4 686	4 692	19,30	110,1	0,00	84,43	-	-	0,00	0,00	-
T19	2 097	2 108	29,58	110,1	0,00	77,48	-	-	0,00	0,00	-
T2	4 431	4 437	20,05	110,1	0,00	83,94	-	-	0,00	0,00	-
T20	3 066	3 074	24,88	110,1	0,00	80,75	-	-	0,00	0,00	-
T21	4 469	4 475	19,94	110,1	0,00	84,01	-	-	0,00	0,00	-
T22	2 986	2 994	25,22	110,1	0,00	80,52	-	-	0,00	0,00	-
T23	3 668	3 675	22,56	110,1	0,00	82,30	-	-	0,00	0,00	-
T24	5 099	5 104	18,16	110,1	0,00	85,16	-	-	0,00	0,00	-
T25	3 912	3 917	21,88	110,1	0,00	82,86	-	-	0,00	0,00	-
T26	4 304	4 310	20,45	110,1	0,00	83,69	-	-	0,00	0,00	-
T27	5 286	5 290	17,67	110,1	0,00	85,47	-	-	0,00	0,00	-
T28	4 677	4 682	19,80	110,1	0,00	84,41	-	-	0,00	0,00	-
T29	5 129	5 133	18,08	110,1	0,00	85,21	-	-	0,00	0,00	-
T3	3 465	3 472	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T30	8 247	8 250	13,02	110,1	0,00	89,33	-	-	0,00	0,00	-
T31	7 083	7 086	14,83	110,1	0,00	88,01	-	-	0,00	0,00	-
T32	9 327	9 330	11,46	110,1	0,00	90,40	-	-	0,00	0,00	-
T33	8 370	8 373	12,81	110,1	0,00	89,46	-	-	0,00	0,00	-
T34	7 081	7 084	14,79	110,1	0,00	88,01	-	-	0,00	0,00	-
T35	6 697	6 700	15,43	110,1	0,00	87,52	-	-	0,00	0,00	-
T36	9 964	9 967	10,58	110,1	0,00	90,97	-	-	0,00	0,00	-
T37	9 327	9 329	11,39	110,1	0,00	90,40	-	-	0,00	0,00	-
T38	8 296	8 299	12,87	110,1	0,00	89,38	-	-	0,00	0,00	-
T39	9 699	9 702	10,87	110,1	0,00	90,74	-	-	0,00	0,00	-
T4	3 990	3 996	21,45	110,1	0,00	83,03	-	-	0,00	0,00	-
T5	2 614	2 623	26,89	110,1	0,00	79,38	-	-	0,00	0,00	-
T6	3 581	3 588	22,88	110,1	0,00	82,10	-	-	0,00	0,00	-
T7	4 606	4 611	19,54	110,1	0,00	84,28	-	-	0,00	0,00	-
T8	5 469	5 474	17,20	110,1	0,00	85,77	-	-	0,00	0,00	-
T9	2 335	2 344	28,29	110,1	0,00	78,40	-	-	0,00	0,00	-
Sum			38,66								

- Data undefined due to calculation with octave data

Noise sensitive area: D Lomarakennus D (Mutaniemi)

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]
1	15 832	15 834	3,71	108,9	0,00	94,99	-	-	0,00	0,00	-
10	18 417	18 418	1,80	108,9	0,00	96,30	-	-	0,00	0,00	-
100	10 640	10 642	3,60	106,0	0,00	91,54	-	-	0,00	0,00	-
101	11 124	11 126	3,06	106,0	0,00	91,93	-	-	0,00	0,00	-
102	9 950	9 952	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
103	9 234	9 236	5,31	106,0	0,00	90,31	-	-	0,00	0,00	-
104	8 577	8 579	6,20	106,0	0,00	89,67	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
105	8 402	8 405	6,45	106,0	0,00	89,49	-	-	0,00	0,00	-
106	7 827	7 829	7,30	106,0	0,00	88,87	-	-	0,00	0,00	-
107	8 941	8 943	5,70	106,0	0,00	90,03	-	-	0,00	0,00	-
108	9 734	9 735	4,68	106,0	0,00	90,77	-	-	0,00	0,00	-
109	8 913	8 915	5,74	106,0	0,00	90,00	-	-	0,00	0,00	-
11	18 096	18 098	2,02	108,9	0,00	96,15	-	-	0,00	0,00	-
110	9 361	9 363	5,15	106,0	0,00	90,43	-	-	0,00	0,00	-
111	6 868	6 870	8,87	106,0	0,00	87,74	-	-	0,00	0,00	-
112	7 737	7 739	7,44	106,0	0,00	88,77	-	-	0,00	0,00	-
12	18 134	18 135	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
13	19 114	19 115	1,33	108,9	0,00	96,63	-	-	0,00	0,00	-
14	21 126	21 128	0,04	108,9	0,00	97,50	-	-	0,00	0,00	-
15	18 982	18 983	1,42	108,9	0,00	96,57	-	-	0,00	0,00	-
16	19 935	19 936	0,80	108,9	0,00	96,99	-	-	0,00	0,00	-
17	19 931	19 933	0,79	108,9	0,00	96,99	-	-	0,00	0,00	-
18	20 757	20 759	0,30	108,9	0,00	97,34	-	-	0,00	0,00	-
19	21 002	21 004	0,12	108,9	0,00	97,45	-	-	0,00	0,00	-
2	16 539	16 541	3,16	108,9	0,00	95,37	-	-	0,00	0,00	-
20	22 455	22 456	-0,75	108,9	0,00	98,03	-	-	0,00	0,00	-
21	21 262	21 263	-0,04	108,9	0,00	97,55	-	-	0,00	0,00	-
22	23 063	23 064	-1,10	108,9	0,00	98,26	-	-	0,00	0,00	-
23	23 001	23 002	-1,06	108,9	0,00	98,24	-	-	0,00	0,00	-
24	20 251	20 253	0,59	108,9	0,00	97,13	-	-	0,00	0,00	-
25	22 470	22 471	-0,75	108,9	0,00	98,03	-	-	0,00	0,00	-
26	23 900	23 901	-1,56	108,9	0,00	98,57	-	-	0,00	0,00	-
27	23 486	23 487	-1,33	108,9	0,00	98,42	-	-	0,00	0,00	-
28	22 088	22 089	-0,53	108,9	0,00	97,88	-	-	0,00	0,00	-
29	21 582	21 584	-0,22	108,9	0,00	97,68	-	-	0,00	0,00	-
3	16 733	16 735	3,03	108,9	0,00	95,47	-	-	0,00	0,00	-
30	19 333	19 335	1,18	108,9	0,00	96,73	-	-	0,00	0,00	-
31	21 651	21 653	-0,27	108,9	0,00	97,71	-	-	0,00	0,00	-
4	17 594	17 596	2,39	108,9	0,00	95,91	-	-	0,00	0,00	-
5	18 527	18 528	1,73	108,9	0,00	96,36	-	-	0,00	0,00	-
6	16 559	16 560	3,15	108,9	0,00	95,38	-	-	0,00	0,00	-
7	17 020	17 022	2,80	108,9	0,00	95,62	-	-	0,00	0,00	-
71	13 080	13 082	1,09	106,0	0,00	93,33	-	-	0,00	0,00	-
72	12 549	12 550	1,59	106,0	0,00	92,97	-	-	0,00	0,00	-
73	11 978	11 979	2,16	106,0	0,00	92,57	-	-	0,00	0,00	-
74	13 484	13 485	0,72	106,0	0,00	93,60	-	-	0,00	0,00	-
75	14 019	14 020	0,25	106,0	0,00	93,94	-	-	0,00	0,00	-
76	14 639	14 640	-0,27	106,0	0,00	94,31	-	-	0,00	0,00	-
77	13 396	13 398	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
78	14 428	14 429	-0,10	106,0	0,00	94,18	-	-	0,00	0,00	-
79	15 065	15 066	-0,63	106,0	0,00	94,56	-	-	0,00	0,00	-
8	17 458	17 460	2,48	108,9	0,00	95,84	-	-	0,00	0,00	-
80	13 638	13 639	0,58	106,0	0,00	93,70	-	-	0,00	0,00	-
81	12 591	12 593	1,56	106,0	0,00	93,00	-	-	0,00	0,00	-
82	11 796	11 798	2,35	106,0	0,00	92,44	-	-	0,00	0,00	-
83	11 631	11 633	2,52	106,0	0,00	92,31	-	-	0,00	0,00	-
84	12 735	12 736	1,42	106,0	0,00	93,10	-	-	0,00	0,00	-
85	12 308	12 309	1,83	106,0	0,00	92,80	-	-	0,00	0,00	-
86	9 740	9 742	4,67	106,0	0,00	90,77	-	-	0,00	0,00	-
87	9 199	9 201	5,36	106,0	0,00	90,28	-	-	0,00	0,00	-
88	8 130	8 132	6,85	106,0	0,00	89,20	-	-	0,00	0,00	-
89	7 426	7 428	7,94	106,0	0,00	88,42	-	-	0,00	0,00	-
9	19 507	19 508	1,07	108,9	0,00	96,80	-	-	0,00	0,00	-
90	6 917	6 920	8,78	106,0	0,00	87,80	-	-	0,00	0,00	-
91	7 507	7 510	7,80	106,0	0,00	88,51	-	-	0,00	0,00	-
92	8 530	8 532	6,27	106,0	0,00	89,62	-	-	0,00	0,00	-
93	10 056	10 058	4,29	106,0	0,00	91,05	-	-	0,00	0,00	-
94	10 625	10 627	3,63	106,0	0,00	91,53	-	-	0,00	0,00	-
95	10 946	10 947	3,25	106,0	0,00	91,79	-	-	0,00	0,00	-
96	11 321	11 322	2,85	106,0	0,00	92,08	-	-	0,00	0,00	-
97	9 474	9 476	5,00	106,0	0,00	90,53	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
98	9 975	9 977	4,38	106,0	0,00	90,98	-	-	0,00	0,00	-
99	10 567	10 569	3,68	106,0	0,00	91,48	-	-	0,00	0,00	-
T1	4 300	4 306	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T10	3 720	3 726	22,38	110,1	0,00	82,43	-	-	0,00	0,00	-
T11	5 193	5 197	17,91	110,1	0,00	85,32	-	-	0,00	0,00	-
T12	2 460	2 469	27,65	110,1	0,00	78,85	-	-	0,00	0,00	-
T13	3 088	3 096	24,79	110,1	0,00	80,82	-	-	0,00	0,00	-
T14	4 192	4 198	20,80	110,1	0,00	83,46	-	-	0,00	0,00	-
T15	5 211	5 216	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T16	2 157	2 168	29,24	110,1	0,00	77,72	-	-	0,00	0,00	-
T17	3 717	3 724	22,39	110,1	0,00	82,42	-	-	0,00	0,00	-
T18	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T19	2 348	2 358	28,22	110,1	0,00	78,45	-	-	0,00	0,00	-
T2	4 172	4 178	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T20	3 258	3 265	24,10	110,1	0,00	81,28	-	-	0,00	0,00	-
T21	4 615	4 621	19,51	110,1	0,00	84,29	-	-	0,00	0,00	-
T22	3 268	3 276	24,06	110,1	0,00	81,31	-	-	0,00	0,00	-
T23	3 898	3 904	21,76	110,1	0,00	82,83	-	-	0,00	0,00	-
T24	5 268	5 273	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T25	4 212	4 217	20,74	110,1	0,00	83,50	-	-	0,00	0,00	-
T26	4 559	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T27	5 499	5 503	17,13	110,1	0,00	85,81	-	-	0,00	0,00	-
T28	4 999	5 003	18,43	110,1	0,00	84,99	-	-	0,00	0,00	-
T29	5 405	5 409	17,36	110,1	0,00	85,66	-	-	0,00	0,00	-
T3	3 209	3 216	24,30	110,1	0,00	81,15	-	-	0,00	0,00	-
T30	8 343	8 346	13,47	110,1	0,00	89,43	-	-	0,00	0,00	-
T31	7 206	7 209	15,12	110,1	0,00	88,16	-	-	0,00	0,00	-
T32	9 426	9 429	11,92	110,1	0,00	90,49	-	-	0,00	0,00	-
T33	8 495	8 497	13,12	110,1	0,00	89,59	-	-	0,00	0,00	-
T34	7 239	7 242	14,97	110,1	0,00	88,20	-	-	0,00	0,00	-
T35	6 886	6 889	15,25	110,1	0,00	87,76	-	-	0,00	0,00	-
T36	10 087	10 089	10,93	110,1	0,00	91,08	-	-	0,00	0,00	-
T37	9 472	9 475	11,70	110,1	0,00	90,53	-	-	0,00	0,00	-
T38	8 468	8 470	12,99	110,1	0,00	89,56	-	-	0,00	0,00	-
T39	9 869	9 871	11,05	110,1	0,00	90,89	-	-	0,00	0,00	-
T4	3 792	3 798	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
T5	2 378	2 387	28,06	110,1	0,00	78,56	-	-	0,00	0,00	-
T6	3 448	3 455	23,37	110,1	0,00	81,77	-	-	0,00	0,00	-
T7	4 482	4 487	19,90	110,1	0,00	84,04	-	-	0,00	0,00	-
T8	5 374	5 378	17,44	110,1	0,00	85,61	-	-	0,00	0,00	-
T9	2 185	2 195	29,09	110,1	0,00	77,83	-	-	0,00	0,00	-
Sum			38,53								

- Data undefined due to calculation with octave data

Noise sensitive area: E Asuinrakennus E (Alanko)

Wind speed: 8,0 m/s

WTG

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]
1	16 100	16 102	3,50	108,9	0,00	95,14	-	-	0,00	0,00	-
10	18 710	18 712	1,60	108,9	0,00	96,44	-	-	0,00	0,00	-
100	10 935	10 937	3,27	106,0	0,00	91,78	-	-	0,00	0,00	-
101	11 412	11 414	2,75	106,0	0,00	92,15	-	-	0,00	0,00	-
102	10 252	10 253	4,05	106,0	0,00	91,22	-	-	0,00	0,00	-
103	9 538	9 540	4,92	106,0	0,00	90,59	-	-	0,00	0,00	-
104	8 885	8 887	5,78	106,0	0,00	89,97	-	-	0,00	0,00	-
105	8 698	8 700	6,03	106,0	0,00	89,79	-	-	0,00	0,00	-
106	8 128	8 130	6,85	106,0	0,00	89,20	-	-	0,00	0,00	-
107	9 228	9 230	5,32	106,0	0,00	90,30	-	-	0,00	0,00	-
108	10 006	10 008	4,34	106,0	0,00	91,01	-	-	0,00	0,00	-
109	9 184	9 186	5,38	106,0	0,00	90,26	-	-	0,00	0,00	-
11	18 406	18 407	1,81	108,9	0,00	96,30	-	-	0,00	0,00	-
110	9 626	9 628	4,81	106,0	0,00	90,67	-	-	0,00	0,00	-
111	7 160	7 162	8,37	106,0	0,00	88,10	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
112	8 023	8 025	7,01	106,0	0,00	89,09	-	-	0,00	0,00	-
12	18 455	18 457	1,78	108,9	0,00	96,32	-	-	0,00	0,00	-
13	19 424	19 425	1,12	108,9	0,00	96,77	-	-	0,00	0,00	-
14	21 413	21 414	-0,12	108,9	0,00	97,61	-	-	0,00	0,00	-
15	19 301	19 303	1,21	108,9	0,00	96,71	-	-	0,00	0,00	-
16	20 250	20 252	0,59	108,9	0,00	97,13	-	-	0,00	0,00	-
17	20 239	20 240	0,60	108,9	0,00	97,12	-	-	0,00	0,00	-
18	21 062	21 063	0,11	108,9	0,00	97,47	-	-	0,00	0,00	-
19	21 318	21 319	-0,07	108,9	0,00	97,58	-	-	0,00	0,00	-
2	16 796	16 798	2,97	108,9	0,00	95,51	-	-	0,00	0,00	-
20	22 763	22 764	-0,93	108,9	0,00	98,14	-	-	0,00	0,00	-
21	21 560	21 561	-0,22	108,9	0,00	97,67	-	-	0,00	0,00	-
22	23 365	23 366	-1,27	108,9	0,00	98,37	-	-	0,00	0,00	-
23	23 293	23 294	-1,23	108,9	0,00	98,34	-	-	0,00	0,00	-
24	20 546	20 547	0,40	108,9	0,00	97,26	-	-	0,00	0,00	-
25	22 751	22 753	-0,92	108,9	0,00	98,14	-	-	0,00	0,00	-
26	24 197	24 198	-1,73	108,9	0,00	98,68	-	-	0,00	0,00	-
27	23 770	23 771	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
28	22 383	22 384	-0,71	108,9	0,00	98,00	-	-	0,00	0,00	-
29	21 888	21 889	-0,40	108,9	0,00	97,80	-	-	0,00	0,00	-
3	17 016	17 018	2,81	108,9	0,00	95,62	-	-	0,00	0,00	-
30	19 629	19 630	0,99	108,9	0,00	96,86	-	-	0,00	0,00	-
31	21 930	21 931	-0,44	108,9	0,00	97,82	-	-	0,00	0,00	-
4	17 876	17 878	2,18	108,9	0,00	96,05	-	-	0,00	0,00	-
5	18 807	18 809	1,53	108,9	0,00	96,49	-	-	0,00	0,00	-
6	16 857	16 858	2,92	108,9	0,00	95,54	-	-	0,00	0,00	-
7	17 330	17 331	2,57	108,9	0,00	95,78	-	-	0,00	0,00	-
71	13 384	13 385	0,81	106,0	0,00	93,53	-	-	0,00	0,00	-
72	12 853	12 854	1,30	106,0	0,00	93,18	-	-	0,00	0,00	-
73	12 286	12 287	1,85	106,0	0,00	92,79	-	-	0,00	0,00	-
74	13 782	13 783	0,45	106,0	0,00	93,79	-	-	0,00	0,00	-
75	14 310	14 311	0,00	106,0	0,00	94,11	-	-	0,00	0,00	-
76	14 923	14 925	-0,50	106,0	0,00	94,48	-	-	0,00	0,00	-
77	13 684	13 685	0,54	106,0	0,00	93,72	-	-	0,00	0,00	-
78	14 703	14 704	-0,33	106,0	0,00	94,35	-	-	0,00	0,00	-
79	15 338	15 340	-0,85	106,0	0,00	94,72	-	-	0,00	0,00	-
8	17 754	17 755	2,27	108,9	0,00	95,99	-	-	0,00	0,00	-
80	13 916	13 917	0,34	106,0	0,00	93,87	-	-	0,00	0,00	-
81	12 877	12 878	1,31	106,0	0,00	93,20	-	-	0,00	0,00	-
82	12 095	12 096	2,04	106,0	0,00	92,65	-	-	0,00	0,00	-
83	11 921	11 923	2,22	106,0	0,00	92,53	-	-	0,00	0,00	-
84	13 009	13 010	1,16	106,0	0,00	93,29	-	-	0,00	0,00	-
85	12 578	12 579	1,57	106,0	0,00	92,99	-	-	0,00	0,00	-
86	9 980	9 982	4,37	106,0	0,00	90,98	-	-	0,00	0,00	-
87	9 447	9 449	5,04	106,0	0,00	90,51	-	-	0,00	0,00	-
88	8 391	8 393	6,47	106,0	0,00	89,48	-	-	0,00	0,00	-
89	7 691	7 694	7,51	106,0	0,00	88,72	-	-	0,00	0,00	-
9	19 792	19 794	0,89	108,9	0,00	96,93	-	-	0,00	0,00	-
90	7 188	7 191	8,32	106,0	0,00	88,14	-	-	0,00	0,00	-
91	7 755	7 758	7,42	106,0	0,00	88,79	-	-	0,00	0,00	-
92	8 776	8 778	5,93	106,0	0,00	89,87	-	-	0,00	0,00	-
93	10 375	10 377	3,91	106,0	0,00	91,32	-	-	0,00	0,00	-
94	10 942	10 944	3,27	106,0	0,00	91,78	-	-	0,00	0,00	-
95	11 259	11 260	2,91	106,0	0,00	92,03	-	-	0,00	0,00	-
96	11 627	11 629	2,52	106,0	0,00	92,31	-	-	0,00	0,00	-
97	9 788	9 790	4,61	106,0	0,00	90,82	-	-	0,00	0,00	-
98	10 286	10 288	4,01	106,0	0,00	91,25	-	-	0,00	0,00	-
99	10 875	10 876	3,33	106,0	0,00	91,73	-	-	0,00	0,00	-
T1	3 999	4 006	21,42	110,1	0,00	83,05	-	-	0,00	0,00	-
T10	3 660	3 666	22,60	110,1	0,00	82,28	-	-	0,00	0,00	-
T11	5 149	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T12	2 446	2 455	27,72	110,1	0,00	78,80	-	-	0,00	0,00	-
T13	3 142	3 149	24,57	110,1	0,00	80,96	-	-	0,00	0,00	-
T14	4 216	4 221	20,72	110,1	0,00	83,51	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T15	5 224	5 228	17,83	110,1	0,00	85,37	-	-	0,00	0,00	-
T16	2 307	2 317	28,43	110,1	0,00	78,30	-	-	0,00	0,00	-
T17	3 820	3 826	22,03	110,1	0,00	82,66	-	-	0,00	0,00	-
T18	4 841	4 846	18,86	110,1	0,00	84,71	-	-	0,00	0,00	-
T19	2 607	2 616	26,93	110,1	0,00	79,35	-	-	0,00	0,00	-
T2	3 906	3 913	21,73	110,1	0,00	82,85	-	-	0,00	0,00	-
T20	3 456	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T21	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T22	3 551	3 558	22,99	110,1	0,00	82,02	-	-	0,00	0,00	-
T23	4 128	4 134	21,00	110,1	0,00	83,33	-	-	0,00	0,00	-
T24	5 435	5 439	17,29	110,1	0,00	85,71	-	-	0,00	0,00	-
T25	4 509	4 514	19,82	110,1	0,00	84,09	-	-	0,00	0,00	-
T26	4 811	4 816	18,95	110,1	0,00	84,65	-	-	0,00	0,00	-
T27	5 709	5 713	16,61	110,1	0,00	86,14	-	-	0,00	0,00	-
T28	5 318	5 322	17,58	110,1	0,00	85,52	-	-	0,00	0,00	-
T29	5 677	5 680	16,69	110,1	0,00	86,09	-	-	0,00	0,00	-
T3	2 950	2 958	25,37	110,1	0,00	80,42	-	-	0,00	0,00	-
T30	8 473	8 476	12,23	110,1	0,00	89,56	-	-	0,00	0,00	-
T31	7 365	7 368	13,90	110,1	0,00	88,35	-	-	0,00	0,00	-
T32	9 559	9 561	10,70	110,1	0,00	90,61	-	-	0,00	0,00	-
T33	8 652	8 655	11,94	110,1	0,00	89,75	-	-	0,00	0,00	-
T34	7 429	7 431	13,60	110,1	0,00	88,42	-	-	0,00	0,00	-
T35	7 105	7 108	14,23	110,1	0,00	88,04	-	-	0,00	0,00	-
T36	10 240	10 242	9,78	110,1	0,00	91,21	-	-	0,00	0,00	-
T37	9 649	9 651	10,45	110,1	0,00	90,69	-	-	0,00	0,00	-
T38	8 669	8 671	11,71	110,1	0,00	89,76	-	-	0,00	0,00	-
T39	10 067	10 070	9,78	110,1	0,00	91,06	-	-	0,00	0,00	-
T4	3 593	3 599	22,84	110,1	0,00	82,12	-	-	0,00	0,00	-
T5	2 149	2 159	29,29	110,1	0,00	77,68	-	-	0,00	0,00	-
T6	3 322	3 329	23,85	110,1	0,00	81,45	-	-	0,00	0,00	-
T7	4 358	4 363	20,28	110,1	0,00	83,80	-	-	0,00	0,00	-
T8	5 275	5 280	17,69	110,1	0,00	85,45	-	-	0,00	0,00	-
T9	2 057	2 068	29,82	110,1	0,00	77,31	-	-	0,00	0,00	-
Sum			38,50								

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Joensuu)

Wind speed: 8,0 m/s

WTG

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]
1	16 350	16 352	3,31	108,9	0,00	95,27	-	-	0,00	0,00	-
10	18 968	18 969	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
100	11 193	11 195	2,98	106,0	0,00	91,98	-	-	0,00	0,00	-
101	11 669	11 670	2,48	106,0	0,00	92,34	-	-	0,00	0,00	-
102	10 511	10 513	3,74	106,0	0,00	91,43	-	-	0,00	0,00	-
103	9 798	9 800	4,60	106,0	0,00	90,82	-	-	0,00	0,00	-
104	9 145	9 147	5,43	106,0	0,00	90,23	-	-	0,00	0,00	-
105	8 957	8 959	5,68	106,0	0,00	90,04	-	-	0,00	0,00	-
106	8 388	8 390	6,47	106,0	0,00	89,48	-	-	0,00	0,00	-
107	9 484	9 486	4,99	106,0	0,00	90,54	-	-	0,00	0,00	-
108	10 258	10 260	4,04	106,0	0,00	91,22	-	-	0,00	0,00	-
109	9 436	9 437	5,05	106,0	0,00	90,50	-	-	0,00	0,00	-
11	18 666	18 668	1,63	108,9	0,00	96,42	-	-	0,00	0,00	-
110	9 875	9 877	4,50	106,0	0,00	90,89	-	-	0,00	0,00	-
111	7 417	7 420	7,95	106,0	0,00	88,41	-	-	0,00	0,00	-
112	8 279	8 281	6,63	106,0	0,00	89,36	-	-	0,00	0,00	-
12	18 716	18 718	1,60	108,9	0,00	96,45	-	-	0,00	0,00	-
13	19 684	19 686	0,95	108,9	0,00	96,88	-	-	0,00	0,00	-
14	21 669	21 670	-0,27	108,9	0,00	97,72	-	-	0,00	0,00	-
15	19 562	19 564	1,04	108,9	0,00	96,83	-	-	0,00	0,00	-
16	20 512	20 513	0,43	108,9	0,00	97,24	-	-	0,00	0,00	-
17	20 499	20 500	0,43	108,9	0,00	97,24	-	-	0,00	0,00	-
18	21 322	21 323	-0,05	108,9	0,00	97,58	-	-	0,00	0,00	-

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 18.49/3.5.584

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
19	21 579	21 580	-0,23	108,9	0,00	97,68	-	-	0,00	0,00	-
2	17 041	17 043	2,78	108,9	0,00	95,63	-	-	0,00	0,00	-
20	23 023	23 024	-1,07	108,9	0,00	98,24	-	-	0,00	0,00	-
21	21 818	21 819	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
22	23 625	23 626	-1,41	108,9	0,00	98,47	-	-	0,00	0,00	-
23	23 550	23 551	-1,37	108,9	0,00	98,44	-	-	0,00	0,00	-
24	20 804	20 805	0,24	108,9	0,00	97,36	-	-	0,00	0,00	-
25	23 006	23 007	-1,06	108,9	0,00	98,24	-	-	0,00	0,00	-
26	24 455	24 456	-1,86	108,9	0,00	98,77	-	-	0,00	0,00	-
27	24 025	24 026	-1,63	108,9	0,00	98,61	-	-	0,00	0,00	-
28	22 641	22 642	-0,86	108,9	0,00	98,10	-	-	0,00	0,00	-
29	22 148	22 149	-0,56	108,9	0,00	97,91	-	-	0,00	0,00	-
3	17 271	17 273	2,62	108,9	0,00	95,75	-	-	0,00	0,00	-
30	19 887	19 888	0,82	108,9	0,00	96,97	-	-	0,00	0,00	-
31	22 183	22 184	-0,59	108,9	0,00	97,92	-	-	0,00	0,00	-
4	18 130	18 132	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
5	19 061	19 063	1,36	108,9	0,00	96,60	-	-	0,00	0,00	-
6	17 115	17 117	2,73	108,9	0,00	95,67	-	-	0,00	0,00	-
7	17 591	17 592	2,38	108,9	0,00	95,91	-	-	0,00	0,00	-
71	13 643	13 644	0,58	106,0	0,00	93,70	-	-	0,00	0,00	-
72	13 113	13 114	1,06	106,0	0,00	93,35	-	-	0,00	0,00	-
73	12 546	12 547	1,60	106,0	0,00	92,97	-	-	0,00	0,00	-
74	14 041	14 042	0,23	106,0	0,00	93,95	-	-	0,00	0,00	-
75	14 567	14 568	-0,22	106,0	0,00	94,27	-	-	0,00	0,00	-
76	15 179	15 180	-0,71	106,0	0,00	94,63	-	-	0,00	0,00	-
77	13 940	13 941	0,32	106,0	0,00	93,89	-	-	0,00	0,00	-
78	14 955	14 957	-0,54	106,0	0,00	94,50	-	-	0,00	0,00	-
79	15 590	15 592	-1,05	106,0	0,00	94,86	-	-	0,00	0,00	-
8	18 012	18 013	2,08	108,9	0,00	96,11	-	-	0,00	0,00	-
80	14 169	14 170	0,12	106,0	0,00	94,03	-	-	0,00	0,00	-
81	13 132	13 134	1,06	106,0	0,00	93,37	-	-	0,00	0,00	-
82	12 353	12 355	1,79	106,0	0,00	92,84	-	-	0,00	0,00	-
83	12 178	12 179	1,96	106,0	0,00	92,71	-	-	0,00	0,00	-
84	13 261	13 262	0,92	106,0	0,00	93,45	-	-	0,00	0,00	-
85	12 828	12 830	1,33	106,0	0,00	93,16	-	-	0,00	0,00	-
86	10 220	10 222	4,09	106,0	0,00	91,19	-	-	0,00	0,00	-
87	9 690	9 691	4,73	106,0	0,00	90,73	-	-	0,00	0,00	-
88	8 638	8 640	6,12	106,0	0,00	89,73	-	-	0,00	0,00	-
89	7 941	7 943	7,13	106,0	0,00	89,00	-	-	0,00	0,00	-
9	20 047	20 049	0,73	108,9	0,00	97,04	-	-	0,00	0,00	-
90	7 440	7 442	7,91	106,0	0,00	88,43	-	-	0,00	0,00	-
91	7 999	8 001	7,04	106,0	0,00	89,06	-	-	0,00	0,00	-
92	9 018	9 020	5,60	106,0	0,00	90,10	-	-	0,00	0,00	-
93	10 636	10 638	3,61	106,0	0,00	91,54	-	-	0,00	0,00	-
94	11 203	11 205	2,99	106,0	0,00	91,99	-	-	0,00	0,00	-
95	11 520	11 521	2,63	106,0	0,00	92,23	-	-	0,00	0,00	-
96	11 888	11 889	2,25	106,0	0,00	92,50	-	-	0,00	0,00	-
97	10 049	10 051	4,29	106,0	0,00	91,04	-	-	0,00	0,00	-
98	10 547	10 548	3,70	106,0	0,00	91,46	-	-	0,00	0,00	-
99	11 135	11 137	3,05	106,0	0,00	91,94	-	-	0,00	0,00	-
T1	3 835	3 841	21,98	110,1	0,00	82,69	-	-	0,00	0,00	-
T10	3 727	3 733	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T11	5 222	5 227	17,83	110,1	0,00	85,36	-	-	0,00	0,00	-
T12	2 557	2 565	27,17	110,1	0,00	79,18	-	-	0,00	0,00	-
T13	3 291	3 297	23,98	110,1	0,00	81,36	-	-	0,00	0,00	-
T14	4 340	4 345	20,34	110,1	0,00	83,76	-	-	0,00	0,00	-
T15	5 338	5 342	17,53	110,1	0,00	85,55	-	-	0,00	0,00	-
T16	2 514	2 523	27,38	110,1	0,00	79,04	-	-	0,00	0,00	-
T17	3 995	4 001	21,44	110,1	0,00	83,04	-	-	0,00	0,00	-
T18	4 998	5 003	18,43	110,1	0,00	84,98	-	-	0,00	0,00	-
T19	2 857	2 865	25,78	110,1	0,00	80,14	-	-	0,00	0,00	-
T2	3 786	3 793	22,15	110,1	0,00	82,58	-	-	0,00	0,00	-
T20	3 682	3 688	22,52	110,1	0,00	82,34	-	-	0,00	0,00	-
T21	4 960	4 965	18,53	110,1	0,00	84,92	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T22	3 807	3 813	22,08	110,1	0,00	82,63	-	-	0,00	0,00	-
T23	4 366	4 372	20,25	110,1	0,00	83,81	-	-	0,00	0,00	-
T24	5 642	5 646	16,77	110,1	0,00	86,03	-	-	0,00	0,00	-
T25	4 768	4 773	19,07	110,1	0,00	84,58	-	-	0,00	0,00	-
T26	5 057	5 061	18,27	110,1	0,00	85,09	-	-	0,00	0,00	-
T27	5 936	5 940	16,07	110,1	0,00	86,48	-	-	0,00	0,00	-
T28	5 579	5 583	16,93	110,1	0,00	85,94	-	-	0,00	0,00	-
T29	5 929	5 933	16,09	110,1	0,00	86,46	-	-	0,00	0,00	-
T3	2 843	2 851	25,84	110,1	0,00	80,10	-	-	0,00	0,00	-
T30	8 491	8 493	12,01	110,1	0,00	89,58	-	-	0,00	0,00	-
T31	7 407	7 410	13,67	110,1	0,00	88,40	-	-	0,00	0,00	-
T32	9 577	9 579	10,48	110,1	0,00	90,63	-	-	0,00	0,00	-
T33	8 692	8 695	11,70	110,1	0,00	89,79	-	-	0,00	0,00	-
T34	7 498	7 501	13,42	110,1	0,00	88,50	-	-	0,00	0,00	-
T35	7 201	7 204	13,88	110,1	0,00	88,15	-	-	0,00	0,00	-
T36	10 276	10 278	9,56	110,1	0,00	91,24	-	-	0,00	0,00	-
T37	9 704	9 706	10,24	110,1	0,00	90,74	-	-	0,00	0,00	-
T38	8 747	8 749	11,51	110,1	0,00	89,84	-	-	0,00	0,00	-
T39	10 142	10 144	9,62	110,1	0,00	91,12	-	-	0,00	0,00	-
T4	3 543	3 550	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T5	2 081	2 091	29,68	110,1	0,00	77,41	-	-	0,00	0,00	-
T6	3 339	3 345	23,79	110,1	0,00	81,49	-	-	0,00	0,00	-
T7	4 371	4 376	20,24	110,1	0,00	83,82	-	-	0,00	0,00	-
T8	5 307	5 312	17,61	110,1	0,00	85,50	-	-	0,00	0,00	-
T9	2 087	2 097	29,65	110,1	0,00	77,43	-	-	0,00	0,00	-
Sum			38,20								

- Data undefined due to calculation with octave data

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Wind speed: 8,0 m/s

WTG

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]
1	18 351	18 352	1,85	108,9	0,00	96,27	-	-	0,00	0,00	-
10	21 130	21 131	0,05	108,9	0,00	97,50	-	-	0,00	0,00	-
100	13 393	13 394	0,82	106,0	0,00	93,54	-	-	0,00	0,00	-
101	13 822	13 824	0,43	106,0	0,00	93,81	-	-	0,00	0,00	-
102	12 757	12 759	1,42	106,0	0,00	93,12	-	-	0,00	0,00	-
103	12 065	12 067	2,10	106,0	0,00	92,63	-	-	0,00	0,00	-
104	11 438	11 439	2,75	106,0	0,00	92,17	-	-	0,00	0,00	-
105	11 180	11 182	3,02	106,0	0,00	91,97	-	-	0,00	0,00	-
106	10 648	10 650	3,62	106,0	0,00	91,55	-	-	0,00	0,00	-
107	11 649	11 651	2,54	106,0	0,00	92,33	-	-	0,00	0,00	-
108	12 329	12 330	1,82	106,0	0,00	92,82	-	-	0,00	0,00	-
109	11 505	11 506	2,67	106,0	0,00	92,22	-	-	0,00	0,00	-
11	20 940	20 941	0,17	108,9	0,00	97,42	-	-	0,00	0,00	-
110	11 904	11 905	2,25	106,0	0,00	92,51	-	-	0,00	0,00	-
111	9 634	9 636	4,84	106,0	0,00	90,68	-	-	0,00	0,00	-
112	10 449	10 450	3,85	106,0	0,00	91,38	-	-	0,00	0,00	-
12	21 074	21 075	0,09	108,9	0,00	97,48	-	-	0,00	0,00	-
13	21 958	21 959	-0,45	108,9	0,00	97,83	-	-	0,00	0,00	-
14	23 776	23 777	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
15	21 901	21 902	-0,41	108,9	0,00	97,81	-	-	0,00	0,00	-
16	22 827	22 828	-0,95	108,9	0,00	98,17	-	-	0,00	0,00	-
17	22 753	22 754	-0,91	108,9	0,00	98,14	-	-	0,00	0,00	-
18	23 558	23 559	-1,35	108,9	0,00	98,44	-	-	0,00	0,00	-
19	23 891	23 892	-1,55	108,9	0,00	98,57	-	-	0,00	0,00	-
2	18 961	18 963	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
20	25 280	25 281	-2,30	108,9	0,00	99,06	-	-	0,00	0,00	-
21	24 002	24 003	-1,61	108,9	0,00	98,61	-	-	0,00	0,00	-
22	25 839	25 840	-2,59	108,9	0,00	99,25	-	-	0,00	0,00	-
23	25 691	25 692	-2,51	108,9	0,00	99,20	-	-	0,00	0,00	-
24	22 971	22 972	-1,04	108,9	0,00	98,22	-	-	0,00	0,00	-
25	25 075	25 076	-2,19	108,9	0,00	98,99	-	-	0,00	0,00	-

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Mikka Saranpää / mikka.saranpaa@fcg.fi
 Calculated:
 9.5.2023 18.49/3.5.584

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
26	26 631	26 632	-2,99	108,9	0,00	99,51	-	-	0,00	0,00	-
27	26 109	26 110	-2,73	108,9	0,00	99,34	-	-	0,00	0,00	-
28	24 806	24 807	-2,05	108,9	0,00	98,89	-	-	0,00	0,00	-
29	24 387	24 388	-1,80	108,9	0,00	98,74	-	-	0,00	0,00	-
3	19 371	19 373	1,16	108,9	0,00	96,74	-	-	0,00	0,00	-
30	22 062	22 063	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
31	24 231	24 232	-1,74	108,9	0,00	98,69	-	-	0,00	0,00	-
4	20 215	20 217	0,62	108,9	0,00	97,11	-	-	0,00	0,00	-
5	21 132	21 134	0,04	108,9	0,00	97,50	-	-	0,00	0,00	-
6	19 313	19 315	1,22	108,9	0,00	96,72	-	-	0,00	0,00	-
7	19 869	19 870	0,85	108,9	0,00	96,96	-	-	0,00	0,00	-
71	15 885	15 886	-1,26	106,0	0,00	95,02	-	-	0,00	0,00	-
72	15 365	15 366	-0,86	106,0	0,00	94,73	-	-	0,00	0,00	-
73	14 822	14 823	-0,41	106,0	0,00	94,42	-	-	0,00	0,00	-
74	16 250	16 251	-1,54	106,0	0,00	95,22	-	-	0,00	0,00	-
75	16 728	16 729	-1,90	106,0	0,00	95,47	-	-	0,00	0,00	-
76	17 293	17 294	-2,31	106,0	0,00	95,76	-	-	0,00	0,00	-
77	16 076	16 078	-1,41	106,0	0,00	95,12	-	-	0,00	0,00	-
78	17 007	17 008	-2,11	106,0	0,00	95,61	-	-	0,00	0,00	-
79	17 631	17 632	-2,55	106,0	0,00	95,93	-	-	0,00	0,00	-
8	20 190	20 191	0,64	108,9	0,00	97,10	-	-	0,00	0,00	-
80	16 242	16 243	-1,54	106,0	0,00	95,21	-	-	0,00	0,00	-
81	15 261	15 263	-0,78	106,0	0,00	94,67	-	-	0,00	0,00	-
82	14 569	14 570	-0,21	106,0	0,00	94,27	-	-	0,00	0,00	-
83	14 343	14 344	-0,01	106,0	0,00	94,13	-	-	0,00	0,00	-
84	15 316	15 317	-0,83	106,0	0,00	94,70	-	-	0,00	0,00	-
85	14 860	14 861	-0,46	106,0	0,00	94,44	-	-	0,00	0,00	-
86	12 094	12 096	2,05	106,0	0,00	92,65	-	-	0,00	0,00	-
87	11 617	11 619	2,54	106,0	0,00	92,30	-	-	0,00	0,00	-
88	10 656	10 658	3,59	106,0	0,00	91,55	-	-	0,00	0,00	-
89	10 001	10 003	4,37	106,0	0,00	91,00	-	-	0,00	0,00	-
9	22 149	22 150	-0,56	108,9	0,00	97,91	-	-	0,00	0,00	-
90	9 539	9 540	4,95	106,0	0,00	90,59	-	-	0,00	0,00	-
91	9 956	9 958	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
92	10 944	10 946	3,26	106,0	0,00	91,78	-	-	0,00	0,00	-
93	12 990	12 991	1,21	106,0	0,00	93,27	-	-	0,00	0,00	-
94	13 544	13 545	0,69	106,0	0,00	93,64	-	-	0,00	0,00	-
95	13 834	13 835	0,43	106,0	0,00	93,82	-	-	0,00	0,00	-
96	14 159	14 160	0,15	106,0	0,00	94,02	-	-	0,00	0,00	-
97	12 373	12 375	1,79	106,0	0,00	92,85	-	-	0,00	0,00	-
98	12 850	12 851	1,33	106,0	0,00	93,18	-	-	0,00	0,00	-
99	13 417	13 418	0,80	106,0	0,00	93,55	-	-	0,00	0,00	-
T1	2 060	2 071	29,79	110,1	0,00	77,33	-	-	0,00	0,00	-
T10	4 264	4 269	20,57	110,1	0,00	83,61	-	-	0,00	0,00	-
T11	5 583	5 587	16,92	110,1	0,00	85,94	-	-	0,00	0,00	-
T12	3 725	3 731	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T13	4 582	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T14	5 269	5 274	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T15	6 057	6 061	15,79	110,1	0,00	86,65	-	-	0,00	0,00	-
T16	4 379	4 384	20,25	110,1	0,00	83,84	-	-	0,00	0,00	-
T17	5 410	5 414	17,35	110,1	0,00	85,67	-	-	0,00	0,00	-
T18	6 152	6 157	15,58	110,1	0,00	86,79	-	-	0,00	0,00	-
T19	5 065	5 069	18,30	110,1	0,00	85,10	-	-	0,00	0,00	-
T2	2 521	2 531	27,34	110,1	0,00	79,07	-	-	0,00	0,00	-
T20	5 581	5 585	16,94	110,1	0,00	85,94	-	-	0,00	0,00	-
T21	6 500	6 504	14,81	110,1	0,00	87,26	-	-	0,00	0,00	-
T22	6 055	6 059	15,84	110,1	0,00	86,65	-	-	0,00	0,00	-
T23	6 358	6 361	15,14	110,1	0,00	87,07	-	-	0,00	0,00	-
T24	7 236	7 239	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T25	7 055	7 058	13,88	110,1	0,00	87,97	-	-	0,00	0,00	-
T26	7 119	7 122	13,75	110,1	0,00	88,05	-	-	0,00	0,00	-
T27	7 745	7 748	12,69	110,1	0,00	88,78	-	-	0,00	0,00	-
T28	7 962	7 964	12,41	110,1	0,00	89,02	-	-	0,00	0,00	-
T29	8 064	8 066	12,23	110,1	0,00	89,13	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T3	2 071	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T30	9 912	9 914	9,74	110,1	0,00	90,92	-	-	0,00	0,00	-
T31	9 035	9 038	11,10	110,1	0,00	90,12	-	-	0,00	0,00	-
T32	10 974	10 976	8,44	110,1	0,00	91,81	-	-	0,00	0,00	-
T33	10 268	10 270	9,45	110,1	0,00	91,23	-	-	0,00	0,00	-
T34	9 295	9 297	10,74	110,1	0,00	90,37	-	-	0,00	0,00	-
T35	9 163	9 165	10,89	110,1	0,00	90,24	-	-	0,00	0,00	-
T36	11 785	11 787	7,58	110,1	0,00	92,43	-	-	0,00	0,00	-
T37	11 362	11 364	8,16	110,1	0,00	92,11	-	-	0,00	0,00	-
T38	10 571	10 573	9,09	110,1	0,00	91,48	-	-	0,00	0,00	-
T39	11 920	11 922	7,53	110,1	0,00	92,53	-	-	0,00	0,00	-
T4	3 074	3 081	24,85	110,1	0,00	80,77	-	-	0,00	0,00	-
T5	2 163	2 173	29,21	110,1	0,00	77,74	-	-	0,00	0,00	-
T6	3 538	3 545	23,04	110,1	0,00	81,99	-	-	0,00	0,00	-
T7	4 299	4 304	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T8	5 266	5 270	17,72	110,1	0,00	85,44	-	-	0,00	0,00	-
T9	2 879	2 887	25,69	110,1	0,00	80,21	-	-	0,00	0,00	-
Sum			37,45								

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Wind speed: 8,0 m/s

WTG

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]
1	19 383	19 385	1,15	108,9	0,00	96,75	-	-	0,00	0,00	-
10	22 204	22 205	-0,60	108,9	0,00	97,93	-	-	0,00	0,00	-
100	14 485	14 486	-0,15	106,0	0,00	94,22	-	-	0,00	0,00	-
101	14 903	14 904	-0,50	106,0	0,00	94,47	-	-	0,00	0,00	-
102	13 860	13 861	0,39	106,0	0,00	93,84	-	-	0,00	0,00	-
103	13 173	13 175	1,00	106,0	0,00	93,39	-	-	0,00	0,00	-
104	12 551	12 552	1,59	106,0	0,00	92,97	-	-	0,00	0,00	-
105	12 280	12 282	1,86	106,0	0,00	92,79	-	-	0,00	0,00	-
106	11 756	11 758	2,39	106,0	0,00	92,41	-	-	0,00	0,00	-
107	12 736	12 737	1,43	106,0	0,00	93,10	-	-	0,00	0,00	-
108	13 392	13 393	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
109	12 570	12 571	1,57	106,0	0,00	92,99	-	-	0,00	0,00	-
11	22 042	22 043	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
110	12 958	12 959	1,20	106,0	0,00	93,25	-	-	0,00	0,00	-
111	10 736	10 738	3,49	106,0	0,00	91,62	-	-	0,00	0,00	-
112	11 539	11 540	2,61	106,0	0,00	92,24	-	-	0,00	0,00	-
12	22 195	22 197	-0,59	108,9	0,00	97,93	-	-	0,00	0,00	-
13	23 061	23 062	-1,10	108,9	0,00	98,26	-	-	0,00	0,00	-
14	24 834	24 835	-2,07	108,9	0,00	98,90	-	-	0,00	0,00	-
15	23 018	23 020	-1,07	108,9	0,00	98,24	-	-	0,00	0,00	-
16	23 939	23 940	-1,58	108,9	0,00	98,58	-	-	0,00	0,00	-
17	23 851	23 852	-1,54	108,9	0,00	98,55	-	-	0,00	0,00	-
18	24 650	24 651	-1,95	108,9	0,00	98,84	-	-	0,00	0,00	-
19	25 002	25 003	-2,16	108,9	0,00	98,96	-	-	0,00	0,00	-
2	19 969	19 971	0,77	108,9	0,00	97,01	-	-	0,00	0,00	-
20	26 378	26 379	-2,87	108,9	0,00	99,43	-	-	0,00	0,00	-
21	25 081	25 082	-2,20	108,9	0,00	98,99	-	-	0,00	0,00	-
22	26 925	26 926	-3,14	108,9	0,00	99,60	-	-	0,00	0,00	-
23	26 757	26 758	-3,06	108,9	0,00	99,55	-	-	0,00	0,00	-
24	24 046	24 047	-1,64	108,9	0,00	98,62	-	-	0,00	0,00	-
25	26 122	26 123	-2,74	108,9	0,00	99,34	-	-	0,00	0,00	-
26	27 707	27 708	-3,52	108,9	0,00	99,85	-	-	0,00	0,00	-
27	27 159	27 160	-3,26	108,9	0,00	99,68	-	-	0,00	0,00	-
28	25 880	25 881	-2,61	108,9	0,00	99,26	-	-	0,00	0,00	-
29	25 480	25 481	-2,39	108,9	0,00	99,12	-	-	0,00	0,00	-
3	20 431	20 432	0,47	108,9	0,00	97,21	-	-	0,00	0,00	-
30	23 140	23 141	-1,14	108,9	0,00	98,29	-	-	0,00	0,00	-
31	25 272	25 273	-2,30	108,9	0,00	99,05	-	-	0,00	0,00	-
4	21 270	21 271	-0,04	108,9	0,00	97,56	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
5	22 182	22 183	-0,59	108,9	0,00	97,92	-	-	0,00	0,00	-
6	20 399	20 400	0,50	108,9	0,00	97,19	-	-	0,00	0,00	-
7	20 974	20 975	0,14	108,9	0,00	97,43	-	-	0,00	0,00	-
71	16 984	16 985	-2,10	106,0	0,00	95,60	-	-	0,00	0,00	-
72	16 466	16 467	-1,72	106,0	0,00	95,33	-	-	0,00	0,00	-
73	15 929	15 930	-1,31	106,0	0,00	95,04	-	-	0,00	0,00	-
74	17 340	17 341	-2,35	106,0	0,00	95,78	-	-	0,00	0,00	-
75	17 806	17 807	-2,68	106,0	0,00	96,01	-	-	0,00	0,00	-
76	18 359	18 360	-3,06	106,0	0,00	96,28	-	-	0,00	0,00	-
77	17 149	17 150	-2,22	106,0	0,00	95,69	-	-	0,00	0,00	-
78	18 056	18 057	-2,85	106,0	0,00	96,13	-	-	0,00	0,00	-
79	18 677	18 678	-3,27	106,0	0,00	96,43	-	-	0,00	0,00	-
8	21 270	21 271	-0,04	108,9	0,00	97,56	-	-	0,00	0,00	-
80	17 298	17 299	-2,32	106,0	0,00	95,76	-	-	0,00	0,00	-
81	16 334	16 334	-1,62	106,0	0,00	95,26	-	-	0,00	0,00	-
82	15 663	15 664	-1,11	106,0	0,00	94,90	-	-	0,00	0,00	-
83	15 425	15 426	-0,92	106,0	0,00	94,76	-	-	0,00	0,00	-
84	16 368	16 369	-1,65	106,0	0,00	95,28	-	-	0,00	0,00	-
85	15 907	15 908	-1,30	106,0	0,00	95,03	-	-	0,00	0,00	-
86	13 107	13 108	1,07	106,0	0,00	93,35	-	-	0,00	0,00	-
87	12 646	12 647	1,50	106,0	0,00	93,04	-	-	0,00	0,00	-
88	11 711	11 713	2,43	106,0	0,00	92,37	-	-	0,00	0,00	-
89	11 069	11 070	3,12	106,0	0,00	91,88	-	-	0,00	0,00	-
9	23 206	23 208	-1,18	108,9	0,00	98,31	-	-	0,00	0,00	-
90	10 616	10 618	3,62	106,0	0,00	91,52	-	-	0,00	0,00	-
91	10 999	11 001	3,19	106,0	0,00	91,83	-	-	0,00	0,00	-
92	11 975	11 976	2,16	106,0	0,00	92,57	-	-	0,00	0,00	-
93	14 113	14 114	0,19	106,0	0,00	93,99	-	-	0,00	0,00	-
94	14 665	14 666	-0,30	106,0	0,00	94,33	-	-	0,00	0,00	-
95	14 949	14 950	-0,54	106,0	0,00	94,49	-	-	0,00	0,00	-
96	15 266	15 267	-0,79	106,0	0,00	94,67	-	-	0,00	0,00	-
97	13 492	13 493	0,72	106,0	0,00	93,60	-	-	0,00	0,00	-
98	13 964	13 965	0,29	106,0	0,00	93,90	-	-	0,00	0,00	-
99	14 526	14 527	-0,19	106,0	0,00	94,24	-	-	0,00	0,00	-
T1	2 090	2 102	29,62	110,1	0,00	77,45	-	-	0,00	0,00	-
T10	5 057	5 061	18,27	110,1	0,00	85,08	-	-	0,00	0,00	-
T11	6 241	6 244	15,38	110,1	0,00	86,91	-	-	0,00	0,00	-
T12	4 712	4 716	19,23	110,1	0,00	84,47	-	-	0,00	0,00	-
T13	5 551	5 555	17,00	110,1	0,00	85,89	-	-	0,00	0,00	-
T14	6 120	6 123	15,65	110,1	0,00	86,74	-	-	0,00	0,00	-
T15	6 813	6 816	14,24	110,1	0,00	87,67	-	-	0,00	0,00	-
T16	5 460	5 464	17,22	110,1	0,00	85,75	-	-	0,00	0,00	-
T17	6 379	6 383	15,08	110,1	0,00	87,10	-	-	0,00	0,00	-
T18	7 035	7 038	13,85	110,1	0,00	87,95	-	-	0,00	0,00	-
T19	6 182	6 186	15,52	110,1	0,00	86,83	-	-	0,00	0,00	-
T2	2 797	2 805	26,05	110,1	0,00	79,96	-	-	0,00	0,00	-
T20	6 647	6 650	14,54	110,1	0,00	87,46	-	-	0,00	0,00	-
T21	7 475	7 478	13,12	110,1	0,00	88,48	-	-	0,00	0,00	-
T22	7 173	7 176	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T23	7 432	7 435	13,19	110,1	0,00	88,43	-	-	0,00	0,00	-
T24	8 212	8 214	11,96	110,1	0,00	89,29	-	-	0,00	0,00	-
T25	8 175	8 177	12,02	110,1	0,00	89,25	-	-	0,00	0,00	-
T26	8 201	8 203	11,97	110,1	0,00	89,28	-	-	0,00	0,00	-
T27	8 768	8 770	11,14	110,1	0,00	89,86	-	-	0,00	0,00	-
T28	9 092	9 094	10,73	110,1	0,00	90,18	-	-	0,00	0,00	-
T29	9 154	9 157	10,60	110,1	0,00	90,23	-	-	0,00	0,00	-
T3	2 728	2 736	26,36	110,1	0,00	79,74	-	-	0,00	0,00	-
T30	10 547	10 549	8,90	110,1	0,00	91,46	-	-	0,00	0,00	-
T31	9 767	9 769	10,00	110,1	0,00	90,80	-	-	0,00	0,00	-
T32	11 585	11 587	7,72	110,1	0,00	92,28	-	-	0,00	0,00	-
T33	10 962	10 964	8,46	110,1	0,00	91,80	-	-	0,00	0,00	-
T34	10 091	10 093	9,61	110,1	0,00	91,08	-	-	0,00	0,00	-
T35	10 026	10 028	9,68	110,1	0,00	91,02	-	-	0,00	0,00	-
T36	12 434	12 436	6,77	110,1	0,00	92,89	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T37	12 078	12 080	7,23	110,1	0,00	92,64	-	-	0,00	0,00	-
T38	11 364	11 366	8,08	110,1	0,00	92,11	-	-	0,00	0,00	-
T39	12 682	12 684	6,66	110,1	0,00	93,07	-	-	0,00	0,00	-
T4	3 644	3 650	22,65	110,1	0,00	82,25	-	-	0,00	0,00	-
T5	3 094	3 100	24,77	110,1	0,00	80,83	-	-	0,00	0,00	-
T6	4 292	4 297	20,49	110,1	0,00	83,66	-	-	0,00	0,00	-
T7	4 883	4 887	18,75	110,1	0,00	84,78	-	-	0,00	0,00	-
T8	5 791	5 795	16,41	110,1	0,00	86,26	-	-	0,00	0,00	-
T9	3 860	3 866	21,89	110,1	0,00	82,74	-	-	0,00	0,00	-
Sum			35,29								

- Data undefined due to calculation with octave data

Noise sensitive area: I Lomarakennus I

Wind speed: 8,0 m/s

WTG

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]
1	16 989	16 990	2,82	108,9	0,00	95,60	-	-	0,00	0,00	-
10	20 165	20 166	0,64	108,9	0,00	97,09	-	-	0,00	0,00	-
100	12 936	12 937	1,22	106,0	0,00	93,24	-	-	0,00	0,00	-
101	13 178	13 179	1,00	106,0	0,00	93,40	-	-	0,00	0,00	-
102	12 517	12 518	1,64	106,0	0,00	92,95	-	-	0,00	0,00	-
103	11 964	11 965	2,17	106,0	0,00	92,56	-	-	0,00	0,00	-
104	11 493	11 494	2,66	106,0	0,00	92,21	-	-	0,00	0,00	-
105	11 007	11 009	3,19	106,0	0,00	91,83	-	-	0,00	0,00	-
106	10 666	10 668	3,57	106,0	0,00	91,56	-	-	0,00	0,00	-
107	11 231	11 233	2,94	106,0	0,00	92,01	-	-	0,00	0,00	-
108	11 552	11 553	2,60	106,0	0,00	92,25	-	-	0,00	0,00	-
109	10 808	10 809	3,41	106,0	0,00	91,68	-	-	0,00	0,00	-
11	20 393	20 394	0,50	108,9	0,00	97,19	-	-	0,00	0,00	-
110	11 047	11 048	3,14	106,0	0,00	91,87	-	-	0,00	0,00	-
111	9 635	9 637	4,80	106,0	0,00	90,68	-	-	0,00	0,00	-
112	10 184	10 185	4,13	106,0	0,00	91,16	-	-	0,00	0,00	-
12	20 906	20 907	0,18	108,9	0,00	97,41	-	-	0,00	0,00	-
13	21 386	21 387	-0,11	108,9	0,00	97,60	-	-	0,00	0,00	-
14	22 562	22 563	-0,81	108,9	0,00	98,07	-	-	0,00	0,00	-
15	21 618	21 619	-0,25	108,9	0,00	97,70	-	-	0,00	0,00	-
16	22 411	22 412	-0,72	108,9	0,00	98,01	-	-	0,00	0,00	-
17	22 080	22 081	-0,53	108,9	0,00	97,88	-	-	0,00	0,00	-
18	22 793	22 794	-0,94	108,9	0,00	98,16	-	-	0,00	0,00	-
19	23 435	23 436	-1,31	108,9	0,00	98,40	-	-	0,00	0,00	-
2	17 355	17 357	2,55	108,9	0,00	95,79	-	-	0,00	0,00	-
20	24 561	24 562	-1,91	108,9	0,00	98,81	-	-	0,00	0,00	-
21	23 038	23 039	-1,08	108,9	0,00	98,25	-	-	0,00	0,00	-
22	24 943	24 944	-2,13	108,9	0,00	98,94	-	-	0,00	0,00	-
23	24 542	24 543	-1,91	108,9	0,00	98,80	-	-	0,00	0,00	-
24	21 972	21 973	-0,46	108,9	0,00	97,84	-	-	0,00	0,00	-
25	23 715	23 716	-1,46	108,9	0,00	98,50	-	-	0,00	0,00	-
26	25 584	25 585	-2,46	108,9	0,00	99,16	-	-	0,00	0,00	-
27	24 772	24 773	-2,03	108,9	0,00	98,88	-	-	0,00	0,00	-
28	23 759	23 760	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
29	23 617	23 618	-1,41	108,9	0,00	98,46	-	-	0,00	0,00	-
3	18 265	18 267	1,91	108,9	0,00	96,23	-	-	0,00	0,00	-
30	21 115	21 116	0,05	108,9	0,00	97,49	-	-	0,00	0,00	-
31	22 826	22 827	-0,96	108,9	0,00	98,17	-	-	0,00	0,00	-
4	19 032	19 033	1,38	108,9	0,00	96,59	-	-	0,00	0,00	-
5	19 878	19 879	0,83	108,9	0,00	96,97	-	-	0,00	0,00	-
6	18 535	18 536	1,72	108,9	0,00	96,36	-	-	0,00	0,00	-
7	19 379	19 380	1,15	108,9	0,00	96,75	-	-	0,00	0,00	-
71	15 421	15 422	-0,92	106,0	0,00	94,76	-	-	0,00	0,00	-
72	14 966	14 967	-0,55	106,0	0,00	94,50	-	-	0,00	0,00	-
73	14 551	14 552	-0,21	106,0	0,00	94,26	-	-	0,00	0,00	-
74	15 644	15 645	-1,09	106,0	0,00	94,89	-	-	0,00	0,00	-
75	15 930	15 931	-1,31	106,0	0,00	95,04	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
76	16 319	16 320	-1,61	106,0	0,00	95,25	-	-	0,00	0,00	-
77	15 235	15 236	-0,77	106,0	0,00	94,66	-	-	0,00	0,00	-
78	15 854	15 855	-1,26	106,0	0,00	95,00	-	-	0,00	0,00	-
79	16 417	16 418	-1,68	106,0	0,00	95,31	-	-	0,00	0,00	-
8	19 312	19 313	1,20	108,9	0,00	96,72	-	-	0,00	0,00	-
80	15 192	15 193	-0,73	106,0	0,00	94,63	-	-	0,00	0,00	-
81	14 441	14 442	-0,12	106,0	0,00	94,19	-	-	0,00	0,00	-
82	14 086	14 087	0,19	106,0	0,00	93,98	-	-	0,00	0,00	-
83	13 696	13 697	0,53	106,0	0,00	93,73	-	-	0,00	0,00	-
84	14 264	14 266	0,03	106,0	0,00	94,09	-	-	0,00	0,00	-
85	13 767	13 768	0,47	106,0	0,00	93,78	-	-	0,00	0,00	-
86	10 806	10 807	3,41	106,0	0,00	91,67	-	-	0,00	0,00	-
87	10 516	10 518	3,74	106,0	0,00	91,44	-	-	0,00	0,00	-
88	9 914	9 916	4,45	106,0	0,00	90,93	-	-	0,00	0,00	-
89	9 468	9 470	5,01	106,0	0,00	90,53	-	-	0,00	0,00	-
9	20 958	20 960	0,15	108,9	0,00	97,43	-	-	0,00	0,00	-
90	9 186	9 188	5,38	106,0	0,00	90,26	-	-	0,00	0,00	-
91	9 150	9 152	5,42	106,0	0,00	90,23	-	-	0,00	0,00	-
92	9 920	9 921	4,45	106,0	0,00	90,93	-	-	0,00	0,00	-
93	13 174	13 175	1,00	106,0	0,00	93,40	-	-	0,00	0,00	-
94	13 629	13 630	0,59	106,0	0,00	93,69	-	-	0,00	0,00	-
95	13 779	13 780	0,46	106,0	0,00	93,79	-	-	0,00	0,00	-
96	13 911	13 912	0,34	106,0	0,00	93,87	-	-	0,00	0,00	-
97	12 475	12 477	1,67	106,0	0,00	92,92	-	-	0,00	0,00	-
98	12 822	12 824	1,33	106,0	0,00	93,16	-	-	0,00	0,00	-
99	13 260	13 261	0,93	106,0	0,00	93,45	-	-	0,00	0,00	-
T1	2 625	2 634	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T10	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T11	2 945	2 952	25,40	110,1	0,00	80,40	-	-	0,00	0,00	-
T12	4 055	4 059	21,25	110,1	0,00	83,17	-	-	0,00	0,00	-
T13	4 315	4 320	20,41	110,1	0,00	83,71	-	-	0,00	0,00	-
T14	3 870	3 876	21,86	110,1	0,00	82,77	-	-	0,00	0,00	-
T15	3 806	3 813	22,08	110,1	0,00	82,62	-	-	0,00	0,00	-
T16	5 213	5 217	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T17	4 798	4 802	18,99	110,1	0,00	84,63	-	-	0,00	0,00	-
T18	4 661	4 667	19,37	110,1	0,00	84,38	-	-	0,00	0,00	-
T19	6 200	6 203	15,47	110,1	0,00	86,85	-	-	0,00	0,00	-
T2	2 072	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T20	5 814	5 818	16,36	110,1	0,00	86,30	-	-	0,00	0,00	-
T21	5 603	5 607	16,87	110,1	0,00	85,97	-	-	0,00	0,00	-
T22	6 929	6 932	14,04	110,1	0,00	87,82	-	-	0,00	0,00	-
T23	6 481	6 485	14,86	110,1	0,00	87,24	-	-	0,00	0,00	-
T24	6 187	6 190	15,50	110,1	0,00	86,83	-	-	0,00	0,00	-
T25	7 771	7 773	12,64	110,1	0,00	88,81	-	-	0,00	0,00	-
T26	7 177	7 179	13,61	110,1	0,00	88,12	-	-	0,00	0,00	-
T27	7 019	7 022	13,88	110,1	0,00	87,93	-	-	0,00	0,00	-
T28	8 851	8 853	11,02	110,1	0,00	89,94	-	-	0,00	0,00	-
T29	8 087	8 089	12,15	110,1	0,00	89,16	-	-	0,00	0,00	-
T3	2 832	2 840	25,89	110,1	0,00	80,07	-	-	0,00	0,00	-
T30	14 064	14 065	5,38	110,1	0,00	93,96	-	-	0,00	0,00	-
T31	13 015	13 017	6,41	110,1	0,00	93,29	-	-	0,00	0,00	-
T32	15 148	15 150	4,37	110,1	0,00	94,61	-	-	0,00	0,00	-
T33	14 297	14 299	5,16	110,1	0,00	94,11	-	-	0,00	0,00	-
T34	13 106	13 108	6,22	110,1	0,00	93,35	-	-	0,00	0,00	-
T35	12 774	12 776	6,48	110,1	0,00	93,13	-	-	0,00	0,00	-
T36	15 875	15 876	3,75	110,1	0,00	95,01	-	-	0,00	0,00	-
T37	15 316	15 318	4,18	110,1	0,00	94,70	-	-	0,00	0,00	-
T38	14 348	14 349	5,01	110,1	0,00	94,14	-	-	0,00	0,00	-
T39	15 746	15 748	3,76	110,1	0,00	94,94	-	-	0,00	0,00	-
T4	2 100	2 111	29,57	110,1	0,00	77,49	-	-	0,00	0,00	-
T5	3 534	3 539	23,06	110,1	0,00	81,98	-	-	0,00	0,00	-
T6	2 703	2 711	26,48	110,1	0,00	79,66	-	-	0,00	0,00	-
T7	1 994	2 005	30,19	110,1	0,00	77,04	-	-	0,00	0,00	-
T8	2 093	2 104	29,61	110,1	0,00	77,46	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T9	3 792	3 797	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
Sum			38,68								

- Data undefined due to calculation with octave data

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Wind speed: 8,0 m/s

WTG

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]
1	10 816	10 819	8,41	108,9	0,00	91,68	-	-	0,00	0,00	-
10	12 731	12 733	6,42	108,9	0,00	93,10	-	-	0,00	0,00	-
100	5 336	5 339	12,02	106,0	0,00	85,55	-	-	0,00	0,00	-
101	5 965	5 968	10,54	106,0	0,00	86,52	-	-	0,00	0,00	-
102	4 524	4 529	14,29	106,0	0,00	84,12	-	-	0,00	0,00	-
103	3 832	3 837	16,55	106,0	0,00	82,68	-	-	0,00	0,00	-
104	3 186	3 191	19,04	106,0	0,00	81,08	-	-	0,00	0,00	-
105	3 510	3 515	17,74	106,0	0,00	81,92	-	-	0,00	0,00	-
106	2 929	2 935	20,15	106,0	0,00	80,35	-	-	0,00	0,00	-
107	4 206	4 211	15,28	106,0	0,00	83,49	-	-	0,00	0,00	-
108	5 261	5 264	12,22	106,0	0,00	85,43	-	-	0,00	0,00	-
109	4 706	4 710	13,77	106,0	0,00	84,46	-	-	0,00	0,00	-
11	12 069	12 072	7,07	108,9	0,00	92,64	-	-	0,00	0,00	-
110	5 208	5 212	12,37	106,0	0,00	85,34	-	-	0,00	0,00	-
111	2 849	2 856	20,51	106,0	0,00	80,11	-	-	0,00	0,00	-
112	3 475	3 480	17,87	106,0	0,00	81,83	-	-	0,00	0,00	-
12	11 863	11 865	7,30	108,9	0,00	92,49	-	-	0,00	0,00	-
13	13 066	13 069	6,10	108,9	0,00	93,32	-	-	0,00	0,00	-
14	15 537	15 539	3,95	108,9	0,00	94,83	-	-	0,00	0,00	-
15	12 753	12 755	6,42	108,9	0,00	93,11	-	-	0,00	0,00	-
16	13 759	13 761	5,50	108,9	0,00	93,77	-	-	0,00	0,00	-
17	13 928	13 930	5,31	108,9	0,00	93,88	-	-	0,00	0,00	-
18	14 795	14 797	4,56	108,9	0,00	94,40	-	-	0,00	0,00	-
19	14 825	14 827	4,56	108,9	0,00	94,42	-	-	0,00	0,00	-
2	11 759	11 762	7,39	108,9	0,00	92,41	-	-	0,00	0,00	-
20	16 409	16 411	3,26	108,9	0,00	95,30	-	-	0,00	0,00	-
21	15 441	15 443	4,02	108,9	0,00	94,77	-	-	0,00	0,00	-
22	17 129	17 130	2,73	108,9	0,00	95,68	-	-	0,00	0,00	-
23	17 275	17 277	2,61	108,9	0,00	95,75	-	-	0,00	0,00	-
24	14 503	14 505	4,81	108,9	0,00	94,23	-	-	0,00	0,00	-
25	16 962	16 964	2,84	108,9	0,00	95,59	-	-	0,00	0,00	-
26	18 060	18 062	2,05	108,9	0,00	96,14	-	-	0,00	0,00	-
27	17 914	17 916	2,15	108,9	0,00	96,06	-	-	0,00	0,00	-
28	16 307	16 309	3,34	108,9	0,00	95,25	-	-	0,00	0,00	-
29	15 598	15 599	3,90	108,9	0,00	94,86	-	-	0,00	0,00	-
3	11 315	11 319	7,86	108,9	0,00	92,08	-	-	0,00	0,00	-
30	13 581	13 584	5,62	108,9	0,00	93,66	-	-	0,00	0,00	-
31	16 227	16 229	3,40	108,9	0,00	95,21	-	-	0,00	0,00	-
4	12 190	12 192	6,95	108,9	0,00	92,72	-	-	0,00	0,00	-
5	13 130	13 133	6,04	108,9	0,00	93,37	-	-	0,00	0,00	-
6	10 815	10 817	8,41	108,9	0,00	91,68	-	-	0,00	0,00	-
7	10 999	11 001	8,20	108,9	0,00	91,83	-	-	0,00	0,00	-
71	7 339	7 342	8,08	106,0	0,00	88,32	-	-	0,00	0,00	-
72	6 804	6 807	8,98	106,0	0,00	87,66	-	-	0,00	0,00	-
73	6 172	6 174	10,14	106,0	0,00	86,81	-	-	0,00	0,00	-
74	7 848	7 850	7,27	106,0	0,00	88,90	-	-	0,00	0,00	-
75	8 536	8 539	6,26	106,0	0,00	89,63	-	-	0,00	0,00	-
76	9 288	9 290	5,26	106,0	0,00	90,36	-	-	0,00	0,00	-
77	8 053	8 056	6,98	106,0	0,00	89,12	-	-	0,00	0,00	-
78	9 330	9 332	5,19	106,0	0,00	90,40	-	-	0,00	0,00	-
79	9 956	9 959	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
8	11 749	11 752	7,40	108,9	0,00	92,40	-	-	0,00	0,00	-
80	8 526	8 528	6,28	106,0	0,00	89,62	-	-	0,00	0,00	-
81	7 356	7 358	8,05	106,0	0,00	88,34	-	-	0,00	0,00	-
82	6 271	6 274	9,96	106,0	0,00	86,95	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
83	6 354	6 357	9,79	106,0	0,00	87,06	-	-	0,00	0,00	-
84	7 790	7 792	7,36	106,0	0,00	88,83	-	-	0,00	0,00	-
85	7 517	7 520	7,79	106,0	0,00	88,52	-	-	0,00	0,00	-
86	6 182	6 185	10,12	106,0	0,00	86,83	-	-	0,00	0,00	-
87	5 584	5 587	11,40	106,0	0,00	85,94	-	-	0,00	0,00	-
88	4 522	4 526	14,29	106,0	0,00	84,11	-	-	0,00	0,00	-
89	3 979	3 984	16,04	106,0	0,00	83,01	-	-	0,00	0,00	-
9	13 980	13 982	5,26	108,9	0,00	93,91	-	-	0,00	0,00	-
90	3 599	3 604	17,40	106,0	0,00	82,14	-	-	0,00	0,00	-
91	4 542	4 547	14,23	106,0	0,00	84,15	-	-	0,00	0,00	-
92	5 187	5 191	12,41	106,0	0,00	85,31	-	-	0,00	0,00	-
93	4 047	4 052	15,81	106,0	0,00	83,15	-	-	0,00	0,00	-
94	4 631	4 635	13,97	106,0	0,00	84,32	-	-	0,00	0,00	-
95	5 054	5 058	12,77	106,0	0,00	85,08	-	-	0,00	0,00	-
96	5 590	5 594	11,38	106,0	0,00	85,95	-	-	0,00	0,00	-
97	3 695	3 700	17,08	106,0	0,00	82,36	-	-	0,00	0,00	-
98	4 242	4 247	15,19	106,0	0,00	83,56	-	-	0,00	0,00	-
99	4 869	4 873	13,29	106,0	0,00	84,76	-	-	0,00	0,00	-
T1	10 347	10 350	9,04	110,1	0,00	91,30	-	-	0,00	0,00	-
T10	7 801	7 804	12,59	110,1	0,00	88,85	-	-	0,00	0,00	-
T11	8 471	8 474	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T12	6 911	6 915	14,07	110,1	0,00	87,80	-	-	0,00	0,00	-
T13	6 530	6 534	14,75	110,1	0,00	87,30	-	-	0,00	0,00	-
T14	7 173	7 177	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T15	7 793	7 797	12,60	110,1	0,00	88,84	-	-	0,00	0,00	-
T16	5 758	5 762	16,49	110,1	0,00	86,21	-	-	0,00	0,00	-
T17	6 144	6 149	15,59	110,1	0,00	86,78	-	-	0,00	0,00	-
T18	6 738	6 742	14,37	110,1	0,00	87,58	-	-	0,00	0,00	-
T19	4 792	4 798	19,00	110,1	0,00	84,62	-	-	0,00	0,00	-
T2	9 915	9 918	9,59	110,1	0,00	90,93	-	-	0,00	0,00	-
T20	5 038	5 043	18,32	110,1	0,00	85,05	-	-	0,00	0,00	-
T21	5 719	5 724	16,58	110,1	0,00	86,15	-	-	0,00	0,00	-
T22	3 932	3 939	21,65	110,1	0,00	82,91	-	-	0,00	0,00	-
T23	4 449	4 455	20,00	110,1	0,00	83,98	-	-	0,00	0,00	-
T24	5 551	5 556	16,99	110,1	0,00	85,90	-	-	0,00	0,00	-
T25	3 090	3 098	24,78	110,1	0,00	80,82	-	-	0,00	0,00	-
T26	3 915	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	4 795	4 800	18,99	110,1	0,00	84,62	-	-	0,00	0,00	-
T28	2 023	2 035	30,01	110,1	0,00	77,17	-	-	0,00	0,00	-
T29	3 336	3 343	23,80	110,1	0,00	81,48	-	-	0,00	0,00	-
T3	9 032	9 035	10,77	110,1	0,00	90,12	-	-	0,00	0,00	-
T30	9 214	9 216	10,52	110,1	0,00	90,29	-	-	0,00	0,00	-
T31	7 925	7 928	12,40	110,1	0,00	88,98	-	-	0,00	0,00	-
T32	9 983	9 985	9,50	110,1	0,00	90,99	-	-	0,00	0,00	-
T33	8 804	8 807	11,09	110,1	0,00	89,90	-	-	0,00	0,00	-
T34	7 329	7 332	13,36	110,1	0,00	88,30	-	-	0,00	0,00	-
T35	6 497	6 501	14,82	110,1	0,00	87,26	-	-	0,00	0,00	-
T36	10 073	10 075	9,39	110,1	0,00	91,07	-	-	0,00	0,00	-
T37	9 129	9 132	10,63	110,1	0,00	90,21	-	-	0,00	0,00	-
T38	7 862	7 865	12,49	110,1	0,00	88,91	-	-	0,00	0,00	-
T39	8 932	8 935	10,91	110,1	0,00	90,02	-	-	0,00	0,00	-
T4	9 042	9 045	10,75	110,1	0,00	90,13	-	-	0,00	0,00	-
T5	8 186	8 189	12,00	110,1	0,00	89,26	-	-	0,00	0,00	-
T6	8 213	8 216	11,95	110,1	0,00	89,29	-	-	0,00	0,00	-
T7	8 871	8 874	10,99	110,1	0,00	89,96	-	-	0,00	0,00	-
T8	9 214	9 217	10,51	110,1	0,00	90,29	-	-	0,00	0,00	-
T9	7 502	7 505	13,07	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			35,99								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: K Asuinrakennus K (Takalo)

Wind speed: 8,0 m/s

WTG

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]
1	9 530	9 534	9,94	108,9	0,00	90,59	-	-	0,00	0,00	-
10	11 401	11 403	7,77	108,9	0,00	92,14	-	-	0,00	0,00	-
100	4 079	4 084	15,73	106,0	0,00	83,22	-	-	0,00	0,00	-
101	4 719	4 723	13,72	106,0	0,00	84,48	-	-	0,00	0,00	-
102	3 269	3 275	18,72	106,0	0,00	81,30	-	-	0,00	0,00	-
103	2 618	2 626	21,61	106,0	0,00	79,39	-	-	0,00	0,00	-
104	2 038	2 047	24,81	106,0	0,00	77,22	-	-	0,00	0,00	-
105	2 516	2 524	22,13	106,0	0,00	79,04	-	-	0,00	0,00	-
106	2 062	2 071	24,67	106,0	0,00	77,32	-	-	0,00	0,00	-
107	3 174	3 180	19,08	106,0	0,00	81,05	-	-	0,00	0,00	-
108	4 211	4 215	15,27	106,0	0,00	83,50	-	-	0,00	0,00	-
109	3 789	3 794	16,70	106,0	0,00	82,58	-	-	0,00	0,00	-
11	10 755	10 758	8,47	108,9	0,00	91,63	-	-	0,00	0,00	-
110	4 254	4 259	15,13	106,0	0,00	83,59	-	-	0,00	0,00	-
111	2 455	2 463	22,45	106,0	0,00	78,83	-	-	0,00	0,00	-
112	2 754	2 761	20,96	106,0	0,00	79,82	-	-	0,00	0,00	-
12	10 596	10 599	8,69	108,9	0,00	91,51	-	-	0,00	0,00	-
13	11 756	11 758	7,39	108,9	0,00	92,41	-	-	0,00	0,00	-
14	14 207	14 209	5,06	108,9	0,00	94,05	-	-	0,00	0,00	-
15	11 475	11 478	7,73	108,9	0,00	92,20	-	-	0,00	0,00	-
16	12 470	12 472	6,70	108,9	0,00	92,92	-	-	0,00	0,00	-
17	12 614	12 616	6,53	108,9	0,00	93,02	-	-	0,00	0,00	-
18	13 478	13 480	5,71	108,9	0,00	93,59	-	-	0,00	0,00	-
19	13 538	13 540	5,69	108,9	0,00	93,63	-	-	0,00	0,00	-
2	10 494	10 497	8,79	108,9	0,00	91,42	-	-	0,00	0,00	-
20	15 102	15 104	4,30	108,9	0,00	94,58	-	-	0,00	0,00	-
21	14 115	14 117	5,14	108,9	0,00	93,99	-	-	0,00	0,00	-
22	15 810	15 812	3,75	108,9	0,00	94,98	-	-	0,00	0,00	-
23	15 946	15 948	3,62	108,9	0,00	95,05	-	-	0,00	0,00	-
24	13 174	13 176	6,00	108,9	0,00	93,40	-	-	0,00	0,00	-
25	15 633	15 634	3,87	108,9	0,00	94,88	-	-	0,00	0,00	-
26	16 736	16 738	3,01	108,9	0,00	95,47	-	-	0,00	0,00	-
27	16 584	16 586	3,13	108,9	0,00	95,39	-	-	0,00	0,00	-
28	14 979	14 981	4,40	108,9	0,00	94,51	-	-	0,00	0,00	-
29	14 283	14 285	5,00	108,9	0,00	94,10	-	-	0,00	0,00	-
3	9 994	9 998	9,36	108,9	0,00	91,00	-	-	0,00	0,00	-
30	12 252	12 255	6,89	108,9	0,00	92,77	-	-	0,00	0,00	-
31	14 900	14 902	4,47	108,9	0,00	94,47	-	-	0,00	0,00	-
4	10 868	10 871	8,35	108,9	0,00	91,73	-	-	0,00	0,00	-
5	11 807	11 810	7,34	108,9	0,00	92,44	-	-	0,00	0,00	-
6	9 484	9 488	9,98	108,9	0,00	90,54	-	-	0,00	0,00	-
7	9 683	9 685	9,74	108,9	0,00	90,72	-	-	0,00	0,00	-
71	6 011	6 014	10,45	106,0	0,00	86,58	-	-	0,00	0,00	-
72	5 477	5 480	11,66	106,0	0,00	85,78	-	-	0,00	0,00	-
73	4 843	4 847	13,35	106,0	0,00	84,71	-	-	0,00	0,00	-
74	6 523	6 526	9,48	106,0	0,00	87,29	-	-	0,00	0,00	-
75	7 219	7 222	8,27	106,0	0,00	88,17	-	-	0,00	0,00	-
76	7 977	7 980	7,08	106,0	0,00	89,04	-	-	0,00	0,00	-
77	6 751	6 754	9,07	106,0	0,00	87,59	-	-	0,00	0,00	-
78	8 045	8 047	7,00	106,0	0,00	89,11	-	-	0,00	0,00	-
79	8 666	8 668	6,10	106,0	0,00	89,76	-	-	0,00	0,00	-
8	10 419	10 422	8,86	108,9	0,00	91,36	-	-	0,00	0,00	-
80	7 246	7 249	8,25	106,0	0,00	88,21	-	-	0,00	0,00	-
81	6 073	6 076	10,34	106,0	0,00	86,67	-	-	0,00	0,00	-
82	4 964	4 967	13,02	106,0	0,00	84,92	-	-	0,00	0,00	-
83	5 079	5 083	12,72	106,0	0,00	85,12	-	-	0,00	0,00	-
84	6 543	6 546	9,46	106,0	0,00	87,32	-	-	0,00	0,00	-
85	6 301	6 304	9,89	106,0	0,00	86,99	-	-	0,00	0,00	-
86	5 309	5 313	12,10	106,0	0,00	85,51	-	-	0,00	0,00	-
87	4 749	4 754	13,64	106,0	0,00	84,54	-	-	0,00	0,00	-
88	3 830	3 835	16,56	106,0	0,00	82,68	-	-	0,00	0,00	-
89	3 457	3 462	17,94	106,0	0,00	81,79	-	-	0,00	0,00	-
9	12 651	12 654	6,49	108,9	0,00	93,04	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
90	3 233	3 239	18,84	106,0	0,00	81,21	-	-	0,00	0,00	-
91	4 063	4 068	15,75	106,0	0,00	83,19	-	-	0,00	0,00	-
92	4 480	4 485	14,42	106,0	0,00	84,03	-	-	0,00	0,00	-
93	2 717	2 724	21,14	106,0	0,00	79,70	-	-	0,00	0,00	-
94	3 301	3 306	18,56	106,0	0,00	81,39	-	-	0,00	0,00	-
95	3 725	3 730	16,94	106,0	0,00	82,43	-	-	0,00	0,00	-
96	4 269	4 273	15,08	106,0	0,00	83,61	-	-	0,00	0,00	-
97	2 393	2 401	22,81	106,0	0,00	78,61	-	-	0,00	0,00	-
98	2 936	2 943	20,12	106,0	0,00	80,37	-	-	0,00	0,00	-
99	3 557	3 563	17,56	106,0	0,00	82,04	-	-	0,00	0,00	-
T1	11 268	11 270	7,95	110,1	0,00	92,04	-	-	0,00	0,00	-
T10	8 473	8 476	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T11	8 946	8 949	10,89	110,1	0,00	90,04	-	-	0,00	0,00	-
T12	7 729	7 732	12,70	110,1	0,00	88,77	-	-	0,00	0,00	-
T13	7 234	7 238	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T14	7 715	7 719	12,73	110,1	0,00	88,75	-	-	0,00	0,00	-
T15	8 196	8 199	11,98	110,1	0,00	89,28	-	-	0,00	0,00	-
T16	6 619	6 623	14,59	110,1	0,00	87,42	-	-	0,00	0,00	-
T17	6 726	6 730	14,39	110,1	0,00	87,56	-	-	0,00	0,00	-
T18	7 142	7 147	13,67	110,1	0,00	88,08	-	-	0,00	0,00	-
T19	5 706	5 711	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T2	10 776	10 779	8,52	110,1	0,00	91,65	-	-	0,00	0,00	-
T20	5 729	5 734	16,56	110,1	0,00	86,17	-	-	0,00	0,00	-
T21	6 108	6 112	15,68	110,1	0,00	86,72	-	-	0,00	0,00	-
T22	4 762	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T23	5 033	5 038	18,33	110,1	0,00	85,05	-	-	0,00	0,00	-
T24	5 785	5 789	16,43	110,1	0,00	86,25	-	-	0,00	0,00	-
T25	3 801	3 808	22,09	110,1	0,00	82,61	-	-	0,00	0,00	-
T26	4 364	4 370	20,26	110,1	0,00	83,81	-	-	0,00	0,00	-
T27	4 946	4 951	18,57	110,1	0,00	84,89	-	-	0,00	0,00	-
T28	2 753	2 761	26,25	110,1	0,00	79,82	-	-	0,00	0,00	-
T29	3 555	3 562	22,97	110,1	0,00	82,03	-	-	0,00	0,00	-
T3	9 937	9 939	9,56	110,1	0,00	90,95	-	-	0,00	0,00	-
T30	10 427	10 429	8,95	110,1	0,00	91,37	-	-	0,00	0,00	-
T31	9 160	9 162	10,59	110,1	0,00	90,24	-	-	0,00	0,00	-
T32	11 150	11 152	8,09	110,1	0,00	91,95	-	-	0,00	0,00	-
T33	9 978	9 981	9,51	110,1	0,00	90,98	-	-	0,00	0,00	-
T34	8 532	8 535	11,48	110,1	0,00	89,62	-	-	0,00	0,00	-
T35	7 692	7 695	12,76	110,1	0,00	88,72	-	-	0,00	0,00	-
T36	11 178	11 180	8,06	110,1	0,00	91,97	-	-	0,00	0,00	-
T37	10 222	10 225	9,20	110,1	0,00	91,19	-	-	0,00	0,00	-
T38	8 970	8 973	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-
T39	9 956	9 958	9,61	110,1	0,00	90,96	-	-	0,00	0,00	-
T4	9 838	9 841	9,69	110,1	0,00	90,86	-	-	0,00	0,00	-
T5	9 120	9 123	10,64	110,1	0,00	90,20	-	-	0,00	0,00	-
T6	8 970	8 972	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-
T7	9 521	9 524	10,10	110,1	0,00	90,58	-	-	0,00	0,00	-
T8	9 743	9 746	9,81	110,1	0,00	90,78	-	-	0,00	0,00	-
T9	8 396	8 399	11,68	110,1	0,00	89,48	-	-	0,00	0,00	-
Sum			36,46								

- Data undefined due to calculation with octave data

Noise sensitive area: L Lomarakenus L (Haukijärvi)

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]
1	16 500	16 502	3,21	108,9	0,00	95,35	-	-	0,00	0,00	-
10	17 677	17 678	2,32	108,9	0,00	95,95	-	-	0,00	0,00	-
100	11 272	11 273	2,99	106,0	0,00	92,04	-	-	0,00	0,00	-
101	11 917	11 919	2,31	106,0	0,00	92,52	-	-	0,00	0,00	-
102	10 487	10 489	3,89	106,0	0,00	91,41	-	-	0,00	0,00	-
103	9 901	9 902	4,86	106,0	0,00	90,91	-	-	0,00	0,00	-
104	9 346	9 348	5,70	106,0	0,00	90,41	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
105	9 784	9 786	5,25	106,0	0,00	90,81	-	-	0,00	0,00	-
106	9 240	9 242	5,99	106,0	0,00	90,32	-	-	0,00	0,00	-
107	10 466	10 467	4,39	106,0	0,00	91,40	-	-	0,00	0,00	-
108	11 512	11 514	3,18	106,0	0,00	92,22	-	-	0,00	0,00	-
109	11 020	11 022	3,82	106,0	0,00	91,85	-	-	0,00	0,00	-
11	16 528	16 530	3,17	108,9	0,00	95,37	-	-	0,00	0,00	-
110	11 513	11 514	3,25	106,0	0,00	92,22	-	-	0,00	0,00	-
111	9 132	9 134	6,25	106,0	0,00	90,21	-	-	0,00	0,00	-
112	9 806	9 808	5,30	106,0	0,00	90,83	-	-	0,00	0,00	-
12	15 748	15 749	3,79	108,9	0,00	94,95	-	-	0,00	0,00	-
13	17 412	17 414	2,55	108,9	0,00	95,82	-	-	0,00	0,00	-
14	20 455	20 457	0,49	108,9	0,00	97,22	-	-	0,00	0,00	-
15	16 689	16 690	3,06	108,9	0,00	95,45	-	-	0,00	0,00	-
16	17 765	17 767	2,27	108,9	0,00	95,99	-	-	0,00	0,00	-
17	18 305	18 306	1,91	108,9	0,00	96,25	-	-	0,00	0,00	-
18	19 197	19 198	1,30	108,9	0,00	96,67	-	-	0,00	0,00	-
19	18 758	18 760	1,57	108,9	0,00	96,46	-	-	0,00	0,00	-
2	17 541	17 543	2,45	108,9	0,00	95,88	-	-	0,00	0,00	-
20	20 564	20 565	0,41	108,9	0,00	97,26	-	-	0,00	0,00	-
21	20 046	20 047	0,73	108,9	0,00	97,04	-	-	0,00	0,00	-
22	21 464	21 465	-0,12	108,9	0,00	97,63	-	-	0,00	0,00	-
23	21 938	21 939	-0,43	108,9	0,00	97,82	-	-	0,00	0,00	-
24	19 263	19 265	1,27	108,9	0,00	96,70	-	-	0,00	0,00	-
25	21 917	21 919	-0,41	108,9	0,00	97,82	-	-	0,00	0,00	-
26	22 518	22 519	-0,76	108,9	0,00	98,05	-	-	0,00	0,00	-
27	22 757	22 759	-0,89	108,9	0,00	98,14	-	-	0,00	0,00	-
28	20 931	20 932	0,18	108,9	0,00	97,42	-	-	0,00	0,00	-
29	19 914	19 915	0,84	108,9	0,00	96,98	-	-	0,00	0,00	-
3	16 648	16 650	3,08	108,9	0,00	95,43	-	-	0,00	0,00	-
30	18 388	18 390	1,87	108,9	0,00	96,29	-	-	0,00	0,00	-
31	21 305	21 307	-0,07	108,9	0,00	97,57	-	-	0,00	0,00	-
4	17 482	17 484	2,46	108,9	0,00	95,85	-	-	0,00	0,00	-
5	18 378	18 380	1,83	108,9	0,00	96,29	-	-	0,00	0,00	-
6	15 818	15 820	3,77	108,9	0,00	94,98	-	-	0,00	0,00	-
7	15 555	15 557	4,00	108,9	0,00	94,84	-	-	0,00	0,00	-
71	12 678	12 679	1,51	106,0	0,00	93,06	-	-	0,00	0,00	-
72	12 203	12 205	1,96	106,0	0,00	92,73	-	-	0,00	0,00	-
73	11 585	11 586	2,60	106,0	0,00	92,28	-	-	0,00	0,00	-
74	13 244	13 246	0,97	106,0	0,00	93,44	-	-	0,00	0,00	-
75	14 016	14 017	0,27	106,0	0,00	93,93	-	-	0,00	0,00	-
76	14 820	14 822	-0,41	106,0	0,00	94,42	-	-	0,00	0,00	-
77	13 693	13 694	0,56	106,0	0,00	93,73	-	-	0,00	0,00	-
78	15 048	15 049	-0,59	106,0	0,00	94,55	-	-	0,00	0,00	-
79	15 628	15 629	-1,06	106,0	0,00	94,88	-	-	0,00	0,00	-
8	16 730	16 731	3,03	108,9	0,00	95,47	-	-	0,00	0,00	-
80	14 291	14 292	0,05	106,0	0,00	94,10	-	-	0,00	0,00	-
81	13 134	13 135	1,08	106,0	0,00	93,37	-	-	0,00	0,00	-
82	11 944	11 945	2,24	106,0	0,00	92,54	-	-	0,00	0,00	-
83	12 198	12 200	1,99	106,0	0,00	92,73	-	-	0,00	0,00	-
84	13 706	13 707	0,57	106,0	0,00	93,74	-	-	0,00	0,00	-
85	13 526	13 527	0,75	106,0	0,00	93,62	-	-	0,00	0,00	-
86	12 510	12 512	2,25	106,0	0,00	92,95	-	-	0,00	0,00	-
87	11 915	11 916	2,87	106,0	0,00	92,52	-	-	0,00	0,00	-
88	10 845	10 847	4,09	106,0	0,00	91,71	-	-	0,00	0,00	-
89	10 265	10 266	4,81	106,0	0,00	91,23	-	-	0,00	0,00	-
9	19 046	19 048	1,39	108,9	0,00	96,60	-	-	0,00	0,00	-
90	9 832	9 834	5,37	106,0	0,00	90,85	-	-	0,00	0,00	-
91	10 793	10 795	4,21	106,0	0,00	91,66	-	-	0,00	0,00	-
92	11 509	11 510	3,35	106,0	0,00	92,22	-	-	0,00	0,00	-
93	9 588	9 589	4,92	106,0	0,00	90,64	-	-	0,00	0,00	-
94	10 070	10 072	4,31	106,0	0,00	91,06	-	-	0,00	0,00	-
95	10 542	10 544	3,75	106,0	0,00	91,46	-	-	0,00	0,00	-
96	11 168	11 169	3,06	106,0	0,00	91,96	-	-	0,00	0,00	-
97	9 541	9 542	5,03	106,0	0,00	90,59	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
98	10 030	10 032	4,39	106,0	0,00	91,03	-	-	0,00	0,00	-
99	10 585	10 586	3,72	106,0	0,00	91,49	-	-	0,00	0,00	-
T1	12 636	12 638	7,85	110,1	0,00	93,03	-	-	0,00	0,00	-
T10	11 638	11 640	8,74	110,1	0,00	92,32	-	-	0,00	0,00	-
T11	12 857	12 859	7,39	110,1	0,00	93,18	-	-	0,00	0,00	-
T12	10 368	10 370	10,26	110,1	0,00	91,32	-	-	0,00	0,00	-
T13	10 507	10 509	10,04	110,1	0,00	91,43	-	-	0,00	0,00	-
T14	11 547	11 549	8,81	110,1	0,00	92,25	-	-	0,00	0,00	-
T15	12 471	12 473	7,78	110,1	0,00	92,92	-	-	0,00	0,00	-
T16	9 350	9 352	11,55	110,1	0,00	90,42	-	-	0,00	0,00	-
T17	10 591	10 594	9,92	110,1	0,00	91,50	-	-	0,00	0,00	-
T18	11 555	11 557	8,75	110,1	0,00	92,26	-	-	0,00	0,00	-
T19	8 505	8 507	12,74	110,1	0,00	89,60	-	-	0,00	0,00	-
T2	12 590	12 592	7,85	110,1	0,00	93,00	-	-	0,00	0,00	-
T20	9 434	9 436	11,38	110,1	0,00	90,50	-	-	0,00	0,00	-
T21	10 738	10 741	9,69	110,1	0,00	91,62	-	-	0,00	0,00	-
T22	8 288	8 291	13,00	110,1	0,00	89,37	-	-	0,00	0,00	-
T23	9 295	9 298	11,54	110,1	0,00	90,37	-	-	0,00	0,00	-
T24	10 912	10 914	9,46	110,1	0,00	91,76	-	-	0,00	0,00	-
T25	8 107	8 110	13,23	110,1	0,00	89,18	-	-	0,00	0,00	-
T26	9 191	9 194	11,65	110,1	0,00	90,27	-	-	0,00	0,00	-
T27	10 402	10 404	10,05	110,1	0,00	91,34	-	-	0,00	0,00	-
T28	7 498	7 501	14,15	110,1	0,00	88,50	-	-	0,00	0,00	-
T29	9 098	9 101	11,74	110,1	0,00	90,18	-	-	0,00	0,00	-
T3	11 631	11 633	8,89	110,1	0,00	92,31	-	-	0,00	0,00	-
T30	3 990	3 996	22,70	110,1	0,00	83,03	-	-	0,00	0,00	-
T31	3 257	3 264	25,30	110,1	0,00	81,27	-	-	0,00	0,00	-
T32	4 286	4 292	21,76	110,1	0,00	83,65	-	-	0,00	0,00	-
T33	3 287	3 294	25,20	110,1	0,00	81,35	-	-	0,00	0,00	-
T34	2 492	2 501	28,63	110,1	0,00	78,96	-	-	0,00	0,00	-
T35	2 024	2 036	31,10	110,1	0,00	77,18	-	-	0,00	0,00	-
T36	4 031	4 037	22,56	110,1	0,00	83,12	-	-	0,00	0,00	-
T37	3 077	3 085	26,03	110,1	0,00	80,79	-	-	0,00	0,00	-
T38	2 006	2 018	31,25	110,1	0,00	77,10	-	-	0,00	0,00	-
T39	2 662	2 671	27,82	110,1	0,00	79,53	-	-	0,00	0,00	-
T4	12 167	12 169	8,25	110,1	0,00	92,71	-	-	0,00	0,00	-
T5	10 799	10 801	9,84	110,1	0,00	91,67	-	-	0,00	0,00	-
T6	11 650	11 653	8,75	110,1	0,00	92,33	-	-	0,00	0,00	-
T7	12 619	12 621	7,69	110,1	0,00	93,02	-	-	0,00	0,00	-
T8	13 338	13 340	6,92	110,1	0,00	93,50	-	-	0,00	0,00	-
T9	10 475	10 477	10,19	110,1	0,00	91,40	-	-	0,00	0,00	-
Sum			37,78								

- Data undefined due to calculation with octave data

Noise sensitive area: M Lomarakennus M (Haukilahti)

Wind speed: 8,0 m/s

WTG

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]
1	18 226	18 228	2,09	108,9	0,00	96,21	-	-	0,00	0,00	-
10	20 098	20 099	0,72	108,9	0,00	97,06	-	-	0,00	0,00	-
100	12 734	12 736	1,60	106,0	0,00	93,10	-	-	0,00	0,00	-
101	13 350	13 351	1,04	106,0	0,00	93,51	-	-	0,00	0,00	-
102	11 928	11 929	2,39	106,0	0,00	92,53	-	-	0,00	0,00	-
103	11 214	11 215	3,17	106,0	0,00	92,00	-	-	0,00	0,00	-
104	10 539	10 541	3,98	106,0	0,00	91,46	-	-	0,00	0,00	-
105	10 713	10 714	3,87	106,0	0,00	91,60	-	-	0,00	0,00	-
106	10 079	10 081	4,63	106,0	0,00	91,07	-	-	0,00	0,00	-
107	11 398	11 400	3,14	106,0	0,00	92,14	-	-	0,00	0,00	-
108	12 413	12 415	2,23	106,0	0,00	92,88	-	-	0,00	0,00	-
109	11 707	11 709	3,01	106,0	0,00	92,37	-	-	0,00	0,00	-
11	19 284	19 286	1,33	108,9	0,00	96,70	-	-	0,00	0,00	-
110	12 222	12 223	2,47	106,0	0,00	92,74	-	-	0,00	0,00	-
111	9 499	9 501	5,59	106,0	0,00	90,56	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
112	10 376	10 378	4,51	106,0	0,00	91,32	-	-	0,00	0,00	-
12	18 831	18 832	1,56	108,9	0,00	96,50	-	-	0,00	0,00	-
13	20 250	20 252	0,64	108,9	0,00	97,13	-	-	0,00	0,00	-
14	22 912	22 913	-0,98	108,9	0,00	98,20	-	-	0,00	0,00	-
15	19 759	19 760	0,94	108,9	0,00	96,92	-	-	0,00	0,00	-
16	20 810	20 811	0,27	108,9	0,00	97,37	-	-	0,00	0,00	-
17	21 133	21 134	0,10	108,9	0,00	97,50	-	-	0,00	0,00	-
18	22 016	22 018	-0,42	108,9	0,00	97,86	-	-	0,00	0,00	-
19	21 856	21 857	-0,37	108,9	0,00	97,79	-	-	0,00	0,00	-
2	19 141	19 142	1,51	108,9	0,00	96,64	-	-	0,00	0,00	-
20	23 550	23 551	-1,37	108,9	0,00	98,44	-	-	0,00	0,00	-
21	22 735	22 736	-0,88	108,9	0,00	98,13	-	-	0,00	0,00	-
22	24 344	24 345	-1,77	108,9	0,00	98,73	-	-	0,00	0,00	-
23	24 596	24 597	-1,92	108,9	0,00	98,82	-	-	0,00	0,00	-
24	21 835	21 836	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
25	24 349	24 351	-1,78	108,9	0,00	98,73	-	-	0,00	0,00	-
26	25 323	25 324	-2,25	108,9	0,00	99,07	-	-	0,00	0,00	-
27	25 282	25 283	-2,28	108,9	0,00	99,06	-	-	0,00	0,00	-
28	23 611	23 613	-1,38	108,9	0,00	98,46	-	-	0,00	0,00	-
29	22 795	22 796	-0,91	108,9	0,00	98,16	-	-	0,00	0,00	-
3	18 737	18 739	1,65	108,9	0,00	96,45	-	-	0,00	0,00	-
30	20 920	20 921	0,18	108,9	0,00	97,41	-	-	0,00	0,00	-
31	23 633	23 634	-1,37	108,9	0,00	98,47	-	-	0,00	0,00	-
4	19 610	19 611	1,06	108,9	0,00	96,85	-	-	0,00	0,00	-
5	20 548	20 550	0,46	108,9	0,00	97,26	-	-	0,00	0,00	-
6	18 181	18 183	2,00	108,9	0,00	96,19	-	-	0,00	0,00	-
7	18 235	18 237	2,04	108,9	0,00	96,22	-	-	0,00	0,00	-
71	14 743	14 744	-0,31	106,0	0,00	94,37	-	-	0,00	0,00	-
72	14 213	14 214	0,14	106,0	0,00	94,05	-	-	0,00	0,00	-
73	13 577	13 578	0,70	106,0	0,00	93,66	-	-	0,00	0,00	-
74	15 263	15 264	-0,73	106,0	0,00	94,67	-	-	0,00	0,00	-
75	15 961	15 962	-1,27	106,0	0,00	95,06	-	-	0,00	0,00	-
76	16 714	16 715	-1,82	106,0	0,00	95,46	-	-	0,00	0,00	-
77	15 478	15 479	-0,85	106,0	0,00	94,80	-	-	0,00	0,00	-
78	16 741	16 742	-1,79	106,0	0,00	95,48	-	-	0,00	0,00	-
79	17 372	17 373	-2,25	106,0	0,00	95,80	-	-	0,00	0,00	-
8	19 118	19 119	1,36	108,9	0,00	96,63	-	-	0,00	0,00	-
80	15 933	15 934	-1,17	106,0	0,00	95,05	-	-	0,00	0,00	-
81	14 769	14 770	-0,24	106,0	0,00	94,39	-	-	0,00	0,00	-
82	13 697	13 698	0,64	106,0	0,00	93,73	-	-	0,00	0,00	-
83	13 763	13 764	0,63	106,0	0,00	93,77	-	-	0,00	0,00	-
84	15 162	15 163	-0,50	106,0	0,00	94,62	-	-	0,00	0,00	-
85	14 850	14 851	-0,21	106,0	0,00	94,44	-	-	0,00	0,00	-
86	12 977	12 979	1,75	106,0	0,00	93,26	-	-	0,00	0,00	-
87	12 365	12 366	2,35	106,0	0,00	92,84	-	-	0,00	0,00	-
88	11 197	11 199	3,59	106,0	0,00	91,98	-	-	0,00	0,00	-
89	10 486	10 487	4,42	106,0	0,00	91,41	-	-	0,00	0,00	-
9	21 376	21 378	-0,07	108,9	0,00	97,60	-	-	0,00	0,00	-
90	9 956	9 958	5,06	106,0	0,00	90,96	-	-	0,00	0,00	-
91	10 838	10 840	4,04	106,0	0,00	91,70	-	-	0,00	0,00	-
92	11 786	11 788	2,97	106,0	0,00	92,43	-	-	0,00	0,00	-
93	11 445	11 446	2,78	106,0	0,00	92,17	-	-	0,00	0,00	-
94	12 019	12 020	2,18	106,0	0,00	92,60	-	-	0,00	0,00	-
95	12 458	12 460	1,75	106,0	0,00	92,91	-	-	0,00	0,00	-
96	13 012	13 013	1,23	106,0	0,00	93,29	-	-	0,00	0,00	-
97	11 121	11 122	3,18	106,0	0,00	91,92	-	-	0,00	0,00	-
98	11 669	11 670	2,59	106,0	0,00	92,34	-	-	0,00	0,00	-
99	12 295	12 297	1,94	106,0	0,00	92,80	-	-	0,00	0,00	-
T1	8 960	8 963	12,33	110,1	0,00	90,05	-	-	0,00	0,00	-
T10	9 035	9 038	12,29	110,1	0,00	90,12	-	-	0,00	0,00	-
T11	10 479	10 481	10,37	110,1	0,00	91,41	-	-	0,00	0,00	-
T12	7 744	7 747	14,21	110,1	0,00	88,78	-	-	0,00	0,00	-
T13	8 221	8 224	13,43	110,1	0,00	89,30	-	-	0,00	0,00	-
T14	9 357	9 360	11,80	110,1	0,00	90,43	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T15	10 380	10 383	10,44	110,1	0,00	91,33	-	-	0,00	0,00	-
T16	7 082	7 086	15,11	110,1	0,00	88,01	-	-	0,00	0,00	-
T17	8 642	8 645	12,63	110,1	0,00	89,74	-	-	0,00	0,00	-
T18	9 724	9 726	11,12	110,1	0,00	90,76	-	-	0,00	0,00	-
T19	6 612	6 615	15,77	110,1	0,00	87,41	-	-	0,00	0,00	-
T2	9 123	9 126	12,11	110,1	0,00	90,21	-	-	0,00	0,00	-
T20	7 735	7 738	13,91	110,1	0,00	88,77	-	-	0,00	0,00	-
T21	9 235	9 237	11,67	110,1	0,00	90,31	-	-	0,00	0,00	-
T22	6 954	6 958	15,01	110,1	0,00	87,85	-	-	0,00	0,00	-
T23	7 994	7 997	13,36	110,1	0,00	89,06	-	-	0,00	0,00	-
T24	9 693	9 696	10,94	110,1	0,00	90,73	-	-	0,00	0,00	-
T25	7 352	7 355	14,28	110,1	0,00	88,33	-	-	0,00	0,00	-
T26	8 286	8 288	12,85	110,1	0,00	89,37	-	-	0,00	0,00	-
T27	9 533	9 536	11,07	110,1	0,00	90,59	-	-	0,00	0,00	-
T28	7 363	7 366	14,12	110,1	0,00	88,34	-	-	0,00	0,00	-
T29	8 685	8 688	12,17	110,1	0,00	89,78	-	-	0,00	0,00	-
T3	8 241	8 244	13,43	110,1	0,00	89,32	-	-	0,00	0,00	-
T30	3 016	3 023	25,10	110,1	0,00	80,61	-	-	0,00	0,00	-
T31	2 008	2 018	30,11	110,1	0,00	77,10	-	-	0,00	0,00	-
T32	4 102	4 107	21,09	110,1	0,00	83,27	-	-	0,00	0,00	-
T33	3 257	3 264	24,11	110,1	0,00	81,27	-	-	0,00	0,00	-
T34	2 361	2 371	28,15	110,1	0,00	78,50	-	-	0,00	0,00	-
T35	2 541	2 550	27,25	110,1	0,00	79,13	-	-	0,00	0,00	-
T36	4 817	4 822	18,93	110,1	0,00	84,66	-	-	0,00	0,00	-
T37	4 335	4 341	20,35	110,1	0,00	83,75	-	-	0,00	0,00	-
T38	3 614	3 621	22,76	110,1	0,00	82,18	-	-	0,00	0,00	-
T39	4 913	4 917	18,66	110,1	0,00	84,83	-	-	0,00	0,00	-
T4	9 015	9 018	12,33	110,1	0,00	90,10	-	-	0,00	0,00	-
T5	7 547	7 550	14,53	110,1	0,00	88,56	-	-	0,00	0,00	-
T6	8 773	8 776	12,68	110,1	0,00	89,87	-	-	0,00	0,00	-
T7	9 809	9 812	11,25	110,1	0,00	90,83	-	-	0,00	0,00	-
T8	10 705	10 707	10,09	110,1	0,00	91,59	-	-	0,00	0,00	-
T9	7 508	7 510	14,60	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			36,08								

- Data undefined due to calculation with octave data

Noise sensitive area: N Lomarakennus N (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
1	17 629	17 630	2,38	108,9	0,00	95,93	-	-	0,00	0,00	-
10	19 514	19 515	1,06	108,9	0,00	96,81	-	-	0,00	0,00	-
100	12 136	12 138	2,04	106,0	0,00	92,68	-	-	0,00	0,00	-
101	12 751	12 752	1,46	106,0	0,00	93,11	-	-	0,00	0,00	-
102	11 330	11 332	2,88	106,0	0,00	92,09	-	-	0,00	0,00	-
103	10 615	10 617	3,70	106,0	0,00	91,52	-	-	0,00	0,00	-
104	9 940	9 942	4,52	106,0	0,00	90,95	-	-	0,00	0,00	-
105	10 113	10 115	4,32	106,0	0,00	91,10	-	-	0,00	0,00	-
106	9 480	9 481	5,11	106,0	0,00	90,54	-	-	0,00	0,00	-
107	10 799	10 800	3,51	106,0	0,00	91,67	-	-	0,00	0,00	-
108	11 815	11 816	2,39	106,0	0,00	92,45	-	-	0,00	0,00	-
109	11 110	11 112	3,12	106,0	0,00	91,92	-	-	0,00	0,00	-
11	18 715	18 716	1,70	108,9	0,00	96,44	-	-	0,00	0,00	-
110	11 625	11 626	2,57	106,0	0,00	92,31	-	-	0,00	0,00	-
111	8 904	8 906	5,79	106,0	0,00	89,99	-	-	0,00	0,00	-
112	9 779	9 781	4,68	106,0	0,00	90,81	-	-	0,00	0,00	-
12	18 280	18 282	1,94	108,9	0,00	96,24	-	-	0,00	0,00	-
13	19 684	19 685	1,03	108,9	0,00	96,88	-	-	0,00	0,00	-
14	22 327	22 329	-0,67	108,9	0,00	97,98	-	-	0,00	0,00	-
15	19 206	19 208	1,30	108,9	0,00	96,67	-	-	0,00	0,00	-
16	20 255	20 256	0,62	108,9	0,00	97,13	-	-	0,00	0,00	-
17	20 565	20 566	0,48	108,9	0,00	97,26	-	-	0,00	0,00	-
18	21 447	21 449	-0,08	108,9	0,00	97,63	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
19	21 303	21 304	-0,04	108,9	0,00	97,57	-	-	0,00	0,00	-
2	18 542	18 543	1,76	108,9	0,00	96,36	-	-	0,00	0,00	-
20	22 989	22 990	-1,05	108,9	0,00	98,23	-	-	0,00	0,00	-
21	22 159	22 160	-0,55	108,9	0,00	97,91	-	-	0,00	0,00	-
22	23 776	23 777	-1,44	108,9	0,00	98,52	-	-	0,00	0,00	-
23	24 018	24 019	-1,62	108,9	0,00	98,61	-	-	0,00	0,00	-
24	21 255	21 257	-0,03	108,9	0,00	97,55	-	-	0,00	0,00	-
25	23 763	23 765	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
26	24 751	24 752	-1,96	108,9	0,00	98,87	-	-	0,00	0,00	-
27	24 699	24 700	-2,00	108,9	0,00	98,85	-	-	0,00	0,00	-
28	23 035	23 036	-1,07	108,9	0,00	98,25	-	-	0,00	0,00	-
29	22 228	22 229	-0,56	108,9	0,00	97,94	-	-	0,00	0,00	-
3	18 145	18 146	1,99	108,9	0,00	96,18	-	-	0,00	0,00	-
30	20 339	20 341	0,53	108,9	0,00	97,17	-	-	0,00	0,00	-
31	23 044	23 045	-1,09	108,9	0,00	98,25	-	-	0,00	0,00	-
4	19 018	19 019	1,39	108,9	0,00	96,58	-	-	0,00	0,00	-
5	19 957	19 958	0,78	108,9	0,00	97,00	-	-	0,00	0,00	-
6	17 597	17 599	2,38	108,9	0,00	95,91	-	-	0,00	0,00	-
7	17 663	17 665	2,43	108,9	0,00	95,94	-	-	0,00	0,00	-
71	14 154	14 155	0,13	106,0	0,00	94,02	-	-	0,00	0,00	-
72	13 623	13 624	0,60	106,0	0,00	93,69	-	-	0,00	0,00	-
73	12 987	12 988	1,18	106,0	0,00	93,27	-	-	0,00	0,00	-
74	14 672	14 673	-0,31	106,0	0,00	94,33	-	-	0,00	0,00	-
75	15 368	15 369	-0,87	106,0	0,00	94,73	-	-	0,00	0,00	-
76	16 119	16 121	-1,44	106,0	0,00	95,15	-	-	0,00	0,00	-
77	14 882	14 883	-0,45	106,0	0,00	94,45	-	-	0,00	0,00	-
78	16 143	16 145	-1,45	106,0	0,00	95,16	-	-	0,00	0,00	-
79	16 775	16 776	-1,93	106,0	0,00	95,49	-	-	0,00	0,00	-
8	18 533	18 535	1,72	108,9	0,00	96,36	-	-	0,00	0,00	-
80	15 335	15 337	-0,82	106,0	0,00	94,71	-	-	0,00	0,00	-
81	14 171	14 173	0,14	106,0	0,00	94,03	-	-	0,00	0,00	-
82	13 102	13 103	1,10	106,0	0,00	93,35	-	-	0,00	0,00	-
83	13 165	13 166	1,05	106,0	0,00	93,39	-	-	0,00	0,00	-
84	14 563	14 564	-0,16	106,0	0,00	94,27	-	-	0,00	0,00	-
85	14 251	14 252	0,11	106,0	0,00	94,08	-	-	0,00	0,00	-
86	12 386	12 387	1,77	106,0	0,00	92,86	-	-	0,00	0,00	-
87	11 772	11 774	2,38	106,0	0,00	92,42	-	-	0,00	0,00	-
88	10 605	10 606	3,65	106,0	0,00	91,51	-	-	0,00	0,00	-
89	9 895	9 897	4,50	106,0	0,00	90,91	-	-	0,00	0,00	-
9	20 789	20 790	0,25	108,9	0,00	97,36	-	-	0,00	0,00	-
90	9 367	9 369	5,16	106,0	0,00	90,43	-	-	0,00	0,00	-
91	10 253	10 255	4,07	106,0	0,00	91,22	-	-	0,00	0,00	-
92	11 197	11 198	3,00	106,0	0,00	91,98	-	-	0,00	0,00	-
93	10 855	10 857	3,35	106,0	0,00	91,71	-	-	0,00	0,00	-
94	11 430	11 431	2,73	106,0	0,00	92,16	-	-	0,00	0,00	-
95	11 868	11 870	2,27	106,0	0,00	92,49	-	-	0,00	0,00	-
96	12 419	12 420	1,72	106,0	0,00	92,88	-	-	0,00	0,00	-
97	10 526	10 528	3,77	106,0	0,00	91,45	-	-	0,00	0,00	-
98	11 074	11 076	3,15	106,0	0,00	91,89	-	-	0,00	0,00	-
99	11 701	11 703	2,45	106,0	0,00	92,37	-	-	0,00	0,00	-
T1	8 779	8 782	12,71	110,1	0,00	89,87	-	-	0,00	0,00	-
T10	8 649	8 652	11,97	110,1	0,00	89,74	-	-	0,00	0,00	-
T11	10 073	10 075	9,90	110,1	0,00	91,07	-	-	0,00	0,00	-
T12	7 349	7 352	13,93	110,1	0,00	88,33	-	-	0,00	0,00	-
T13	7 785	7 788	12,96	110,1	0,00	88,83	-	-	0,00	0,00	-
T14	8 920	8 923	11,25	110,1	0,00	90,01	-	-	0,00	0,00	-
T15	9 939	9 941	9,82	110,1	0,00	90,95	-	-	0,00	0,00	-
T16	6 632	6 635	14,80	110,1	0,00	87,44	-	-	0,00	0,00	-
T17	8 172	8 175	12,18	110,1	0,00	89,25	-	-	0,00	0,00	-
T18	9 250	9 253	10,62	110,1	0,00	90,33	-	-	0,00	0,00	-
T19	6 113	6 117	15,75	110,1	0,00	86,73	-	-	0,00	0,00	-
T2	8 894	8 896	12,43	110,1	0,00	89,98	-	-	0,00	0,00	-
T20	7 232	7 235	13,60	110,1	0,00	88,19	-	-	0,00	0,00	-
T21	8 727	8 730	11,25	110,1	0,00	89,82	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T22	6 413	6 417	15,04	110,1	0,00	87,15	-	-	0,00	0,00	-
T23	7 461	7 464	13,20	110,1	0,00	88,46	-	-	0,00	0,00	-
T24	9 167	9 169	10,63	110,1	0,00	90,25	-	-	0,00	0,00	-
T25	6 781	6 784	14,33	110,1	0,00	87,63	-	-	0,00	0,00	-
T26	7 729	7 732	12,75	110,1	0,00	88,77	-	-	0,00	0,00	-
T27	8 983	8 986	10,87	110,1	0,00	90,07	-	-	0,00	0,00	-
T28	6 771	6 774	14,34	110,1	0,00	87,62	-	-	0,00	0,00	-
T29	8 108	8 111	12,15	110,1	0,00	89,18	-	-	0,00	0,00	-
T3	7 988	7 991	13,69	110,1	0,00	89,05	-	-	0,00	0,00	-
T30	3 392	3 398	23,59	110,1	0,00	81,62	-	-	0,00	0,00	-
T31	2 230	2 240	28,85	110,1	0,00	78,00	-	-	0,00	0,00	-
T32	4 465	4 470	19,95	110,1	0,00	84,01	-	-	0,00	0,00	-
T33	3 517	3 524	23,11	110,1	0,00	81,94	-	-	0,00	0,00	-
T34	2 390	2 400	28,00	110,1	0,00	78,60	-	-	0,00	0,00	-
T35	2 363	2 373	28,14	110,1	0,00	78,50	-	-	0,00	0,00	-
T36	5 107	5 112	18,14	110,1	0,00	85,17	-	-	0,00	0,00	-
T37	4 532	4 537	19,75	110,1	0,00	84,14	-	-	0,00	0,00	-
T38	3 666	3 672	22,57	110,1	0,00	82,30	-	-	0,00	0,00	-
T39	5 026	5 030	18,36	110,1	0,00	85,03	-	-	0,00	0,00	-
T4	8 720	8 723	12,40	110,1	0,00	89,81	-	-	0,00	0,00	-
T5	7 259	7 262	14,70	110,1	0,00	88,22	-	-	0,00	0,00	-
T6	8 428	8 431	12,52	110,1	0,00	89,52	-	-	0,00	0,00	-
T7	9 461	9 463	11,02	110,1	0,00	90,52	-	-	0,00	0,00	-
T8	10 335	10 338	9,77	110,1	0,00	91,29	-	-	0,00	0,00	-
T9	7 165	7 168	14,53	110,1	0,00	88,11	-	-	0,00	0,00	-
Sum			35,64								

- Data undefined due to calculation with octave data

Noise sensitive area: O Lomarakennus O (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
1	17 567	17 569	2,43	108,9	0,00	95,89	-	-	0,00	0,00	-
10	19 459	19 460	1,10	108,9	0,00	96,78	-	-	0,00	0,00	-
100	12 075	12 077	2,12	106,0	0,00	92,64	-	-	0,00	0,00	-
101	12 689	12 690	1,53	106,0	0,00	93,07	-	-	0,00	0,00	-
102	11 269	11 271	2,95	106,0	0,00	92,04	-	-	0,00	0,00	-
103	10 554	10 556	3,78	106,0	0,00	91,47	-	-	0,00	0,00	-
104	9 878	9 880	4,60	106,0	0,00	90,90	-	-	0,00	0,00	-
105	10 049	10 051	4,40	106,0	0,00	91,04	-	-	0,00	0,00	-
106	9 416	9 417	5,20	106,0	0,00	90,48	-	-	0,00	0,00	-
107	10 735	10 736	3,59	106,0	0,00	91,62	-	-	0,00	0,00	-
108	11 750	11 751	2,46	106,0	0,00	92,40	-	-	0,00	0,00	-
109	11 044	11 046	3,20	106,0	0,00	91,86	-	-	0,00	0,00	-
11	18 664	18 665	1,74	108,9	0,00	96,42	-	-	0,00	0,00	-
110	11 559	11 560	2,64	106,0	0,00	92,26	-	-	0,00	0,00	-
111	8 837	8 839	5,87	106,0	0,00	89,93	-	-	0,00	0,00	-
112	9 713	9 715	4,77	106,0	0,00	90,75	-	-	0,00	0,00	-
12	18 234	18 235	1,98	108,9	0,00	96,22	-	-	0,00	0,00	-
13	19 634	19 635	1,07	108,9	0,00	96,86	-	-	0,00	0,00	-
14	22 272	22 273	-0,64	108,9	0,00	97,96	-	-	0,00	0,00	-
15	19 159	19 161	1,34	108,9	0,00	96,65	-	-	0,00	0,00	-
16	20 207	20 209	0,65	108,9	0,00	97,11	-	-	0,00	0,00	-
17	20 514	20 516	0,51	108,9	0,00	97,24	-	-	0,00	0,00	-
18	21 397	21 398	-0,05	108,9	0,00	97,61	-	-	0,00	0,00	-
19	21 256	21 257	-0,01	108,9	0,00	97,55	-	-	0,00	0,00	-
2	18 479	18 481	1,80	108,9	0,00	96,33	-	-	0,00	0,00	-
20	22 940	22 941	-1,02	108,9	0,00	98,21	-	-	0,00	0,00	-
21	22 107	22 108	-0,53	108,9	0,00	97,89	-	-	0,00	0,00	-
22	23 726	23 727	-1,40	108,9	0,00	98,50	-	-	0,00	0,00	-
23	23 964	23 966	-1,59	108,9	0,00	98,59	-	-	0,00	0,00	-
24	21 202	21 203	0,00	108,9	0,00	97,53	-	-	0,00	0,00	-
25	23 708	23 709	-1,46	108,9	0,00	98,50	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
26	24 700	24 701	-1,93	108,9	0,00	98,85	-	-	0,00	0,00	-
27	24 644	24 645	-1,97	108,9	0,00	98,83	-	-	0,00	0,00	-
28	22 982	22 983	-1,04	108,9	0,00	98,23	-	-	0,00	0,00	-
29	22 178	22 179	-0,52	108,9	0,00	97,92	-	-	0,00	0,00	-
3	18 086	18 088	2,03	108,9	0,00	96,15	-	-	0,00	0,00	-
30	20 285	20 287	0,57	108,9	0,00	97,14	-	-	0,00	0,00	-
31	22 987	22 988	-1,05	108,9	0,00	98,23	-	-	0,00	0,00	-
4	18 960	18 961	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
5	19 899	19 901	0,81	108,9	0,00	96,98	-	-	0,00	0,00	-
6	17 542	17 544	2,42	108,9	0,00	95,88	-	-	0,00	0,00	-
7	17 612	17 613	2,46	108,9	0,00	95,92	-	-	0,00	0,00	-
71	14 097	14 098	0,18	106,0	0,00	93,98	-	-	0,00	0,00	-
72	13 565	13 567	0,65	106,0	0,00	93,65	-	-	0,00	0,00	-
73	12 930	12 931	1,23	106,0	0,00	93,23	-	-	0,00	0,00	-
74	14 614	14 616	-0,26	106,0	0,00	94,30	-	-	0,00	0,00	-
75	15 309	15 310	-0,82	106,0	0,00	94,70	-	-	0,00	0,00	-
76	16 060	16 061	-1,39	106,0	0,00	95,12	-	-	0,00	0,00	-
77	14 822	14 824	-0,40	106,0	0,00	94,42	-	-	0,00	0,00	-
78	16 082	16 084	-1,41	106,0	0,00	95,13	-	-	0,00	0,00	-
79	16 714	16 715	-1,88	106,0	0,00	95,46	-	-	0,00	0,00	-
8	18 478	18 480	1,76	108,9	0,00	96,33	-	-	0,00	0,00	-
80	15 274	15 275	-0,77	106,0	0,00	94,68	-	-	0,00	0,00	-
81	14 111	14 112	0,20	106,0	0,00	93,99	-	-	0,00	0,00	-
82	13 043	13 044	1,16	106,0	0,00	93,31	-	-	0,00	0,00	-
83	13 104	13 105	1,10	106,0	0,00	93,35	-	-	0,00	0,00	-
84	14 501	14 502	-0,11	106,0	0,00	94,23	-	-	0,00	0,00	-
85	14 187	14 189	0,16	106,0	0,00	94,04	-	-	0,00	0,00	-
86	12 318	12 319	1,84	106,0	0,00	92,81	-	-	0,00	0,00	-
87	11 705	11 706	2,46	106,0	0,00	92,37	-	-	0,00	0,00	-
88	10 537	10 539	3,73	106,0	0,00	91,46	-	-	0,00	0,00	-
89	9 827	9 829	4,58	106,0	0,00	90,85	-	-	0,00	0,00	-
9	20 732	20 734	0,29	108,9	0,00	97,33	-	-	0,00	0,00	-
90	9 299	9 301	5,25	106,0	0,00	90,37	-	-	0,00	0,00	-
91	10 184	10 186	4,15	106,0	0,00	91,16	-	-	0,00	0,00	-
92	11 129	11 130	3,07	106,0	0,00	91,93	-	-	0,00	0,00	-
93	10 798	10 800	3,42	106,0	0,00	91,67	-	-	0,00	0,00	-
94	11 374	11 375	2,79	106,0	0,00	92,12	-	-	0,00	0,00	-
95	11 811	11 812	2,33	106,0	0,00	92,45	-	-	0,00	0,00	-
96	12 361	12 362	1,78	106,0	0,00	92,84	-	-	0,00	0,00	-
97	10 467	10 468	3,85	106,0	0,00	91,40	-	-	0,00	0,00	-
98	11 015	11 017	3,22	106,0	0,00	91,84	-	-	0,00	0,00	-
99	11 642	11 644	2,54	106,0	0,00	92,32	-	-	0,00	0,00	-
T1	8 734	8 737	12,50	110,1	0,00	89,83	-	-	0,00	0,00	-
T10	8 587	8 589	12,36	110,1	0,00	89,68	-	-	0,00	0,00	-
T11	10 009	10 011	10,24	110,1	0,00	91,01	-	-	0,00	0,00	-
T12	7 286	7 289	14,33	110,1	0,00	88,25	-	-	0,00	0,00	-
T13	7 719	7 722	13,24	110,1	0,00	88,75	-	-	0,00	0,00	-
T14	8 854	8 857	11,51	110,1	0,00	89,95	-	-	0,00	0,00	-
T15	9 872	9 875	10,08	110,1	0,00	90,89	-	-	0,00	0,00	-
T16	6 565	6 569	15,10	110,1	0,00	87,35	-	-	0,00	0,00	-
T17	8 105	8 108	12,47	110,1	0,00	89,18	-	-	0,00	0,00	-
T18	9 182	9 185	10,87	110,1	0,00	90,26	-	-	0,00	0,00	-
T19	6 045	6 048	15,94	110,1	0,00	86,63	-	-	0,00	0,00	-
T2	8 844	8 846	12,35	110,1	0,00	89,94	-	-	0,00	0,00	-
T20	7 163	7 166	13,71	110,1	0,00	88,11	-	-	0,00	0,00	-
T21	8 658	8 661	11,35	110,1	0,00	89,75	-	-	0,00	0,00	-
T22	6 343	6 347	15,19	110,1	0,00	87,05	-	-	0,00	0,00	-
T23	7 391	7 394	13,31	110,1	0,00	88,38	-	-	0,00	0,00	-
T24	9 097	9 099	10,72	110,1	0,00	90,18	-	-	0,00	0,00	-
T25	6 711	6 714	14,45	110,1	0,00	87,54	-	-	0,00	0,00	-
T26	7 659	7 662	12,86	110,1	0,00	88,69	-	-	0,00	0,00	-
T27	8 913	8 916	10,97	110,1	0,00	90,00	-	-	0,00	0,00	-
T28	6 703	6 707	14,46	110,1	0,00	87,53	-	-	0,00	0,00	-
T29	8 039	8 042	12,26	110,1	0,00	89,11	-	-	0,00	0,00	-

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 18.49/3.5.584

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T3	7 936	7 939	13,68	110,1	0,00	89,00	-	-	0,00	0,00	-
T30	3 457	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T31	2 287	2 297	28,54	110,1	0,00	78,22	-	-	0,00	0,00	-
T32	4 529	4 534	19,76	110,1	0,00	84,13	-	-	0,00	0,00	-
T33	3 575	3 582	22,90	110,1	0,00	82,08	-	-	0,00	0,00	-
T34	2 431	2 440	27,79	110,1	0,00	78,75	-	-	0,00	0,00	-
T35	2 381	2 391	28,04	110,1	0,00	78,57	-	-	0,00	0,00	-
T36	5 166	5 171	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T37	4 584	4 589	19,60	110,1	0,00	84,23	-	-	0,00	0,00	-
T38	3 706	3 712	22,43	110,1	0,00	82,39	-	-	0,00	0,00	-
T39	5 070	5 075	18,24	110,1	0,00	85,11	-	-	0,00	0,00	-
T4	8 664	8 667	12,54	110,1	0,00	89,76	-	-	0,00	0,00	-
T5	7 204	7 207	14,81	110,1	0,00	88,16	-	-	0,00	0,00	-
T6	8 368	8 371	12,80	110,1	0,00	89,46	-	-	0,00	0,00	-
T7	9 401	9 403	11,32	110,1	0,00	90,47	-	-	0,00	0,00	-
T8	10 274	10 276	10,11	110,1	0,00	91,24	-	-	0,00	0,00	-
T9	7 106	7 109	14,84	110,1	0,00	88,04	-	-	0,00	0,00	-
Sum			35,51								

- Data undefined due to calculation with octave data

Project:
Haarasuonkangas

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 18.49/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuonkangas_melu ja varjot_1.w2r (11)

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA 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]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 7200 250.0 !O!

Noise: V172 - 7,2 MW PO7200 STE + 2dB

Source Source/Date Creator Edited

Vestas 15.11.2022 USER 29.11.2022 14.53

DMS no.: 0128-4336_00

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63	125	250	500	1000	2000	4000	8000	
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	225,0	8,0	108,9	No	92,4	100,0	103,3	103,5	101,9	97,4	89,9	79,2	

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited

Manufacturer 8.7.2022 USER 8.5.2023 15.45

Based on Document no.: 0127-1584 V01.

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	110,1	No	91,5	100,2	104,1	105,0	103,7	99,3	91,6	80,8

WTG: NORDEX N149/4.0-4.5 4500 180.0 !O!

Noise: Serrations Mode 00 - 106.0 dB(A) octave data only

Source Source/Date Creator Edited

F008_271_A13_R01 30.6.2017 USER 10.11.2022 10.32

Mode available on request

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	190,0	8,0	106,0	No	88,0	94,0	98,0	100,0	101,0	98,0	91,0	83,0

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 18.49/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard:

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

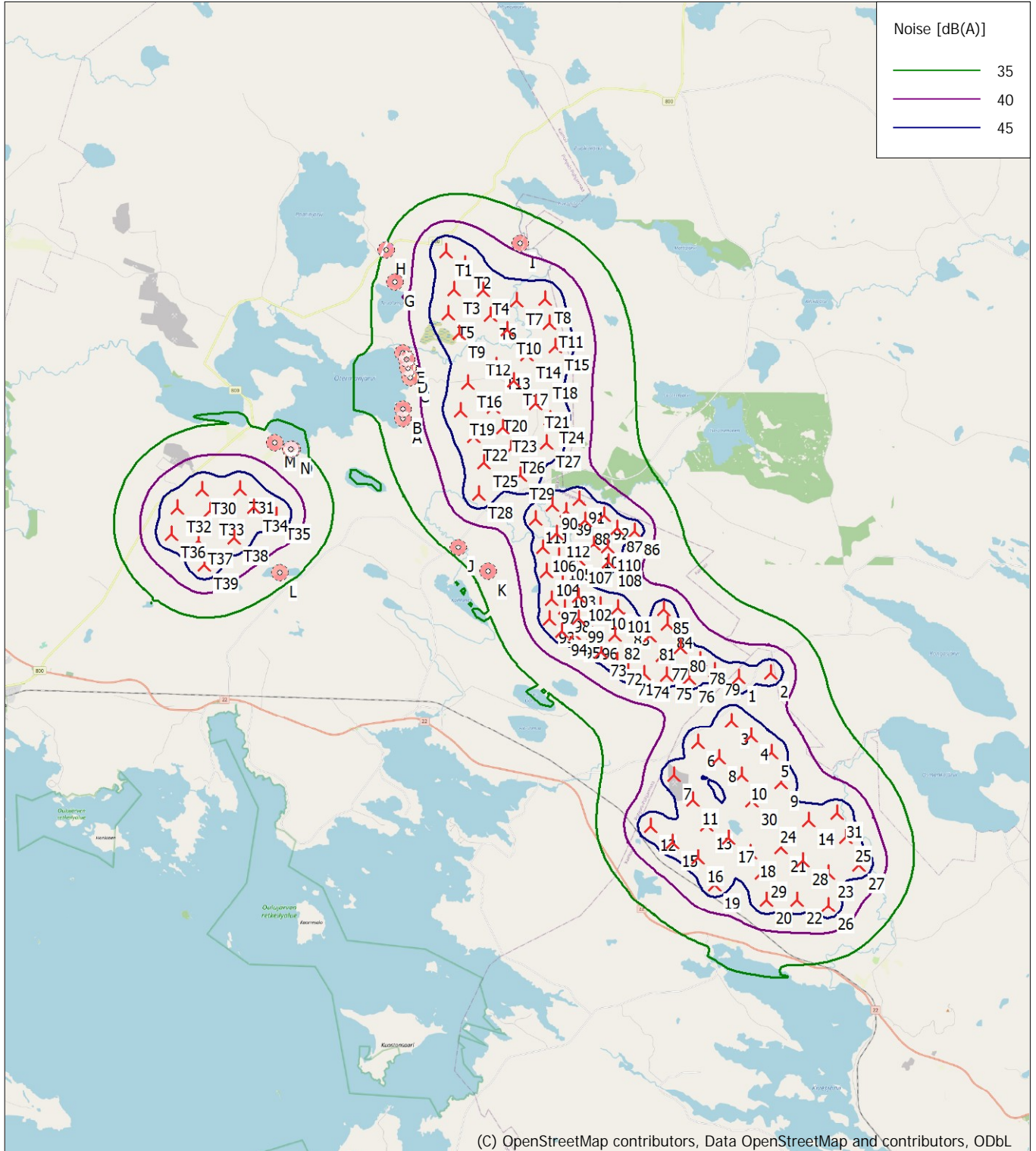
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Haarasuonkangas_VE1_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

0 2,5 5 7,5 10km

Map: EMD OpenStreetMap, Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 510 789 North: 7 163 440

▲ 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

Liite 8. Melun yhteismallinnuksen tulokset VE2

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

F1-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 19.07/3.5.584

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuo

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

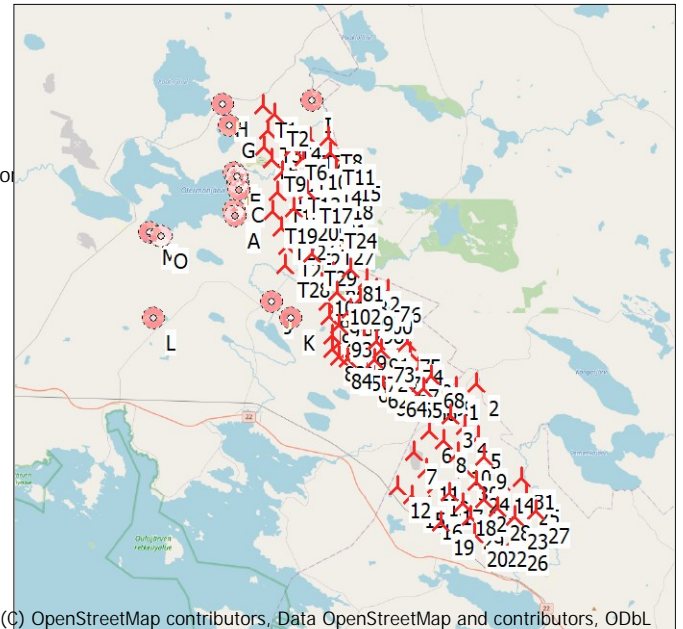
Uncertainty margin:

0,0 dB; Uncertainty margin in NSA has priority

Deviation from "official" noise demands. Negative is more

restrictive, positive is less restrictive.:

0,0 dB(A)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:400 000

📍 New WTG

👤 Noise sensitive area

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	Valid	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	LwA,ref [dB(A)]
						Manufact.	Type-generator				Creator	Name		
1	518 603	7 160 024	164,3	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
10	518 711	7 156 574	157,6	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
100	513 976	7 164 554	141,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
101	511 430	7 165 541	140,0	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
102	512 201	7 165 062	137,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
11	517 010	7 155 708	145,0	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
12	515 527	7 154 776	152,4	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
13	517 530	7 154 832	146,4	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
14	521 058	7 155 020	164,8	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
15	516 293	7 154 229	165,0	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
16	517 207	7 153 659	146,1	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
17	518 286	7 154 356	145,1	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
18	519 036	7 153 873	147,5	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
19	517 798	7 152 768	147,2	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
2	519 707	7 160 212	181,4	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
20	519 595	7 152 194	138,1	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
21	520 112	7 154 049	153,0	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
22	520 685	7 152 221	143,4	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
23	521 787	7 153 171	156,9	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
24	519 754	7 155 057	147,5	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
25	522 393	7 154 422	158,3	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
26	521 798	7 152 019	160,0	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
27	522 872	7 153 480	157,2	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
28	520 875	7 153 602	157,5	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
29	519 434	7 153 144	142,6	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
3	518 335	7 158 482	177,5	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
30	519 097	7 155 706	152,4	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
31	522 104	7 155 279	160,3	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
4	519 041	7 157 963	170,0	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
5	519 788	7 157 386	171,2	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
6	517 177	7 157 725	162,5	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
61	514 713	7 160 221	138,9	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
62	514 322	7 160 594	136,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
63	513 760	7 160 896	134,6	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
64	515 280	7 160 145	142,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
65	516 065	7 160 095	148,9	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
66	516 865	7 159 975	150,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
67	515 893	7 160 771	145,1	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
68	517 250	7 160 639	147,2	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
69	517 760	7 160 250	152,8	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
7	516 365	7 156 572	143,6	VESTAS V172-7.2 7200 250.0 ... Yes	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	108,9
70	516 561	7 161 067	145,9	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
71	515 455	7 161 460	140,3	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
72	514 251	7 161 482	138,1	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
73	514 587	7 161 973	140,0	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
74	516 095	7 161 880	142,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
75	515 968	7 162 365	143,8	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
76	514 920	7 165 135	143,8	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
77	514 309	7 165 216	143,5	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
78	513 180	7 165 515	143,2	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0
79	512 525	7 165 835	140,7	NORDEX N149/4.0-4.5 4500 1... Yes	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106,0 dB(A) octave data only	8,0	106,0

To be continued on next page...

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator Name	Wind speed [m/s]	LwA_ref [dB(A)]
					Valid	Manufact.	Type-generator						
8	517 940	7 157 182	154,8	VESTAS V172-7.2 7200 250.0 ...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW P07200 STE + 2dB	8,0 108,9
80	512 030	7 166 046	139,7	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
81	512 970	7 166 250	144,6	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
82	513 824	7 165 685	143,8	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
83	511 955	7 162 030	134,6	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
84	512 368	7 161 612	135,2	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
85	512 831	7 161 519	136,4	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
86	513 463	7 161 490	137,5	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
87	512 000	7 162 735	139,8	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
88	512 460	7 162 435	142,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
89	512 970	7 162 065	141,5	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
9	520 096	7 156 333	164,3	VESTAS V172-7.2 7200 250.0 ...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW P07200 STE + 2dB	8,0 108,9
90	513 720	7 162 538	142,3	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
91	514 360	7 162 448	140,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
92	512 957	7 162 816	145,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
93	512 396	7 163 292	145,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
94	511 847	7 163 708	136,2	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
95	512 266	7 164 240	144,4	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
96	511 697	7 164 525	140,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
97	512 955	7 164 121	140,7	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
98	514 006	7 164 037	145,0	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
99	513 472	7 164 666	141,3	NORDEX N149/4.0-4.5 4500 1...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0 106,0
T1	508 282	7 174 861	157,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T10	510 426	7 172 148	146,6	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T11	511 902	7 172 395	147,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T12	509 346	7 171 412	143,2	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T13	510 056	7 170 927	146,6	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T14	511 130	7 171 298	148,8	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T15	512 122	7 171 560	159,0	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T16	509 073	7 170 275	147,6	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T17	510 668	7 170 368	152,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T18	511 731	7 170 576	165,0	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T19	508 820	7 169 317	148,1	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T2	508 948	7 174 439	157,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T20	509 941	7 169 425	149,8	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T21	511 434	7 169 585	157,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T22	509 256	7 168 427	147,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T23	510 283	7 168 708	149,6	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T24	511 959	7 169 067	152,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T25	509 625	7 167 494	142,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T26	510 589	7 170 275	147,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T27	511 839	7 168 207	148,1	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T28	509 456	7 166 427	142,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T29	510 920	7 167 074	142,1	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T3	508 557	7 173 555	151,9	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T4	509 564	7 173 532	152,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T5	508 354	7 172 700	144,8	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T6	509 849	7 172 666	152,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T7	510 753	7 173 171	147,6	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T8	511 738	7 173 247	154,9	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1
T9	508 756	7 172 027	142,5	VESTAS V172-7.2 HH214 720...	Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - P07200-OS - 07-2022	8,0 110,1

Calculation Results

Sound level

Noise sensitive area

No.	Name	East	North	Z	Immission height	Noise	From WTGs	Distance to noise demand
				[m]	[m]	[dB(A)]	[dB(A)]	[m]
A	Lomarakenus A (Syvälahti)	506 817	7 169 043	142,5	4,0	40,0	37,2	665
B	Asuinrakenus B (Syväanlahti)	506 799	7 169 349	142,5	4,0	40,0	37,3	649
C	Lomarakenus C (Mutalahti)	507 047	7 170 436	142,5	4,0	40,0	38,5	378
D	Lomarakenus D (Mutaniemi)	506 972	7 170 765	142,5	4,0	40,0	38,4	421
E	Asuinrakenus E (Alanko)	506 919	7 171 101	145,0	4,0	40,0	38,4	408
F	Asuinrakenus F (Joensuu)	506 790	7 171 328	147,5	4,0	40,0	38,1	473
G	Asuinrakenus G (Heiniäho)	506 504	7 173 821	147,5	4,0	40,0	37,4	570
H	Asuinrakenus H (Mäkelä)	506 192	7 174 913	150,9	4,0	40,0	35,2	976
I	Lomarakenus I	510 890	7 175 161	155,0	4,0	40,0	38,7	322
J	Lomarakenus J (Hautakaarto)	508 768	7 164 525	132,5	4,0	40,0	35,8	948
K	Asuinrakenus K (Takalo)	509 809	7 163 697	133,1	4,0			

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	14841	15043	15555	15832	16100	16350	18351	19383	16989	10816	9530	16500	18226	17629	17567
10	17232	17467	18116	18417	18710	18968	21130	22204	20165	12731	11401	17677	20098	19514	19459
100	8450	8631	9089	9361	9626	9875	11904	12958	11047	5208	4254	11513	12222	11625	11559
101	5792	5996	6570	6868	7160	7417	9634	10736	9635	2849	2455	9132	9499	8904	8837
102	6696	6896	7446	7737	8023	8279	10449	11539	10184	3475	2754	9806	10376	9779	9713
11	16785	17040	17781	18096	18406	18666	20940	22042	20393	12069	10755	16528	19284	18715	18664
12	16716	16987	17809	18134	18455	18716	21074	22195	20906	11863	10596	15748	18831	18280	18234
13	17797	18053	18799	19114	19424	19684	21958	23061	21386	13066	11756	17412	20250	19684	19634
14	19986	20215	20832	21126	21413	21669	23776	24834	22562	15537	14207	20455	22912	22327	22272
15	17585	17853	18659	18982	19301	19562	21901	23018	21618	12753	11475	16689	19759	19206	19159
16	18564	18829	19614	19935	20250	20512	22827	23939	22411	13759	12470	17765	20810	20255	20207
17	18634	18887	19618	19931	20239	20499	22753	23851	22080	13928	12614	18305	21133	20565	20514
18	19479	19729	20447	20757	21062	21322	23558	24650	22793	14795	13478	19197	22016	21447	21397
19	19633	19898	20682	21002	21318	21579	23891	25002	23435	14825	13538	18758	21856	21303	21256
2	15625	15815	16273	16539	16796	17041	18961	19969	17355	11759	10494	17541	19141	18542	18479
20	21146	21401	22141	22455	22763	23023	25280	26378	24561	16409	15102	20564	23550	22989	22940
21	20039	20281	20958	21262	21560	21818	24002	25081	23038	15441	14115	20046	22735	22159	22107
22	21801	22049	22754	23063	23365	23625	25839	26925	24943	17129	15810	21464	24344	23776	23726
23	21818	22054	22702	23001	23293	23550	25691	26757	24542	17275	15946	21938	24596	24018	23964
24	19052	19290	19950	20251	20546	20804	22971	24046	21972	14503	13174	19263	21835	21255	21202
25	21363	21587	22180	22470	22751	23006	25075	26122	23715	16962	15633	21917	24349	23763	23708
26	22677	22919	23596	23900	24197	24455	26631	27707	25584	18060	16736	22518	25323	24751	24700
27	22360	22587	23193	23486	23770	24025	26109	27159	24772	17914	16584	22757	25282	24699	24644
28	20882	21122	21786	22088	22383	22641	24806	25880	23759	16307	14979	20931	23611	23035	22982
29	20297	20549	21271	21582	21888	22148	24387	25480	23617	15598	14283	19914	22795	22228	22178
3	15627	15848	16441	16733	17016	17271	19371	20431	18265	11315	9994	16648	18737	18145	18086
30	18129	18367	19031	19333	19629	19887	22062	23140	21115	13581	12252	18388	20920	20339	20285
31	20570	20789	21364	21651	21930	22183	24231	25272	22826	16227	14900	21305	23633	23044	22987
4	16498	16718	17304	17594	17876	18130	20215	21270	19032	12190	10868	17482	19610	19018	18960
5	17439	17658	18238	18527	18807	19061	21132	22182	19878	13130	11807	18378	20548	19957	19899
6	15344	15583	16254	16559	16857	17115	19313	20399	18535	10815	9484	15818	18181	17597	17542
61	11839	12081	12772	13080	13384	13643	15885	16984	15421	7339	6011	12678	14743	14154	14097
62	11301	11543	12239	12549	12853	13113	15365	16466	14966	6804	5477	12203	14213	13623	13565
63	10704	10950	11665	11978	12286	12546	14822	15929	14551	6172	4843	11585	13577	12987	12930
64	12280	12516	13179	13484	13782	14041	16250	17340	15644	7848	6523	13244	15263	14672	14614
65	12868	13096	13721	14019	14310	14567	16728	17806	15930	8536	7219	14016	15961	15368	15309
66	13535	13755	14347	14639	14923	15179	17293	18359	16319	9288	7977	14820	16714	16119	16060
67	12280	12501	13102	13396	13684	13940	16076	17149	15235	8053	6751	13693	15478	14882	14822
68	13397	13605	14145	14428	14703	14955	17007	18056	15854	9330	8045	15048	16741	16143	16082
69	14038	14245	14782	15065	15338	15590	17631	18677	16417	9956	8666	15628	17372	16775	16714
7	15707	15962	16705	17020	17330	17591	19869	20974	19379	10999	9683	15555	18235	17663	17612
70	12592	12802	13353	13638	13916	14169	16242	17298	15192	8526	7246	14291	15933	15335	15274
71	11494	11712	12299	12591	12877	13132	15261	16334	14441	7356	6073	13134	14769	14171	14111
72	10603	10836	11492	11796	12095	12353	14569	15663	14086	6271	4964	11944	13697	13102	13043
73	10505	10726	11335	11631	11921	12178	14343	15425	13696	6354	5079	12198	13763	13165	13104
74	11721	11925	12453	12735	13009	13261	15316	16368	14264	7790	6543	13706	15162	14563	14501
75	11329	11526	12030	12308	12578	12828	14860	15907	13767	7517	6301	13526	14850	14251	14187
76	8996	9149	9491	9740	9980	10220	12094	13107	10806	6182	5309	12510	12977	12386	12318
77	8413	8572	8943	9199	9447	9690	11617	12646	10516	5584	4749	11915	12365	11772	11705
78	7276	7444	7863	8130	8391	8638	10656	11711	9914	4522	3830	10845	11197	10605	10537
79	6548	6718	7154	7426	7691	7941	10001	11069	9468	3979	3457	10265	10486	9895	9827
8	16261	16497	17156	17458	17754	18012	20190	21270	19312	11749	10419	16730	19118	18533	18478
80	6013	6186	6641	6917	7188	7440	9539	10616	9186	3599	3233	9832	9956	9367	9299
81	6757	6905	7253	7507	7755	7999	9956	10999	9150	4542	4063	10793	10838	10253	10184
82	7770	7923	8276	8530	8776	9018	10944	11975	9920	5187	4480	11509	11786	11197	11129
83	8694	8953	9734	10056	10375	10636	12990	14113	13174	4047	2717	9588	11445	10855	10798
84	9275	9533	10304	10625	10942	11203	13544	14665	13629	4631	3301	10070	12019	11430	11374
85	9632	9884	10629	10946	11259	11520	13834	14949	13779	5054	3725	10542	12458	11868	11811
86	10061	10304	11009	11321	11627	11888	14159	15266	13911	5590	4269	11168	13012	12419	12361
87	8164	8414	9156	9474	9788	10049	12373	13492	12475	3695	2393	9541	11121	10526	10467
88	8690	8936	9660	9975	10286	10547	12850	13964	12822	4242	2936	10030	11669	11074	11015
89	9303	9547	10254	10567	10875	11135	13417	14526	13260	4869	3557	10585	12295	11701	11642
9	18381	18607	19214	19507	19792	20047	22149	23206	20958	13980	12651	19046	21376	20789	20732
90	9485	9710	10340	10640	10935	11193	13393	14485	12936	5336	4079	11272	12734	12136	12075
91	10019	10237	10830	11124	11412	11669	13822	14903	13178	5965	4719	11917	13350	12751	12689
92	8745	8978	9643	9950	10252	10511	12757	13860	12517	4524	3269	10487	11928	11330	11269

To be continued on next page...

DECIBEL - Main Result

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
93	8012	8247	8925	9234	9538	9798	12065	13173	11964	3832	2618	9901	11214	10615	10554
94	7332	7570	8265	8577	8885	9145	11438	12551	11493	3186	2038	9346	10539	9940	9878
95	7264	7483	8101	8402	8698	8957	11180	12280	11007	3510	2516	9784	10713	10113	10049
96	6650	6875	7521	7827	8128	8388	10648	11756	10666	2929	2062	9240	10079	9480	9416
97	7868	8076	8648	8941	9228	9484	11649	12736	11231	4206	3174	10466	11398	10799	10735
98	8760	8953	9454	9734	10006	10258	12329	13392	11552	5261	4211	11512	12413	11815	11750
99	7965	8152	8636	8913	9184	9436	11505	12570	10808	4706	3789	11020	11707	11110	11044
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas 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 Lomarakenus A (Syvälahti)

Wind speed: 8,0 m/s

WTG

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]
1	14 841	14 843	4,53	108,9	0,00	94,43	-	-	0,00	0,00	-
10	17 232	17 233	2,64	108,9	0,00	95,73	-	-	0,00	0,00	-
100	8 450	8 452	6,38	106,0	0,00	89,54	-	-	0,00	0,00	-
101	5 792	5 795	10,89	106,0	0,00	86,26	-	-	0,00	0,00	-
102	6 696	6 698	9,17	106,0	0,00	87,52	-	-	0,00	0,00	-
11	16 785	16 786	2,98	108,9	0,00	95,50	-	-	0,00	0,00	-
12	16 716	16 717	3,06	108,9	0,00	95,46	-	-	0,00	0,00	-
13	17 797	17 798	2,24	108,9	0,00	96,01	-	-	0,00	0,00	-
14	19 986	19 988	0,76	108,9	0,00	97,02	-	-	0,00	0,00	-
15	17 585	17 587	2,40	108,9	0,00	95,90	-	-	0,00	0,00	-
16	18 564	18 566	1,70	108,9	0,00	96,37	-	-	0,00	0,00	-
17	18 634	18 636	1,66	108,9	0,00	96,41	-	-	0,00	0,00	-
18	19 479	19 480	1,11	108,9	0,00	96,79	-	-	0,00	0,00	-
19	19 633	19 634	0,99	108,9	0,00	96,86	-	-	0,00	0,00	-
2	15 625	15 627	3,88	108,9	0,00	94,88	-	-	0,00	0,00	-
20	21 146	21 147	0,03	108,9	0,00	97,51	-	-	0,00	0,00	-
21	20 039	20 041	0,72	108,9	0,00	97,04	-	-	0,00	0,00	-
22	21 801	21 802	-0,34	108,9	0,00	97,77	-	-	0,00	0,00	-
23	21 818	21 820	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
24	19 052	19 053	1,37	108,9	0,00	96,60	-	-	0,00	0,00	-
25	21 363	21 364	-0,10	108,9	0,00	97,59	-	-	0,00	0,00	-
26	22 677	22 678	-0,88	108,9	0,00	98,11	-	-	0,00	0,00	-
27	22 360	22 361	-0,69	108,9	0,00	97,99	-	-	0,00	0,00	-
28	20 882	20 884	0,19	108,9	0,00	97,40	-	-	0,00	0,00	-
29	20 297	20 298	0,56	108,9	0,00	97,15	-	-	0,00	0,00	-
3	15 627	15 629	3,87	108,9	0,00	94,88	-	-	0,00	0,00	-
30	18 129	18 131	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
31	20 570	20 571	0,39	108,9	0,00	97,27	-	-	0,00	0,00	-
4	16 498	16 500	3,19	108,9	0,00	95,35	-	-	0,00	0,00	-
5	17 439	17 441	2,49	108,9	0,00	95,83	-	-	0,00	0,00	-
6	15 344	15 346	4,10	108,9	0,00	94,72	-	-	0,00	0,00	-
61	11 839	11 841	2,30	106,0	0,00	92,47	-	-	0,00	0,00	-
62	11 301	11 302	2,87	106,0	0,00	92,06	-	-	0,00	0,00	-
63	10 704	10 706	3,52	106,0	0,00	91,59	-	-	0,00	0,00	-
64	12 280	12 281	1,86	106,0	0,00	92,78	-	-	0,00	0,00	-
65	12 868	12 870	1,29	106,0	0,00	93,19	-	-	0,00	0,00	-
66	13 535	13 536	0,67	106,0	0,00	93,63	-	-	0,00	0,00	-
67	12 280	12 281	1,86	106,0	0,00	92,78	-	-	0,00	0,00	-
68	13 397	13 398	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
69	14 038	14 039	0,23	106,0	0,00	93,95	-	-	0,00	0,00	-
7	15 707	15 708	3,82	108,9	0,00	94,92	-	-	0,00	0,00	-
70	12 592	12 593	1,55	106,0	0,00	93,00	-	-	0,00	0,00	-
71	11 494	11 496	2,66	106,0	0,00	92,21	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

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]
72	10 603	10 605	3,64	106,0	0,00	91,51	-	-	0,00	0,00	-
73	10 505	10 507	3,75	106,0	0,00	91,43	-	-	0,00	0,00	-
74	11 721	11 723	2,43	106,0	0,00	92,38	-	-	0,00	0,00	-
75	11 329	11 330	2,84	106,0	0,00	92,08	-	-	0,00	0,00	-
76	8 996	8 998	5,63	106,0	0,00	90,08	-	-	0,00	0,00	-
77	8 413	8 415	6,44	106,0	0,00	89,50	-	-	0,00	0,00	-
78	7 276	7 278	8,18	106,0	0,00	88,24	-	-	0,00	0,00	-
79	6 548	6 550	9,44	106,0	0,00	87,33	-	-	0,00	0,00	-
8	16 261	16 262	3,38	108,9	0,00	95,22	-	-	0,00	0,00	-
80	6 013	6 016	10,44	106,0	0,00	86,59	-	-	0,00	0,00	-
81	6 757	6 760	9,06	106,0	0,00	87,60	-	-	0,00	0,00	-
82	7 770	7 772	7,39	106,0	0,00	88,81	-	-	0,00	0,00	-
83	8 694	8 695	6,04	106,0	0,00	89,79	-	-	0,00	0,00	-
84	9 275	9 277	5,26	106,0	0,00	90,35	-	-	0,00	0,00	-
85	9 632	9 634	4,82	106,0	0,00	90,68	-	-	0,00	0,00	-
86	10 061	10 062	4,28	106,0	0,00	91,05	-	-	0,00	0,00	-
87	8 164	8 166	6,80	106,0	0,00	89,24	-	-	0,00	0,00	-
88	8 690	8 692	6,05	106,0	0,00	89,78	-	-	0,00	0,00	-
89	9 303	9 305	5,22	106,0	0,00	90,37	-	-	0,00	0,00	-
9	18 381	18 383	1,83	108,9	0,00	96,29	-	-	0,00	0,00	-
90	9 485	9 487	4,99	106,0	0,00	90,54	-	-	0,00	0,00	-
91	10 019	10 021	4,33	106,0	0,00	91,02	-	-	0,00	0,00	-
92	8 745	8 747	5,97	106,0	0,00	89,84	-	-	0,00	0,00	-
93	8 012	8 015	7,02	106,0	0,00	89,08	-	-	0,00	0,00	-
94	7 332	7 334	8,09	106,0	0,00	88,31	-	-	0,00	0,00	-
95	7 264	7 266	8,20	106,0	0,00	88,23	-	-	0,00	0,00	-
96	6 650	6 653	9,25	106,0	0,00	87,46	-	-	0,00	0,00	-
97	7 868	7 870	7,24	106,0	0,00	88,92	-	-	0,00	0,00	-
98	8 760	8 762	5,95	106,0	0,00	89,85	-	-	0,00	0,00	-
99	7 965	7 967	7,09	106,0	0,00	89,03	-	-	0,00	0,00	-
T1	6 000	6 004	15,94	110,1	0,00	86,57	-	-	0,00	0,00	-
T10	4 760	4 765	19,09	110,1	0,00	84,56	-	-	0,00	0,00	-
T11	6 091	6 094	15,72	110,1	0,00	86,70	-	-	0,00	0,00	-
T12	3 465	3 471	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T13	3 747	3 753	22,28	110,1	0,00	82,49	-	-	0,00	0,00	-
T14	4 867	4 872	18,79	110,1	0,00	84,75	-	-	0,00	0,00	-
T15	5 872	5 876	16,22	110,1	0,00	86,38	-	-	0,00	0,00	-
T16	2 570	2 579	27,10	110,1	0,00	79,23	-	-	0,00	0,00	-
T17	4 073	4 079	21,18	110,1	0,00	83,21	-	-	0,00	0,00	-
T18	5 148	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T19	2 022	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 802	5 806	16,39	110,1	0,00	86,28	-	-	0,00	0,00	-
T20	3 148	3 155	24,55	110,1	0,00	80,98	-	-	0,00	0,00	-
T21	4 649	4 654	19,41	110,1	0,00	84,36	-	-	0,00	0,00	-
T22	2 516	2 525	27,37	110,1	0,00	79,04	-	-	0,00	0,00	-
T23	3 482	3 489	23,24	110,1	0,00	81,85	-	-	0,00	0,00	-
T24	5 142	5 147	18,04	110,1	0,00	85,23	-	-	0,00	0,00	-
T25	3 207	3 214	24,31	110,1	0,00	81,14	-	-	0,00	0,00	-
T26	3 916	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	5 092	5 096	18,18	110,1	0,00	85,14	-	-	0,00	0,00	-
T28	3 716	3 722	22,40	110,1	0,00	82,42	-	-	0,00	0,00	-
T29	4 551	4 556	19,70	110,1	0,00	84,17	-	-	0,00	0,00	-
T3	4 836	4 841	18,88	110,1	0,00	84,70	-	-	0,00	0,00	-
T4	5 263	5 268	17,73	110,1	0,00	85,43	-	-	0,00	0,00	-
T5	3 967	3 973	21,53	110,1	0,00	82,98	-	-	0,00	0,00	-
T6	4 724	4 729	19,19	110,1	0,00	84,50	-	-	0,00	0,00	-
T7	5 704	5 708	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T8	6 472	6 476	14,87	110,1	0,00	87,23	-	-	0,00	0,00	-
T9	3 559	3 565	22,96	110,1	0,00	82,04	-	-	0,00	0,00	-
Sum			37,17								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Wind speed: 8,0 m/s

WTG

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]
1	15 043	15 045	4,36	108,9	0,00	94,55	-	-	0,00	0,00	-
10	17 467	17 468	2,47	108,9	0,00	95,84	-	-	0,00	0,00	-
100	8 631	8 633	6,13	106,0	0,00	89,72	-	-	0,00	0,00	-
101	5 996	5 998	10,48	106,0	0,00	86,56	-	-	0,00	0,00	-
102	6 896	6 899	8,82	106,0	0,00	87,78	-	-	0,00	0,00	-
11	17 040	17 041	2,79	108,9	0,00	95,63	-	-	0,00	0,00	-
12	16 987	16 988	2,86	108,9	0,00	95,60	-	-	0,00	0,00	-
13	18 053	18 054	2,06	108,9	0,00	96,13	-	-	0,00	0,00	-
14	20 215	20 216	0,61	108,9	0,00	97,11	-	-	0,00	0,00	-
15	17 853	17 855	2,20	108,9	0,00	96,04	-	-	0,00	0,00	-
16	18 829	18 830	1,52	108,9	0,00	96,50	-	-	0,00	0,00	-
17	18 887	18 889	1,49	108,9	0,00	96,52	-	-	0,00	0,00	-
18	19 729	19 731	0,94	108,9	0,00	96,90	-	-	0,00	0,00	-
19	19 898	19 899	0,81	108,9	0,00	96,98	-	-	0,00	0,00	-
2	15 815	15 817	3,72	108,9	0,00	94,98	-	-	0,00	0,00	-
20	21 401	21 403	-0,12	108,9	0,00	97,61	-	-	0,00	0,00	-
21	20 281	20 282	0,57	108,9	0,00	97,14	-	-	0,00	0,00	-
22	22 049	22 050	-0,49	108,9	0,00	97,87	-	-	0,00	0,00	-
23	22 054	22 056	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
24	19 290	19 291	1,21	108,9	0,00	96,71	-	-	0,00	0,00	-
25	21 587	21 588	-0,24	108,9	0,00	97,68	-	-	0,00	0,00	-
26	22 919	22 920	-1,01	108,9	0,00	98,20	-	-	0,00	0,00	-
27	22 587	22 588	-0,82	108,9	0,00	98,08	-	-	0,00	0,00	-
28	21 122	21 123	0,05	108,9	0,00	97,50	-	-	0,00	0,00	-
29	20 549	20 550	0,40	108,9	0,00	97,26	-	-	0,00	0,00	-
3	15 848	15 850	3,70	108,9	0,00	95,00	-	-	0,00	0,00	-
30	18 367	18 369	1,84	108,9	0,00	96,28	-	-	0,00	0,00	-
31	20 789	20 791	0,25	108,9	0,00	97,36	-	-	0,00	0,00	-
4	16 718	16 720	3,03	108,9	0,00	95,46	-	-	0,00	0,00	-
5	17 658	17 660	2,34	108,9	0,00	95,94	-	-	0,00	0,00	-
6	15 583	15 585	3,91	108,9	0,00	94,85	-	-	0,00	0,00	-
61	12 081	12 082	2,06	106,0	0,00	92,64	-	-	0,00	0,00	-
62	11 543	11 545	2,61	106,0	0,00	92,25	-	-	0,00	0,00	-
63	10 950	10 952	3,25	106,0	0,00	91,79	-	-	0,00	0,00	-
64	12 516	12 517	1,63	106,0	0,00	92,95	-	-	0,00	0,00	-
65	13 096	13 097	1,08	106,0	0,00	93,34	-	-	0,00	0,00	-
66	13 755	13 756	0,48	106,0	0,00	93,77	-	-	0,00	0,00	-
67	12 501	12 503	1,64	106,0	0,00	92,94	-	-	0,00	0,00	-
68	13 605	13 606	0,61	106,0	0,00	93,67	-	-	0,00	0,00	-
69	14 245	14 247	0,05	106,0	0,00	94,07	-	-	0,00	0,00	-
7	15 962	15 963	3,62	108,9	0,00	95,06	-	-	0,00	0,00	-
70	12 802	12 803	1,35	106,0	0,00	93,15	-	-	0,00	0,00	-
71	11 712	11 713	2,43	106,0	0,00	92,37	-	-	0,00	0,00	-
72	10 836	10 838	3,38	106,0	0,00	91,70	-	-	0,00	0,00	-
73	10 726	10 728	3,50	106,0	0,00	91,61	-	-	0,00	0,00	-
74	11 925	11 926	2,24	106,0	0,00	92,53	-	-	0,00	0,00	-
75	11 526	11 527	2,63	106,0	0,00	92,23	-	-	0,00	0,00	-
76	9 149	9 151	5,42	106,0	0,00	90,23	-	-	0,00	0,00	-
77	8 572	8 574	6,21	106,0	0,00	89,66	-	-	0,00	0,00	-
78	7 444	7 447	7,91	106,0	0,00	88,44	-	-	0,00	0,00	-
79	6 718	6 721	9,13	106,0	0,00	87,55	-	-	0,00	0,00	-
8	16 497	16 499	3,19	108,9	0,00	95,35	-	-	0,00	0,00	-
80	6 186	6 189	10,11	106,0	0,00	86,83	-	-	0,00	0,00	-
81	6 905	6 908	8,80	106,0	0,00	87,79	-	-	0,00	0,00	-
82	7 923	7 925	7,16	106,0	0,00	88,98	-	-	0,00	0,00	-
83	8 953	8 954	5,69	106,0	0,00	90,04	-	-	0,00	0,00	-
84	9 533	9 534	4,93	106,0	0,00	90,59	-	-	0,00	0,00	-
85	9 884	9 886	4,50	106,0	0,00	90,90	-	-	0,00	0,00	-
86	10 304	10 306	3,99	106,0	0,00	91,26	-	-	0,00	0,00	-
87	8 414	8 416	6,44	106,0	0,00	89,50	-	-	0,00	0,00	-
88	8 936	8 938	5,71	106,0	0,00	90,02	-	-	0,00	0,00	-
89	9 547	9 548	4,91	106,0	0,00	90,60	-	-	0,00	0,00	-
9	18 607	18 609	1,67	108,9	0,00	96,39	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
90	9 710	9 712	4,70	106,0	0,00	90,75	-	-	0,00	0,00	-
91	10 237	10 238	4,07	106,0	0,00	91,20	-	-	0,00	0,00	-
92	8 978	8 980	5,65	106,0	0,00	90,07	-	-	0,00	0,00	-
93	8 247	8 249	6,68	106,0	0,00	89,33	-	-	0,00	0,00	-
94	7 570	7 572	7,71	106,0	0,00	88,58	-	-	0,00	0,00	-
95	7 483	7 485	7,84	106,0	0,00	88,48	-	-	0,00	0,00	-
96	6 875	6 877	8,86	106,0	0,00	87,75	-	-	0,00	0,00	-
97	8 076	8 078	6,93	106,0	0,00	89,15	-	-	0,00	0,00	-
98	8 953	8 955	5,69	106,0	0,00	90,04	-	-	0,00	0,00	-
99	8 152	8 154	6,82	106,0	0,00	89,23	-	-	0,00	0,00	-
T1	5 708	5 712	16,64	110,1	0,00	86,14	-	-	0,00	0,00	-
T10	4 581	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T11	5 943	5 947	16,06	110,1	0,00	86,49	-	-	0,00	0,00	-
T12	3 277	3 284	24,03	110,1	0,00	81,33	-	-	0,00	0,00	-
T13	3 619	3 625	22,74	110,1	0,00	82,19	-	-	0,00	0,00	-
T14	4 750	4 755	19,12	110,1	0,00	84,54	-	-	0,00	0,00	-
T15	5 764	5 769	16,48	110,1	0,00	86,22	-	-	0,00	0,00	-
T16	2 455	2 465	27,67	110,1	0,00	78,84	-	-	0,00	0,00	-
T17	4 001	4 007	21,42	110,1	0,00	83,06	-	-	0,00	0,00	-
T18	5 082	5 088	18,20	110,1	0,00	85,13	-	-	0,00	0,00	-
T19	2 021	2 033	30,02	110,1	0,00	77,16	-	-	0,00	0,00	-
T2	5 525	5 530	17,06	110,1	0,00	85,85	-	-	0,00	0,00	-
T20	3 143	3 151	24,56	110,1	0,00	80,97	-	-	0,00	0,00	-
T21	4 641	4 646	19,43	110,1	0,00	84,34	-	-	0,00	0,00	-
T22	2 624	2 633	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T23	3 542	3 549	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T24	5 168	5 172	17,98	110,1	0,00	85,27	-	-	0,00	0,00	-
T25	3 380	3 387	23,63	110,1	0,00	81,60	-	-	0,00	0,00	-
T26	4 026	4 032	21,34	110,1	0,00	83,11	-	-	0,00	0,00	-
T27	5 168	5 173	17,97	110,1	0,00	85,27	-	-	0,00	0,00	-
T28	3 949	3 955	21,59	110,1	0,00	82,94	-	-	0,00	0,00	-
T29	4 707	4 712	19,24	110,1	0,00	84,46	-	-	0,00	0,00	-
T3	4 558	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T4	5 014	5 019	18,39	110,1	0,00	85,01	-	-	0,00	0,00	-
T5	3 694	3 700	22,47	110,1	0,00	82,36	-	-	0,00	0,00	-
T6	4 506	4 511	19,83	110,1	0,00	84,09	-	-	0,00	0,00	-
T7	5 500	5 504	17,12	110,1	0,00	85,81	-	-	0,00	0,00	-
T8	6 292	6 296	15,27	110,1	0,00	86,98	-	-	0,00	0,00	-
T9	3 317	3 323	23,88	110,1	0,00	81,43	-	-	0,00	0,00	-
Sum			37,28								

- Data undefined due to calculation with octave data

Noise sensitive area: C Lomarakennus C (Mutalahti)

Wind speed: 8,0 m/s

WTG

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]
1	15 555	15 557	3,93	108,9	0,00	94,84	-	-	0,00	0,00	-
10	18 116	18 118	2,17	108,9	0,00	96,16	-	-	0,00	0,00	-
100	9 089	9 091	5,50	106,0	0,00	90,17	-	-	0,00	0,00	-
101	6 570	6 573	9,54	106,0	0,00	87,36	-	-	0,00	0,00	-
102	7 446	7 448	7,99	106,0	0,00	88,44	-	-	0,00	0,00	-
11	17 781	17 783	2,55	108,9	0,00	96,00	-	-	0,00	0,00	-
12	17 809	17 810	2,63	108,9	0,00	96,01	-	-	0,00	0,00	-
13	18 799	18 800	1,83	108,9	0,00	96,48	-	-	0,00	0,00	-
14	20 832	20 833	0,32	108,9	0,00	97,38	-	-	0,00	0,00	-
15	18 659	18 660	2,01	108,9	0,00	96,42	-	-	0,00	0,00	-
16	19 614	19 615	1,34	108,9	0,00	96,85	-	-	0,00	0,00	-
17	19 618	19 619	1,26	108,9	0,00	96,85	-	-	0,00	0,00	-
18	20 447	20 448	0,73	108,9	0,00	97,21	-	-	0,00	0,00	-
19	20 682	20 683	0,64	108,9	0,00	97,31	-	-	0,00	0,00	-
2	16 273	16 275	3,37	108,9	0,00	95,23	-	-	0,00	0,00	-
20	22 141	22 142	-0,32	108,9	0,00	97,90	-	-	0,00	0,00	-
21	20 958	20 959	0,32	108,9	0,00	97,43	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
22	22 754	22 755	-0,72	108,9	0,00	98,14	-	-	0,00	0,00	-
23	22 702	22 703	-0,77	108,9	0,00	98,12	-	-	0,00	0,00	-
24	19 950	19 951	0,93	108,9	0,00	97,00	-	-	0,00	0,00	-
25	22 180	22 181	-0,52	108,9	0,00	97,92	-	-	0,00	0,00	-
26	23 596	23 597	-1,24	108,9	0,00	98,46	-	-	0,00	0,00	-
27	23 193	23 195	-1,10	108,9	0,00	98,31	-	-	0,00	0,00	-
28	21 786	21 787	-0,21	108,9	0,00	97,76	-	-	0,00	0,00	-
29	21 271	21 272	0,19	108,9	0,00	97,56	-	-	0,00	0,00	-
3	16 441	16 443	3,32	108,9	0,00	95,32	-	-	0,00	0,00	-
30	19 031	19 032	1,55	108,9	0,00	96,59	-	-	0,00	0,00	-
31	21 364	21 366	-0,06	108,9	0,00	97,59	-	-	0,00	0,00	-
4	17 304	17 306	2,68	108,9	0,00	95,76	-	-	0,00	0,00	-
5	18 238	18 240	1,99	108,9	0,00	96,22	-	-	0,00	0,00	-
6	16 254	16 256	3,59	108,9	0,00	95,22	-	-	0,00	0,00	-
61	12 772	12 773	1,62	106,0	0,00	93,13	-	-	0,00	0,00	-
62	12 239	12 240	2,15	106,0	0,00	92,76	-	-	0,00	0,00	-
63	11 665	11 666	2,77	106,0	0,00	92,34	-	-	0,00	0,00	-
64	13 179	13 180	1,19	106,0	0,00	93,40	-	-	0,00	0,00	-
65	13 721	13 722	0,64	106,0	0,00	93,75	-	-	0,00	0,00	-
66	14 347	14 348	0,05	106,0	0,00	94,14	-	-	0,00	0,00	-
67	13 102	13 103	1,17	106,0	0,00	93,35	-	-	0,00	0,00	-
68	14 145	14 146	0,14	106,0	0,00	94,01	-	-	0,00	0,00	-
69	14 782	14 784	-0,40	106,0	0,00	94,40	-	-	0,00	0,00	-
7	16 705	16 706	3,35	108,9	0,00	95,46	-	-	0,00	0,00	-
70	13 353	13 354	0,86	106,0	0,00	93,51	-	-	0,00	0,00	-
71	12 299	12 300	1,93	106,0	0,00	92,80	-	-	0,00	0,00	-
72	11 492	11 494	2,86	106,0	0,00	92,21	-	-	0,00	0,00	-
73	11 335	11 336	2,96	106,0	0,00	92,09	-	-	0,00	0,00	-
74	12 453	12 454	1,69	106,0	0,00	92,91	-	-	0,00	0,00	-
75	12 030	12 032	2,11	106,0	0,00	92,61	-	-	0,00	0,00	-
76	9 491	9 493	4,98	106,0	0,00	90,55	-	-	0,00	0,00	-
77	8 943	8 945	5,70	106,0	0,00	90,03	-	-	0,00	0,00	-
78	7 863	7 865	7,25	106,0	0,00	88,91	-	-	0,00	0,00	-
79	7 154	7 156	8,38	106,0	0,00	88,09	-	-	0,00	0,00	-
8	17 156	17 158	2,88	108,9	0,00	95,69	-	-	0,00	0,00	-
80	6 641	6 643	9,27	106,0	0,00	87,45	-	-	0,00	0,00	-
81	7 253	7 255	8,22	106,0	0,00	88,21	-	-	0,00	0,00	-
82	8 276	8 279	6,63	106,0	0,00	89,36	-	-	0,00	0,00	-
83	9 734	9 735	5,10	106,0	0,00	90,77	-	-	0,00	0,00	-
84	10 304	10 306	4,39	106,0	0,00	91,26	-	-	0,00	0,00	-
85	10 629	10 630	3,96	106,0	0,00	91,53	-	-	0,00	0,00	-
86	11 009	11 010	3,47	106,0	0,00	91,84	-	-	0,00	0,00	-
87	9 156	9 158	5,79	106,0	0,00	90,24	-	-	0,00	0,00	-
88	9 660	9 662	5,10	106,0	0,00	90,70	-	-	0,00	0,00	-
89	10 254	10 256	4,35	106,0	0,00	91,22	-	-	0,00	0,00	-
9	19 214	19 215	1,35	108,9	0,00	96,67	-	-	0,00	0,00	-
90	10 340	10 341	4,11	106,0	0,00	91,29	-	-	0,00	0,00	-
91	10 830	10 831	3,49	106,0	0,00	91,69	-	-	0,00	0,00	-
92	9 643	9 645	5,03	106,0	0,00	90,69	-	-	0,00	0,00	-
93	8 925	8 927	6,00	106,0	0,00	90,01	-	-	0,00	0,00	-
94	8 265	8 267	6,96	106,0	0,00	89,35	-	-	0,00	0,00	-
95	8 101	8 103	7,07	106,0	0,00	89,17	-	-	0,00	0,00	-
96	7 521	7 523	8,03	106,0	0,00	88,53	-	-	0,00	0,00	-
97	8 648	8 650	6,21	106,0	0,00	89,74	-	-	0,00	0,00	-
98	9 454	9 456	5,03	106,0	0,00	90,51	-	-	0,00	0,00	-
99	8 636	8 638	6,12	106,0	0,00	89,73	-	-	0,00	0,00	-
T1	4 594	4 600	19,57	110,1	0,00	84,25	-	-	0,00	0,00	-
T10	3 787	3 794	22,14	110,1	0,00	82,58	-	-	0,00	0,00	-
T11	5 236	5 240	17,80	110,1	0,00	85,39	-	-	0,00	0,00	-
T12	2 497	2 506	27,46	110,1	0,00	78,98	-	-	0,00	0,00	-
T13	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T14	4 173	4 179	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T15	5 198	5 203	17,89	110,1	0,00	85,33	-	-	0,00	0,00	-
T16	2 032	2 044	29,96	110,1	0,00	77,21	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T17	3 622	3 629	22,73	110,1	0,00	82,19	-	-	0,00	0,00	-
T18	4 686	4 692	19,30	110,1	0,00	84,43	-	-	0,00	0,00	-
T19	2 097	2 108	29,58	110,1	0,00	77,48	-	-	0,00	0,00	-
T2	4 431	4 437	20,05	110,1	0,00	83,94	-	-	0,00	0,00	-
T20	3 066	3 074	24,88	110,1	0,00	80,75	-	-	0,00	0,00	-
T21	4 469	4 475	19,94	110,1	0,00	84,01	-	-	0,00	0,00	-
T22	2 986	2 994	25,22	110,1	0,00	80,52	-	-	0,00	0,00	-
T23	3 668	3 675	22,56	110,1	0,00	82,30	-	-	0,00	0,00	-
T24	5 099	5 104	18,16	110,1	0,00	85,16	-	-	0,00	0,00	-
T25	3 912	3 917	21,88	110,1	0,00	82,86	-	-	0,00	0,00	-
T26	4 304	4 310	20,45	110,1	0,00	83,69	-	-	0,00	0,00	-
T27	5 286	5 290	17,67	110,1	0,00	85,47	-	-	0,00	0,00	-
T28	4 677	4 682	19,80	110,1	0,00	84,41	-	-	0,00	0,00	-
T29	5 129	5 133	18,08	110,1	0,00	85,21	-	-	0,00	0,00	-
T3	3 465	3 472	23,31	110,1	0,00	81,81	-	-	0,00	0,00	-
T4	3 990	3 996	21,45	110,1	0,00	83,03	-	-	0,00	0,00	-
T5	2 614	2 623	26,89	110,1	0,00	79,38	-	-	0,00	0,00	-
T6	3 581	3 588	22,88	110,1	0,00	82,10	-	-	0,00	0,00	-
T7	4 606	4 611	19,54	110,1	0,00	84,28	-	-	0,00	0,00	-
T8	5 469	5 474	17,20	110,1	0,00	85,77	-	-	0,00	0,00	-
T9	2 335	2 344	28,29	110,1	0,00	78,40	-	-	0,00	0,00	-
Sum			38,54								

- Data undefined due to calculation with octave data

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Wind speed: 8,0 m/s

WTG

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]
1	15 832	15 834	3,71	108,9	0,00	94,99	-	-	0,00	0,00	-
10	18 417	18 418	1,80	108,9	0,00	96,30	-	-	0,00	0,00	-
100	9 361	9 363	5,15	106,0	0,00	90,43	-	-	0,00	0,00	-
101	6 868	6 870	8,87	106,0	0,00	87,74	-	-	0,00	0,00	-
102	7 737	7 739	7,44	106,0	0,00	88,77	-	-	0,00	0,00	-
11	18 096	18 098	2,02	108,9	0,00	96,15	-	-	0,00	0,00	-
12	18 134	18 135	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
13	19 114	19 115	1,33	108,9	0,00	96,63	-	-	0,00	0,00	-
14	21 126	21 128	0,04	108,9	0,00	97,50	-	-	0,00	0,00	-
15	18 982	18 983	1,42	108,9	0,00	96,57	-	-	0,00	0,00	-
16	19 935	19 936	0,80	108,9	0,00	96,99	-	-	0,00	0,00	-
17	19 931	19 933	0,79	108,9	0,00	96,99	-	-	0,00	0,00	-
18	20 757	20 759	0,30	108,9	0,00	97,34	-	-	0,00	0,00	-
19	21 002	21 004	0,12	108,9	0,00	97,45	-	-	0,00	0,00	-
2	16 539	16 541	3,16	108,9	0,00	95,37	-	-	0,00	0,00	-
20	22 455	22 456	-0,75	108,9	0,00	98,03	-	-	0,00	0,00	-
21	21 262	21 263	-0,04	108,9	0,00	97,55	-	-	0,00	0,00	-
22	23 063	23 064	-1,10	108,9	0,00	98,26	-	-	0,00	0,00	-
23	23 001	23 002	-1,06	108,9	0,00	98,24	-	-	0,00	0,00	-
24	20 251	20 253	0,59	108,9	0,00	97,13	-	-	0,00	0,00	-
25	22 470	22 471	-0,75	108,9	0,00	98,03	-	-	0,00	0,00	-
26	23 900	23 901	-1,56	108,9	0,00	98,57	-	-	0,00	0,00	-
27	23 486	23 487	-1,33	108,9	0,00	98,42	-	-	0,00	0,00	-
28	22 088	22 089	-0,53	108,9	0,00	97,88	-	-	0,00	0,00	-
29	21 582	21 584	-0,22	108,9	0,00	97,68	-	-	0,00	0,00	-
3	16 733	16 735	3,03	108,9	0,00	95,47	-	-	0,00	0,00	-
30	19 333	19 335	1,18	108,9	0,00	96,73	-	-	0,00	0,00	-
31	21 651	21 653	-0,27	108,9	0,00	97,71	-	-	0,00	0,00	-
4	17 594	17 596	2,39	108,9	0,00	95,91	-	-	0,00	0,00	-
5	18 527	18 528	1,73	108,9	0,00	96,36	-	-	0,00	0,00	-
6	16 559	16 560	3,15	108,9	0,00	95,38	-	-	0,00	0,00	-
61	13 080	13 082	1,09	106,0	0,00	93,33	-	-	0,00	0,00	-
62	12 549	12 550	1,59	106,0	0,00	92,97	-	-	0,00	0,00	-
63	11 978	11 979	2,16	106,0	0,00	92,57	-	-	0,00	0,00	-
64	13 484	13 485	0,72	106,0	0,00	93,60	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
65	14 019	14 020	0,25	106,0	0,00	93,94	-	-	0,00	0,00	-
66	14 639	14 640	-0,27	106,0	0,00	94,31	-	-	0,00	0,00	-
67	13 396	13 398	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
68	14 428	14 429	-0,10	106,0	0,00	94,18	-	-	0,00	0,00	-
69	15 065	15 066	-0,63	106,0	0,00	94,56	-	-	0,00	0,00	-
7	17 020	17 022	2,80	108,9	0,00	95,62	-	-	0,00	0,00	-
70	13 638	13 639	0,58	106,0	0,00	93,70	-	-	0,00	0,00	-
71	12 591	12 593	1,56	106,0	0,00	93,00	-	-	0,00	0,00	-
72	11 796	11 798	2,35	106,0	0,00	92,44	-	-	0,00	0,00	-
73	11 631	11 633	2,52	106,0	0,00	92,31	-	-	0,00	0,00	-
74	12 735	12 736	1,42	106,0	0,00	93,10	-	-	0,00	0,00	-
75	12 308	12 309	1,83	106,0	0,00	92,80	-	-	0,00	0,00	-
76	9 740	9 742	4,67	106,0	0,00	90,77	-	-	0,00	0,00	-
77	9 199	9 201	5,36	106,0	0,00	90,28	-	-	0,00	0,00	-
78	8 130	8 132	6,85	106,0	0,00	89,20	-	-	0,00	0,00	-
79	7 426	7 428	7,94	106,0	0,00	88,42	-	-	0,00	0,00	-
8	17 458	17 460	2,48	108,9	0,00	95,84	-	-	0,00	0,00	-
80	6 917	6 920	8,78	106,0	0,00	87,80	-	-	0,00	0,00	-
81	7 507	7 510	7,80	106,0	0,00	88,51	-	-	0,00	0,00	-
82	8 530	8 532	6,27	106,0	0,00	89,62	-	-	0,00	0,00	-
83	10 056	10 058	4,29	106,0	0,00	91,05	-	-	0,00	0,00	-
84	10 625	10 627	3,63	106,0	0,00	91,53	-	-	0,00	0,00	-
85	10 946	10 947	3,25	106,0	0,00	91,79	-	-	0,00	0,00	-
86	11 321	11 322	2,85	106,0	0,00	92,08	-	-	0,00	0,00	-
87	9 474	9 476	5,00	106,0	0,00	90,53	-	-	0,00	0,00	-
88	9 975	9 977	4,38	106,0	0,00	90,98	-	-	0,00	0,00	-
89	10 567	10 569	3,68	106,0	0,00	91,48	-	-	0,00	0,00	-
9	19 507	19 508	1,07	108,9	0,00	96,80	-	-	0,00	0,00	-
90	10 640	10 642	3,60	106,0	0,00	91,54	-	-	0,00	0,00	-
91	11 124	11 126	3,06	106,0	0,00	91,93	-	-	0,00	0,00	-
92	9 950	9 952	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
93	9 234	9 236	5,31	106,0	0,00	90,31	-	-	0,00	0,00	-
94	8 577	8 579	6,20	106,0	0,00	89,67	-	-	0,00	0,00	-
95	8 402	8 405	6,45	106,0	0,00	89,49	-	-	0,00	0,00	-
96	7 827	7 829	7,30	106,0	0,00	88,87	-	-	0,00	0,00	-
97	8 941	8 943	5,70	106,0	0,00	90,03	-	-	0,00	0,00	-
98	9 734	9 735	4,68	106,0	0,00	90,77	-	-	0,00	0,00	-
99	8 913	8 915	5,74	106,0	0,00	90,00	-	-	0,00	0,00	-
T1	4 300	4 306	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T10	3 720	3 726	22,38	110,1	0,00	82,43	-	-	0,00	0,00	-
T11	5 193	5 197	17,91	110,1	0,00	85,32	-	-	0,00	0,00	-
T12	2 460	2 469	27,65	110,1	0,00	78,85	-	-	0,00	0,00	-
T13	3 088	3 096	24,79	110,1	0,00	80,82	-	-	0,00	0,00	-
T14	4 192	4 198	20,80	110,1	0,00	83,46	-	-	0,00	0,00	-
T15	5 211	5 216	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T16	2 157	2 168	29,24	110,1	0,00	77,72	-	-	0,00	0,00	-
T17	3 717	3 724	22,39	110,1	0,00	82,42	-	-	0,00	0,00	-
T18	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T19	2 348	2 358	28,22	110,1	0,00	78,45	-	-	0,00	0,00	-
T2	4 172	4 178	20,86	110,1	0,00	83,42	-	-	0,00	0,00	-
T20	3 258	3 265	24,10	110,1	0,00	81,28	-	-	0,00	0,00	-
T21	4 615	4 621	19,51	110,1	0,00	84,29	-	-	0,00	0,00	-
T22	3 268	3 276	24,06	110,1	0,00	81,31	-	-	0,00	0,00	-
T23	3 898	3 904	21,76	110,1	0,00	82,83	-	-	0,00	0,00	-
T24	5 268	5 273	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T25	4 212	4 217	20,74	110,1	0,00	83,50	-	-	0,00	0,00	-
T26	4 559	4 564	19,68	110,1	0,00	84,19	-	-	0,00	0,00	-
T27	5 499	5 503	17,13	110,1	0,00	85,81	-	-	0,00	0,00	-
T28	4 999	5 003	18,43	110,1	0,00	84,99	-	-	0,00	0,00	-
T29	5 405	5 409	17,36	110,1	0,00	85,66	-	-	0,00	0,00	-
T3	3 209	3 216	24,30	110,1	0,00	81,15	-	-	0,00	0,00	-
T4	3 792	3 798	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
T5	2 378	2 387	28,06	110,1	0,00	78,56	-	-	0,00	0,00	-
T6	3 448	3 455	23,37	110,1	0,00	81,77	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
T7	4 482	4 487	19,90	110,1	0,00	84,04	-	-	0,00	0,00	-
T8	5 374	5 378	17,44	110,1	0,00	85,61	-	-	0,00	0,00	-
T9	2 185	2 195	29,09	110,1	0,00	77,83	-	-	0,00	0,00	-
Sum			38,39								

- Data undefined due to calculation with octave data

Noise sensitive area: E Asuinrakennus E (Alanko)

Wind speed: 8,0 m/s

WTG

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]
1	16 100	16 102	3,50	108,9	0,00	95,14	-	-	0,00	0,00	-
10	18 710	18 712	1,60	108,9	0,00	96,44	-	-	0,00	0,00	-
100	9 626	9 628	4,81	106,0	0,00	90,67	-	-	0,00	0,00	-
101	7 160	7 162	8,37	106,0	0,00	88,10	-	-	0,00	0,00	-
102	8 023	8 025	7,01	106,0	0,00	89,09	-	-	0,00	0,00	-
11	18 406	18 407	1,81	108,9	0,00	96,30	-	-	0,00	0,00	-
12	18 455	18 457	1,78	108,9	0,00	96,32	-	-	0,00	0,00	-
13	19 424	19 425	1,12	108,9	0,00	96,77	-	-	0,00	0,00	-
14	21 413	21 414	-0,12	108,9	0,00	97,61	-	-	0,00	0,00	-
15	19 301	19 303	1,21	108,9	0,00	96,71	-	-	0,00	0,00	-
16	20 250	20 252	0,59	108,9	0,00	97,13	-	-	0,00	0,00	-
17	20 239	20 240	0,60	108,9	0,00	97,12	-	-	0,00	0,00	-
18	21 062	21 063	0,11	108,9	0,00	97,47	-	-	0,00	0,00	-
19	21 318	21 319	-0,07	108,9	0,00	97,58	-	-	0,00	0,00	-
2	16 796	16 798	2,97	108,9	0,00	95,51	-	-	0,00	0,00	-
20	22 763	22 764	-0,93	108,9	0,00	98,14	-	-	0,00	0,00	-
21	21 560	21 561	-0,22	108,9	0,00	97,67	-	-	0,00	0,00	-
22	23 365	23 366	-1,27	108,9	0,00	98,37	-	-	0,00	0,00	-
23	23 293	23 294	-1,23	108,9	0,00	98,34	-	-	0,00	0,00	-
24	20 546	20 547	0,40	108,9	0,00	97,26	-	-	0,00	0,00	-
25	22 751	22 753	-0,92	108,9	0,00	98,14	-	-	0,00	0,00	-
26	24 197	24 198	-1,73	108,9	0,00	98,68	-	-	0,00	0,00	-
27	23 770	23 771	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
28	22 383	22 384	-0,71	108,9	0,00	98,00	-	-	0,00	0,00	-
29	21 888	21 889	-0,40	108,9	0,00	97,80	-	-	0,00	0,00	-
3	17 016	17 018	2,81	108,9	0,00	95,62	-	-	0,00	0,00	-
30	19 629	19 630	0,99	108,9	0,00	96,86	-	-	0,00	0,00	-
31	21 930	21 931	-0,44	108,9	0,00	97,82	-	-	0,00	0,00	-
4	17 876	17 878	2,18	108,9	0,00	96,05	-	-	0,00	0,00	-
5	18 807	18 809	1,53	108,9	0,00	96,49	-	-	0,00	0,00	-
6	16 857	16 858	2,92	108,9	0,00	95,54	-	-	0,00	0,00	-
61	13 384	13 385	0,81	106,0	0,00	93,53	-	-	0,00	0,00	-
62	12 853	12 854	1,30	106,0	0,00	93,18	-	-	0,00	0,00	-
63	12 286	12 287	1,85	106,0	0,00	92,79	-	-	0,00	0,00	-
64	13 782	13 783	0,45	106,0	0,00	93,79	-	-	0,00	0,00	-
65	14 310	14 311	0,00	106,0	0,00	94,11	-	-	0,00	0,00	-
66	14 923	14 925	-0,50	106,0	0,00	94,48	-	-	0,00	0,00	-
67	13 684	13 685	0,54	106,0	0,00	93,72	-	-	0,00	0,00	-
68	14 703	14 704	-0,33	106,0	0,00	94,35	-	-	0,00	0,00	-
69	15 338	15 340	-0,85	106,0	0,00	94,72	-	-	0,00	0,00	-
7	17 330	17 331	2,57	108,9	0,00	95,78	-	-	0,00	0,00	-
70	13 916	13 917	0,34	106,0	0,00	93,87	-	-	0,00	0,00	-
71	12 877	12 878	1,31	106,0	0,00	93,20	-	-	0,00	0,00	-
72	12 095	12 096	2,04	106,0	0,00	92,65	-	-	0,00	0,00	-
73	11 921	11 923	2,22	106,0	0,00	92,53	-	-	0,00	0,00	-
74	13 009	13 010	1,16	106,0	0,00	93,29	-	-	0,00	0,00	-
75	12 578	12 579	1,57	106,0	0,00	92,99	-	-	0,00	0,00	-
76	9 980	9 982	4,37	106,0	0,00	90,98	-	-	0,00	0,00	-
77	9 447	9 449	5,04	106,0	0,00	90,51	-	-	0,00	0,00	-
78	8 391	8 393	6,47	106,0	0,00	89,48	-	-	0,00	0,00	-
79	7 691	7 694	7,51	106,0	0,00	88,72	-	-	0,00	0,00	-
8	17 754	17 755	2,27	108,9	0,00	95,99	-	-	0,00	0,00	-
80	7 188	7 191	8,32	106,0	0,00	88,14	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
81	7 755	7 758	7,42	106,0	0,00	88,79	-	-	0,00	0,00	-
82	8 776	8 778	5,93	106,0	0,00	89,87	-	-	0,00	0,00	-
83	10 375	10 377	3,91	106,0	0,00	91,32	-	-	0,00	0,00	-
84	10 942	10 944	3,27	106,0	0,00	91,78	-	-	0,00	0,00	-
85	11 259	11 260	2,91	106,0	0,00	92,03	-	-	0,00	0,00	-
86	11 627	11 629	2,52	106,0	0,00	92,31	-	-	0,00	0,00	-
87	9 788	9 790	4,61	106,0	0,00	90,82	-	-	0,00	0,00	-
88	10 286	10 288	4,01	106,0	0,00	91,25	-	-	0,00	0,00	-
89	10 875	10 876	3,33	106,0	0,00	91,73	-	-	0,00	0,00	-
9	19 792	19 794	0,89	108,9	0,00	96,93	-	-	0,00	0,00	-
90	10 935	10 937	3,27	106,0	0,00	91,78	-	-	0,00	0,00	-
91	11 412	11 414	2,75	106,0	0,00	92,15	-	-	0,00	0,00	-
92	10 252	10 253	4,05	106,0	0,00	91,22	-	-	0,00	0,00	-
93	9 538	9 540	4,92	106,0	0,00	90,59	-	-	0,00	0,00	-
94	8 885	8 887	5,78	106,0	0,00	89,97	-	-	0,00	0,00	-
95	8 698	8 700	6,03	106,0	0,00	89,79	-	-	0,00	0,00	-
96	8 128	8 130	6,85	106,0	0,00	89,20	-	-	0,00	0,00	-
97	9 228	9 230	5,32	106,0	0,00	90,30	-	-	0,00	0,00	-
98	10 006	10 008	4,34	106,0	0,00	91,01	-	-	0,00	0,00	-
99	9 184	9 186	5,38	106,0	0,00	90,26	-	-	0,00	0,00	-
T1	3 999	4 006	21,42	110,1	0,00	83,05	-	-	0,00	0,00	-
T10	3 660	3 666	22,60	110,1	0,00	82,28	-	-	0,00	0,00	-
T11	5 149	5 153	18,03	110,1	0,00	85,24	-	-	0,00	0,00	-
T12	2 446	2 455	27,72	110,1	0,00	78,80	-	-	0,00	0,00	-
T13	3 142	3 149	24,57	110,1	0,00	80,96	-	-	0,00	0,00	-
T14	4 216	4 221	20,72	110,1	0,00	83,51	-	-	0,00	0,00	-
T15	5 224	5 228	17,83	110,1	0,00	85,37	-	-	0,00	0,00	-
T16	2 307	2 317	28,43	110,1	0,00	78,30	-	-	0,00	0,00	-
T17	3 820	3 826	22,03	110,1	0,00	82,66	-	-	0,00	0,00	-
T18	4 841	4 846	18,86	110,1	0,00	84,71	-	-	0,00	0,00	-
T19	2 607	2 616	26,93	110,1	0,00	79,35	-	-	0,00	0,00	-
T2	3 906	3 913	21,73	110,1	0,00	82,85	-	-	0,00	0,00	-
T20	3 456	3 463	23,34	110,1	0,00	81,79	-	-	0,00	0,00	-
T21	4 763	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T22	3 551	3 558	22,99	110,1	0,00	82,02	-	-	0,00	0,00	-
T23	4 128	4 134	21,00	110,1	0,00	83,33	-	-	0,00	0,00	-
T24	5 435	5 439	17,29	110,1	0,00	85,71	-	-	0,00	0,00	-
T25	4 509	4 514	19,82	110,1	0,00	84,09	-	-	0,00	0,00	-
T26	4 811	4 816	18,95	110,1	0,00	84,65	-	-	0,00	0,00	-
T27	5 709	5 713	16,61	110,1	0,00	86,14	-	-	0,00	0,00	-
T28	5 318	5 322	17,58	110,1	0,00	85,52	-	-	0,00	0,00	-
T29	5 677	5 680	16,69	110,1	0,00	86,09	-	-	0,00	0,00	-
T3	2 950	2 958	25,37	110,1	0,00	80,42	-	-	0,00	0,00	-
T4	3 593	3 599	22,84	110,1	0,00	82,12	-	-	0,00	0,00	-
T5	2 149	2 159	29,29	110,1	0,00	77,68	-	-	0,00	0,00	-
T6	3 322	3 329	23,85	110,1	0,00	81,45	-	-	0,00	0,00	-
T7	4 358	4 363	20,28	110,1	0,00	83,80	-	-	0,00	0,00	-
T8	5 275	5 280	17,69	110,1	0,00	85,45	-	-	0,00	0,00	-
T9	2 057	2 068	29,82	110,1	0,00	77,31	-	-	0,00	0,00	-
Sum			38,40								

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus F (Joensuu)

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]
1	16 350	16 352	3,31	108,9	0,00	95,27	-	-	0,00	0,00	-
10	18 968	18 969	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
100	9 875	9 877	4,50	106,0	0,00	90,89	-	-	0,00	0,00	-
101	7 417	7 420	7,95	106,0	0,00	88,41	-	-	0,00	0,00	-
102	8 279	8 281	6,63	106,0	0,00	89,36	-	-	0,00	0,00	-
11	18 666	18 668	1,63	108,9	0,00	96,42	-	-	0,00	0,00	-
12	18 716	18 718	1,60	108,9	0,00	96,45	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
13	19 684	19 686	0,95	108,9	0,00	96,88	-	-	0,00	0,00	-
14	21 669	21 670	-0,27	108,9	0,00	97,72	-	-	0,00	0,00	-
15	19 562	19 564	1,04	108,9	0,00	96,83	-	-	0,00	0,00	-
16	20 512	20 513	0,43	108,9	0,00	97,24	-	-	0,00	0,00	-
17	20 499	20 500	0,43	108,9	0,00	97,24	-	-	0,00	0,00	-
18	21 322	21 323	-0,05	108,9	0,00	97,58	-	-	0,00	0,00	-
19	21 579	21 580	-0,23	108,9	0,00	97,68	-	-	0,00	0,00	-
2	17 041	17 043	2,78	108,9	0,00	95,63	-	-	0,00	0,00	-
20	23 023	23 024	-1,07	108,9	0,00	98,24	-	-	0,00	0,00	-
21	21 818	21 819	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
22	23 625	23 626	-1,41	108,9	0,00	98,47	-	-	0,00	0,00	-
23	23 550	23 551	-1,37	108,9	0,00	98,44	-	-	0,00	0,00	-
24	20 804	20 805	0,24	108,9	0,00	97,36	-	-	0,00	0,00	-
25	23 006	23 007	-1,06	108,9	0,00	98,24	-	-	0,00	0,00	-
26	24 455	24 456	-1,86	108,9	0,00	98,77	-	-	0,00	0,00	-
27	24 025	24 026	-1,63	108,9	0,00	98,61	-	-	0,00	0,00	-
28	22 641	22 642	-0,86	108,9	0,00	98,10	-	-	0,00	0,00	-
29	22 148	22 149	-0,56	108,9	0,00	97,91	-	-	0,00	0,00	-
3	17 271	17 273	2,62	108,9	0,00	95,75	-	-	0,00	0,00	-
30	19 887	19 888	0,82	108,9	0,00	96,97	-	-	0,00	0,00	-
31	22 183	22 184	-0,59	108,9	0,00	97,92	-	-	0,00	0,00	-
4	18 130	18 132	2,00	108,9	0,00	96,17	-	-	0,00	0,00	-
5	19 061	19 063	1,36	108,9	0,00	96,60	-	-	0,00	0,00	-
6	17 115	17 117	2,73	108,9	0,00	95,67	-	-	0,00	0,00	-
61	13 643	13 644	0,58	106,0	0,00	93,70	-	-	0,00	0,00	-
62	13 113	13 114	1,06	106,0	0,00	93,35	-	-	0,00	0,00	-
63	12 546	12 547	1,60	106,0	0,00	92,97	-	-	0,00	0,00	-
64	14 041	14 042	0,23	106,0	0,00	93,95	-	-	0,00	0,00	-
65	14 567	14 568	-0,22	106,0	0,00	94,27	-	-	0,00	0,00	-
66	15 179	15 180	-0,71	106,0	0,00	94,63	-	-	0,00	0,00	-
67	13 940	13 941	0,32	106,0	0,00	93,89	-	-	0,00	0,00	-
68	14 955	14 957	-0,54	106,0	0,00	94,50	-	-	0,00	0,00	-
69	15 590	15 592	-1,05	106,0	0,00	94,86	-	-	0,00	0,00	-
7	17 591	17 592	2,38	108,9	0,00	95,91	-	-	0,00	0,00	-
70	14 169	14 170	0,12	106,0	0,00	94,03	-	-	0,00	0,00	-
71	13 132	13 134	1,06	106,0	0,00	93,37	-	-	0,00	0,00	-
72	12 353	12 355	1,79	106,0	0,00	92,84	-	-	0,00	0,00	-
73	12 178	12 179	1,96	106,0	0,00	92,71	-	-	0,00	0,00	-
74	13 261	13 262	0,92	106,0	0,00	93,45	-	-	0,00	0,00	-
75	12 828	12 830	1,33	106,0	0,00	93,16	-	-	0,00	0,00	-
76	10 220	10 222	4,09	106,0	0,00	91,19	-	-	0,00	0,00	-
77	9 690	9 691	4,73	106,0	0,00	90,73	-	-	0,00	0,00	-
78	8 638	8 640	6,12	106,0	0,00	89,73	-	-	0,00	0,00	-
79	7 941	7 943	7,13	106,0	0,00	89,00	-	-	0,00	0,00	-
8	18 012	18 013	2,08	108,9	0,00	96,11	-	-	0,00	0,00	-
80	7 440	7 442	7,91	106,0	0,00	88,43	-	-	0,00	0,00	-
81	7 999	8 001	7,04	106,0	0,00	89,06	-	-	0,00	0,00	-
82	9 018	9 020	5,60	106,0	0,00	90,10	-	-	0,00	0,00	-
83	10 636	10 638	3,61	106,0	0,00	91,54	-	-	0,00	0,00	-
84	11 203	11 205	2,99	106,0	0,00	91,99	-	-	0,00	0,00	-
85	11 520	11 521	2,63	106,0	0,00	92,23	-	-	0,00	0,00	-
86	11 888	11 889	2,25	106,0	0,00	92,50	-	-	0,00	0,00	-
87	10 049	10 051	4,29	106,0	0,00	91,04	-	-	0,00	0,00	-
88	10 547	10 548	3,70	106,0	0,00	91,46	-	-	0,00	0,00	-
89	11 135	11 137	3,05	106,0	0,00	91,94	-	-	0,00	0,00	-
9	20 047	20 049	0,73	108,9	0,00	97,04	-	-	0,00	0,00	-
90	11 193	11 195	2,98	106,0	0,00	91,98	-	-	0,00	0,00	-
91	11 669	11 670	2,48	106,0	0,00	92,34	-	-	0,00	0,00	-
92	10 511	10 513	3,74	106,0	0,00	91,43	-	-	0,00	0,00	-
93	9 798	9 800	4,60	106,0	0,00	90,82	-	-	0,00	0,00	-
94	9 145	9 147	5,43	106,0	0,00	90,23	-	-	0,00	0,00	-
95	8 957	8 959	5,68	106,0	0,00	90,04	-	-	0,00	0,00	-
96	8 388	8 390	6,47	106,0	0,00	89,48	-	-	0,00	0,00	-
97	9 484	9 486	4,99	106,0	0,00	90,54	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
98	10 258	10 260	4,04	106,0	0,00	91,22	-	-	0,00	0,00	-
99	9 436	9 437	5,05	106,0	0,00	90,50	-	-	0,00	0,00	-
T1	3 835	3 841	21,98	110,1	0,00	82,69	-	-	0,00	0,00	-
T10	3 727	3 733	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T11	5 222	5 227	17,83	110,1	0,00	85,36	-	-	0,00	0,00	-
T12	2 557	2 565	27,17	110,1	0,00	79,18	-	-	0,00	0,00	-
T13	3 291	3 297	23,98	110,1	0,00	81,36	-	-	0,00	0,00	-
T14	4 340	4 345	20,34	110,1	0,00	83,76	-	-	0,00	0,00	-
T15	5 338	5 342	17,53	110,1	0,00	85,55	-	-	0,00	0,00	-
T16	2 514	2 523	27,38	110,1	0,00	79,04	-	-	0,00	0,00	-
T17	3 995	4 001	21,44	110,1	0,00	83,04	-	-	0,00	0,00	-
T18	4 998	5 003	18,43	110,1	0,00	84,98	-	-	0,00	0,00	-
T19	2 857	2 865	25,78	110,1	0,00	80,14	-	-	0,00	0,00	-
T2	3 786	3 793	22,15	110,1	0,00	82,58	-	-	0,00	0,00	-
T20	3 682	3 688	22,52	110,1	0,00	82,34	-	-	0,00	0,00	-
T21	4 960	4 965	18,53	110,1	0,00	84,92	-	-	0,00	0,00	-
T22	3 807	3 813	22,08	110,1	0,00	82,63	-	-	0,00	0,00	-
T23	4 366	4 372	20,25	110,1	0,00	83,81	-	-	0,00	0,00	-
T24	5 642	5 646	16,77	110,1	0,00	86,03	-	-	0,00	0,00	-
T25	4 768	4 773	19,07	110,1	0,00	84,58	-	-	0,00	0,00	-
T26	5 057	5 061	18,27	110,1	0,00	85,09	-	-	0,00	0,00	-
T27	5 936	5 940	16,07	110,1	0,00	86,48	-	-	0,00	0,00	-
T28	5 579	5 583	16,93	110,1	0,00	85,94	-	-	0,00	0,00	-
T29	5 929	5 933	16,09	110,1	0,00	86,46	-	-	0,00	0,00	-
T3	2 843	2 851	25,84	110,1	0,00	80,10	-	-	0,00	0,00	-
T4	3 543	3 550	23,02	110,1	0,00	82,00	-	-	0,00	0,00	-
T5	2 081	2 091	29,68	110,1	0,00	77,41	-	-	0,00	0,00	-
T6	3 339	3 345	23,79	110,1	0,00	81,49	-	-	0,00	0,00	-
T7	4 371	4 376	20,24	110,1	0,00	83,82	-	-	0,00	0,00	-
T8	5 307	5 312	17,61	110,1	0,00	85,50	-	-	0,00	0,00	-
T9	2 087	2 097	29,65	110,1	0,00	77,43	-	-	0,00	0,00	-
Sum			38,09								

- Data undefined due to calculation with octave data

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Wind speed: 8,0 m/s

WTG

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]
1	18 351	18 352	1,85	108,9	0,00	96,27	-	-	0,00	0,00	-
10	21 130	21 131	0,05	108,9	0,00	97,50	-	-	0,00	0,00	-
100	11 904	11 905	2,25	106,0	0,00	92,51	-	-	0,00	0,00	-
101	9 634	9 636	4,84	106,0	0,00	90,68	-	-	0,00	0,00	-
102	10 449	10 450	3,85	106,0	0,00	91,38	-	-	0,00	0,00	-
11	20 940	20 941	0,17	108,9	0,00	97,42	-	-	0,00	0,00	-
12	21 074	21 075	0,09	108,9	0,00	97,48	-	-	0,00	0,00	-
13	21 958	21 959	-0,45	108,9	0,00	97,83	-	-	0,00	0,00	-
14	23 776	23 777	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
15	21 901	21 902	-0,41	108,9	0,00	97,81	-	-	0,00	0,00	-
16	22 827	22 828	-0,95	108,9	0,00	98,17	-	-	0,00	0,00	-
17	22 753	22 754	-0,91	108,9	0,00	98,14	-	-	0,00	0,00	-
18	23 558	23 559	-1,35	108,9	0,00	98,44	-	-	0,00	0,00	-
19	23 891	23 892	-1,55	108,9	0,00	98,57	-	-	0,00	0,00	-
2	18 961	18 963	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
20	25 280	25 281	-2,30	108,9	0,00	99,06	-	-	0,00	0,00	-
21	24 002	24 003	-1,61	108,9	0,00	98,61	-	-	0,00	0,00	-
22	25 839	25 840	-2,59	108,9	0,00	99,25	-	-	0,00	0,00	-
23	25 691	25 692	-2,51	108,9	0,00	99,20	-	-	0,00	0,00	-
24	22 971	22 972	-1,04	108,9	0,00	98,22	-	-	0,00	0,00	-
25	25 075	25 076	-2,19	108,9	0,00	98,99	-	-	0,00	0,00	-
26	26 631	26 632	-2,99	108,9	0,00	99,51	-	-	0,00	0,00	-
27	26 109	26 110	-2,73	108,9	0,00	99,34	-	-	0,00	0,00	-
28	24 806	24 807	-2,05	108,9	0,00	98,89	-	-	0,00	0,00	-
29	24 387	24 388	-1,80	108,9	0,00	98,74	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
3	19 371	19 373	1,16	108,9	0,00	96,74	-	-	0,00	0,00	-
30	22 062	22 063	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
31	24 231	24 232	-1,74	108,9	0,00	98,69	-	-	0,00	0,00	-
4	20 215	20 217	0,62	108,9	0,00	97,11	-	-	0,00	0,00	-
5	21 132	21 134	0,04	108,9	0,00	97,50	-	-	0,00	0,00	-
6	19 313	19 315	1,22	108,9	0,00	96,72	-	-	0,00	0,00	-
61	15 885	15 886	-1,26	106,0	0,00	95,02	-	-	0,00	0,00	-
62	15 365	15 366	-0,86	106,0	0,00	94,73	-	-	0,00	0,00	-
63	14 822	14 823	-0,41	106,0	0,00	94,42	-	-	0,00	0,00	-
64	16 250	16 251	-1,54	106,0	0,00	95,22	-	-	0,00	0,00	-
65	16 728	16 729	-1,90	106,0	0,00	95,47	-	-	0,00	0,00	-
66	17 293	17 294	-2,31	106,0	0,00	95,76	-	-	0,00	0,00	-
67	16 076	16 078	-1,41	106,0	0,00	95,12	-	-	0,00	0,00	-
68	17 007	17 008	-2,11	106,0	0,00	95,61	-	-	0,00	0,00	-
69	17 631	17 632	-2,55	106,0	0,00	95,93	-	-	0,00	0,00	-
7	19 869	19 870	0,85	108,9	0,00	96,96	-	-	0,00	0,00	-
70	16 242	16 243	-1,54	106,0	0,00	95,21	-	-	0,00	0,00	-
71	15 261	15 263	-0,78	106,0	0,00	94,67	-	-	0,00	0,00	-
72	14 569	14 570	-0,21	106,0	0,00	94,27	-	-	0,00	0,00	-
73	14 343	14 344	-0,01	106,0	0,00	94,13	-	-	0,00	0,00	-
74	15 316	15 317	-0,83	106,0	0,00	94,70	-	-	0,00	0,00	-
75	14 860	14 861	-0,46	106,0	0,00	94,44	-	-	0,00	0,00	-
76	12 094	12 096	2,05	106,0	0,00	92,65	-	-	0,00	0,00	-
77	11 617	11 619	2,54	106,0	0,00	92,30	-	-	0,00	0,00	-
78	10 656	10 658	3,59	106,0	0,00	91,55	-	-	0,00	0,00	-
79	10 001	10 003	4,37	106,0	0,00	91,00	-	-	0,00	0,00	-
8	20 190	20 191	0,64	108,9	0,00	97,10	-	-	0,00	0,00	-
80	9 539	9 540	4,95	106,0	0,00	90,59	-	-	0,00	0,00	-
81	9 956	9 958	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
82	10 944	10 946	3,26	106,0	0,00	91,78	-	-	0,00	0,00	-
83	12 990	12 991	1,21	106,0	0,00	93,27	-	-	0,00	0,00	-
84	13 544	13 545	0,69	106,0	0,00	93,64	-	-	0,00	0,00	-
85	13 834	13 835	0,43	106,0	0,00	93,82	-	-	0,00	0,00	-
86	14 159	14 160	0,15	106,0	0,00	94,02	-	-	0,00	0,00	-
87	12 373	12 375	1,79	106,0	0,00	92,85	-	-	0,00	0,00	-
88	12 850	12 851	1,33	106,0	0,00	93,18	-	-	0,00	0,00	-
89	13 417	13 418	0,80	106,0	0,00	93,55	-	-	0,00	0,00	-
9	22 149	22 150	-0,56	108,9	0,00	97,91	-	-	0,00	0,00	-
90	13 393	13 394	0,82	106,0	0,00	93,54	-	-	0,00	0,00	-
91	13 822	13 824	0,43	106,0	0,00	93,81	-	-	0,00	0,00	-
92	12 757	12 759	1,42	106,0	0,00	93,12	-	-	0,00	0,00	-
93	12 065	12 067	2,10	106,0	0,00	92,63	-	-	0,00	0,00	-
94	11 438	11 439	2,75	106,0	0,00	92,17	-	-	0,00	0,00	-
95	11 180	11 182	3,02	106,0	0,00	91,97	-	-	0,00	0,00	-
96	10 648	10 650	3,62	106,0	0,00	91,55	-	-	0,00	0,00	-
97	11 649	11 651	2,54	106,0	0,00	92,33	-	-	0,00	0,00	-
98	12 329	12 330	1,82	106,0	0,00	92,82	-	-	0,00	0,00	-
99	11 505	11 506	2,67	106,0	0,00	92,22	-	-	0,00	0,00	-
T1	2 060	2 071	29,79	110,1	0,00	77,33	-	-	0,00	0,00	-
T10	4 264	4 269	20,57	110,1	0,00	83,61	-	-	0,00	0,00	-
T11	5 583	5 587	16,92	110,1	0,00	85,94	-	-	0,00	0,00	-
T12	3 725	3 731	22,36	110,1	0,00	82,44	-	-	0,00	0,00	-
T13	4 582	4 586	19,61	110,1	0,00	84,23	-	-	0,00	0,00	-
T14	5 269	5 274	17,71	110,1	0,00	85,44	-	-	0,00	0,00	-
T15	6 057	6 061	15,79	110,1	0,00	86,65	-	-	0,00	0,00	-
T16	4 379	4 384	20,25	110,1	0,00	83,84	-	-	0,00	0,00	-
T17	5 410	5 414	17,35	110,1	0,00	85,67	-	-	0,00	0,00	-
T18	6 152	6 157	15,58	110,1	0,00	86,79	-	-	0,00	0,00	-
T19	5 065	5 069	18,30	110,1	0,00	85,10	-	-	0,00	0,00	-
T2	2 521	2 531	27,34	110,1	0,00	79,07	-	-	0,00	0,00	-
T20	5 581	5 585	16,94	110,1	0,00	85,94	-	-	0,00	0,00	-
T21	6 500	6 504	14,81	110,1	0,00	87,26	-	-	0,00	0,00	-
T22	6 055	6 059	15,84	110,1	0,00	86,65	-	-	0,00	0,00	-
T23	6 358	6 361	15,14	110,1	0,00	87,07	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T24	7 236	7 239	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T25	7 055	7 058	13,88	110,1	0,00	87,97	-	-	0,00	0,00	-
T26	7 119	7 122	13,75	110,1	0,00	88,05	-	-	0,00	0,00	-
T27	7 745	7 748	12,69	110,1	0,00	88,78	-	-	0,00	0,00	-
T28	7 962	7 964	12,41	110,1	0,00	89,02	-	-	0,00	0,00	-
T29	8 064	8 066	12,23	110,1	0,00	89,13	-	-	0,00	0,00	-
T3	2 071	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T4	3 074	3 081	24,85	110,1	0,00	80,77	-	-	0,00	0,00	-
T5	2 163	2 173	29,21	110,1	0,00	77,74	-	-	0,00	0,00	-
T6	3 538	3 545	23,04	110,1	0,00	81,99	-	-	0,00	0,00	-
T7	4 299	4 304	20,46	110,1	0,00	83,68	-	-	0,00	0,00	-
T8	5 266	5 270	17,72	110,1	0,00	85,44	-	-	0,00	0,00	-
T9	2 879	2 887	25,69	110,1	0,00	80,21	-	-	0,00	0,00	-
Sum			37,38								

- Data undefined due to calculation with octave data

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Wind speed: 8,0 m/s

WTG

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]
1	19 383	19 385	1,15	108,9	0,00	96,75	-	-	0,00	0,00	-
10	22 204	22 205	-0,60	108,9	0,00	97,93	-	-	0,00	0,00	-
100	12 958	12 959	1,20	106,0	0,00	93,25	-	-	0,00	0,00	-
101	10 736	10 738	3,49	106,0	0,00	91,62	-	-	0,00	0,00	-
102	11 539	11 540	2,61	106,0	0,00	92,24	-	-	0,00	0,00	-
11	22 042	22 043	-0,51	108,9	0,00	97,87	-	-	0,00	0,00	-
12	22 195	22 197	-0,59	108,9	0,00	97,93	-	-	0,00	0,00	-
13	23 061	23 062	-1,10	108,9	0,00	98,26	-	-	0,00	0,00	-
14	24 834	24 835	-2,07	108,9	0,00	98,90	-	-	0,00	0,00	-
15	23 018	23 020	-1,07	108,9	0,00	98,24	-	-	0,00	0,00	-
16	23 939	23 940	-1,58	108,9	0,00	98,58	-	-	0,00	0,00	-
17	23 851	23 852	-1,54	108,9	0,00	98,55	-	-	0,00	0,00	-
18	24 650	24 651	-1,95	108,9	0,00	98,84	-	-	0,00	0,00	-
19	25 002	25 003	-2,16	108,9	0,00	98,96	-	-	0,00	0,00	-
2	19 969	19 971	0,77	108,9	0,00	97,01	-	-	0,00	0,00	-
20	26 378	26 379	-2,87	108,9	0,00	99,43	-	-	0,00	0,00	-
21	25 081	25 082	-2,20	108,9	0,00	98,99	-	-	0,00	0,00	-
22	26 925	26 926	-3,14	108,9	0,00	99,60	-	-	0,00	0,00	-
23	26 757	26 758	-3,06	108,9	0,00	99,55	-	-	0,00	0,00	-
24	24 046	24 047	-1,64	108,9	0,00	98,62	-	-	0,00	0,00	-
25	26 122	26 123	-2,74	108,9	0,00	99,34	-	-	0,00	0,00	-
26	27 707	27 708	-3,52	108,9	0,00	99,85	-	-	0,00	0,00	-
27	27 159	27 160	-3,26	108,9	0,00	99,68	-	-	0,00	0,00	-
28	25 880	25 881	-2,61	108,9	0,00	99,26	-	-	0,00	0,00	-
29	25 480	25 481	-2,39	108,9	0,00	99,12	-	-	0,00	0,00	-
3	20 431	20 432	0,47	108,9	0,00	97,21	-	-	0,00	0,00	-
30	23 140	23 141	-1,14	108,9	0,00	98,29	-	-	0,00	0,00	-
31	25 272	25 273	-2,30	108,9	0,00	99,05	-	-	0,00	0,00	-
4	21 270	21 271	-0,04	108,9	0,00	97,56	-	-	0,00	0,00	-
5	22 182	22 183	-0,59	108,9	0,00	97,92	-	-	0,00	0,00	-
6	20 399	20 400	0,50	108,9	0,00	97,19	-	-	0,00	0,00	-
61	16 984	16 985	-2,10	106,0	0,00	95,60	-	-	0,00	0,00	-
62	16 466	16 467	-1,72	106,0	0,00	95,33	-	-	0,00	0,00	-
63	15 929	15 930	-1,31	106,0	0,00	95,04	-	-	0,00	0,00	-
64	17 340	17 341	-2,35	106,0	0,00	95,78	-	-	0,00	0,00	-
65	17 806	17 807	-2,68	106,0	0,00	96,01	-	-	0,00	0,00	-
66	18 359	18 360	-3,06	106,0	0,00	96,28	-	-	0,00	0,00	-
67	17 149	17 150	-2,22	106,0	0,00	95,69	-	-	0,00	0,00	-
68	18 056	18 057	-2,85	106,0	0,00	96,13	-	-	0,00	0,00	-
69	18 677	18 678	-3,27	106,0	0,00	96,43	-	-	0,00	0,00	-
7	20 974	20 975	0,14	108,9	0,00	97,43	-	-	0,00	0,00	-
70	17 298	17 299	-2,32	106,0	0,00	95,76	-	-	0,00	0,00	-
71	16 334	16 334	-1,62	106,0	0,00	95,26	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

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]
72	15 663	15 664	-1,11	106,0	0,00	94,90	-	-	0,00	0,00	-
73	15 425	15 426	-0,92	106,0	0,00	94,76	-	-	0,00	0,00	-
74	16 368	16 369	-1,65	106,0	0,00	95,28	-	-	0,00	0,00	-
75	15 907	15 908	-1,30	106,0	0,00	95,03	-	-	0,00	0,00	-
76	13 107	13 108	1,07	106,0	0,00	93,35	-	-	0,00	0,00	-
77	12 646	12 647	1,50	106,0	0,00	93,04	-	-	0,00	0,00	-
78	11 711	11 713	2,43	106,0	0,00	92,37	-	-	0,00	0,00	-
79	11 069	11 070	3,12	106,0	0,00	91,88	-	-	0,00	0,00	-
8	21 270	21 271	-0,04	108,9	0,00	97,56	-	-	0,00	0,00	-
80	10 616	10 618	3,62	106,0	0,00	91,52	-	-	0,00	0,00	-
81	10 999	11 001	3,19	106,0	0,00	91,83	-	-	0,00	0,00	-
82	11 975	11 976	2,16	106,0	0,00	92,57	-	-	0,00	0,00	-
83	14 113	14 114	0,19	106,0	0,00	93,99	-	-	0,00	0,00	-
84	14 665	14 666	-0,30	106,0	0,00	94,33	-	-	0,00	0,00	-
85	14 949	14 950	-0,54	106,0	0,00	94,49	-	-	0,00	0,00	-
86	15 266	15 267	-0,79	106,0	0,00	94,67	-	-	0,00	0,00	-
87	13 492	13 493	0,72	106,0	0,00	93,60	-	-	0,00	0,00	-
88	13 964	13 965	0,29	106,0	0,00	93,90	-	-	0,00	0,00	-
89	14 526	14 527	-0,19	106,0	0,00	94,24	-	-	0,00	0,00	-
9	23 206	23 208	-1,18	108,9	0,00	98,31	-	-	0,00	0,00	-
90	14 485	14 486	-0,15	106,0	0,00	94,22	-	-	0,00	0,00	-
91	14 903	14 904	-0,50	106,0	0,00	94,47	-	-	0,00	0,00	-
92	13 860	13 861	0,39	106,0	0,00	93,84	-	-	0,00	0,00	-
93	13 173	13 175	1,00	106,0	0,00	93,39	-	-	0,00	0,00	-
94	12 551	12 552	1,59	106,0	0,00	92,97	-	-	0,00	0,00	-
95	12 280	12 282	1,86	106,0	0,00	92,79	-	-	0,00	0,00	-
96	11 756	11 758	2,39	106,0	0,00	92,41	-	-	0,00	0,00	-
97	12 736	12 737	1,43	106,0	0,00	93,10	-	-	0,00	0,00	-
98	13 392	13 393	0,80	106,0	0,00	93,54	-	-	0,00	0,00	-
99	12 570	12 571	1,57	106,0	0,00	92,99	-	-	0,00	0,00	-
T1	2 090	2 102	29,62	110,1	0,00	77,45	-	-	0,00	0,00	-
T10	5 057	5 061	18,27	110,1	0,00	85,08	-	-	0,00	0,00	-
T11	6 241	6 244	15,38	110,1	0,00	86,91	-	-	0,00	0,00	-
T12	4 712	4 716	19,23	110,1	0,00	84,47	-	-	0,00	0,00	-
T13	5 551	5 555	17,00	110,1	0,00	85,89	-	-	0,00	0,00	-
T14	6 120	6 123	15,65	110,1	0,00	86,74	-	-	0,00	0,00	-
T15	6 813	6 816	14,24	110,1	0,00	87,67	-	-	0,00	0,00	-
T16	5 460	5 464	17,22	110,1	0,00	85,75	-	-	0,00	0,00	-
T17	6 379	6 383	15,08	110,1	0,00	87,10	-	-	0,00	0,00	-
T18	7 035	7 038	13,85	110,1	0,00	87,95	-	-	0,00	0,00	-
T19	6 182	6 186	15,52	110,1	0,00	86,83	-	-	0,00	0,00	-
T2	2 797	2 805	26,05	110,1	0,00	79,96	-	-	0,00	0,00	-
T20	6 647	6 650	14,54	110,1	0,00	87,46	-	-	0,00	0,00	-
T21	7 475	7 478	13,12	110,1	0,00	88,48	-	-	0,00	0,00	-
T22	7 173	7 176	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T23	7 432	7 435	13,19	110,1	0,00	88,43	-	-	0,00	0,00	-
T24	8 212	8 214	11,96	110,1	0,00	89,29	-	-	0,00	0,00	-
T25	8 175	8 177	12,02	110,1	0,00	89,25	-	-	0,00	0,00	-
T26	8 201	8 203	11,97	110,1	0,00	89,28	-	-	0,00	0,00	-
T27	8 768	8 770	11,14	110,1	0,00	89,86	-	-	0,00	0,00	-
T28	9 092	9 094	10,73	110,1	0,00	90,18	-	-	0,00	0,00	-
T29	9 154	9 157	10,60	110,1	0,00	90,23	-	-	0,00	0,00	-
T3	2 728	2 736	26,36	110,1	0,00	79,74	-	-	0,00	0,00	-
T4	3 644	3 650	22,65	110,1	0,00	82,25	-	-	0,00	0,00	-
T5	3 094	3 100	24,77	110,1	0,00	80,83	-	-	0,00	0,00	-
T6	4 292	4 297	20,49	110,1	0,00	83,66	-	-	0,00	0,00	-
T7	4 883	4 887	18,75	110,1	0,00	84,78	-	-	0,00	0,00	-
T8	5 791	5 795	16,41	110,1	0,00	86,26	-	-	0,00	0,00	-
T9	3 860	3 866	21,89	110,1	0,00	82,74	-	-	0,00	0,00	-
Sum			35,20								

- Data undefined due to calculation with octave data

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: I Lomarakennus I

Wind speed: 8,0 m/s

WTG

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]
1	16 989	16 990	2,82	108,9	0,00	95,60	-	-	0,00	0,00	-
10	20 165	20 166	0,64	108,9	0,00	97,09	-	-	0,00	0,00	-
100	11 047	11 048	3,14	106,0	0,00	91,87	-	-	0,00	0,00	-
101	9 635	9 637	4,80	106,0	0,00	90,68	-	-	0,00	0,00	-
102	10 184	10 185	4,13	106,0	0,00	91,16	-	-	0,00	0,00	-
11	20 393	20 394	0,50	108,9	0,00	97,19	-	-	0,00	0,00	-
12	20 906	20 907	0,18	108,9	0,00	97,41	-	-	0,00	0,00	-
13	21 386	21 387	-0,11	108,9	0,00	97,60	-	-	0,00	0,00	-
14	22 562	22 563	-0,81	108,9	0,00	98,07	-	-	0,00	0,00	-
15	21 618	21 619	-0,25	108,9	0,00	97,70	-	-	0,00	0,00	-
16	22 411	22 412	-0,72	108,9	0,00	98,01	-	-	0,00	0,00	-
17	22 080	22 081	-0,53	108,9	0,00	97,88	-	-	0,00	0,00	-
18	22 793	22 794	-0,94	108,9	0,00	98,16	-	-	0,00	0,00	-
19	23 435	23 436	-1,31	108,9	0,00	98,40	-	-	0,00	0,00	-
2	17 355	17 357	2,55	108,9	0,00	95,79	-	-	0,00	0,00	-
20	24 561	24 562	-1,91	108,9	0,00	98,81	-	-	0,00	0,00	-
21	23 038	23 039	-1,08	108,9	0,00	98,25	-	-	0,00	0,00	-
22	24 943	24 944	-2,13	108,9	0,00	98,94	-	-	0,00	0,00	-
23	24 542	24 543	-1,91	108,9	0,00	98,80	-	-	0,00	0,00	-
24	21 972	21 973	-0,46	108,9	0,00	97,84	-	-	0,00	0,00	-
25	23 715	23 716	-1,46	108,9	0,00	98,50	-	-	0,00	0,00	-
26	25 584	25 585	-2,46	108,9	0,00	99,16	-	-	0,00	0,00	-
27	24 772	24 773	-2,03	108,9	0,00	98,88	-	-	0,00	0,00	-
28	23 759	23 760	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
29	23 617	23 618	-1,41	108,9	0,00	98,46	-	-	0,00	0,00	-
3	18 265	18 267	1,91	108,9	0,00	96,23	-	-	0,00	0,00	-
30	21 115	21 116	0,05	108,9	0,00	97,49	-	-	0,00	0,00	-
31	22 826	22 827	-0,96	108,9	0,00	98,17	-	-	0,00	0,00	-
4	19 032	19 033	1,38	108,9	0,00	96,59	-	-	0,00	0,00	-
5	19 878	19 879	0,83	108,9	0,00	96,97	-	-	0,00	0,00	-
6	18 535	18 536	1,72	108,9	0,00	96,36	-	-	0,00	0,00	-
61	15 421	15 422	-0,92	106,0	0,00	94,76	-	-	0,00	0,00	-
62	14 966	14 967	-0,55	106,0	0,00	94,50	-	-	0,00	0,00	-
63	14 551	14 552	-0,21	106,0	0,00	94,26	-	-	0,00	0,00	-
64	15 644	15 645	-1,09	106,0	0,00	94,89	-	-	0,00	0,00	-
65	15 930	15 931	-1,31	106,0	0,00	95,04	-	-	0,00	0,00	-
66	16 319	16 320	-1,61	106,0	0,00	95,25	-	-	0,00	0,00	-
67	15 235	15 236	-0,77	106,0	0,00	94,66	-	-	0,00	0,00	-
68	15 854	15 855	-1,26	106,0	0,00	95,00	-	-	0,00	0,00	-
69	16 417	16 418	-1,68	106,0	0,00	95,31	-	-	0,00	0,00	-
7	19 379	19 380	1,15	108,9	0,00	96,75	-	-	0,00	0,00	-
70	15 192	15 193	-0,73	106,0	0,00	94,63	-	-	0,00	0,00	-
71	14 441	14 442	-0,12	106,0	0,00	94,19	-	-	0,00	0,00	-
72	14 086	14 087	0,19	106,0	0,00	93,98	-	-	0,00	0,00	-
73	13 696	13 697	0,53	106,0	0,00	93,73	-	-	0,00	0,00	-
74	14 264	14 266	0,03	106,0	0,00	94,09	-	-	0,00	0,00	-
75	13 767	13 768	0,47	106,0	0,00	93,78	-	-	0,00	0,00	-
76	10 806	10 807	3,41	106,0	0,00	91,67	-	-	0,00	0,00	-
77	10 516	10 518	3,74	106,0	0,00	91,44	-	-	0,00	0,00	-
78	9 914	9 916	4,45	106,0	0,00	90,93	-	-	0,00	0,00	-
79	9 468	9 470	5,01	106,0	0,00	90,53	-	-	0,00	0,00	-
8	19 312	19 313	1,20	108,9	0,00	96,72	-	-	0,00	0,00	-
80	9 186	9 188	5,38	106,0	0,00	90,26	-	-	0,00	0,00	-
81	9 150	9 152	5,42	106,0	0,00	90,23	-	-	0,00	0,00	-
82	9 920	9 921	4,45	106,0	0,00	90,93	-	-	0,00	0,00	-
83	13 174	13 175	1,00	106,0	0,00	93,40	-	-	0,00	0,00	-
84	13 629	13 630	0,59	106,0	0,00	93,69	-	-	0,00	0,00	-
85	13 779	13 780	0,46	106,0	0,00	93,79	-	-	0,00	0,00	-
86	13 911	13 912	0,34	106,0	0,00	93,87	-	-	0,00	0,00	-
87	12 475	12 477	1,67	106,0	0,00	92,92	-	-	0,00	0,00	-
88	12 822	12 824	1,33	106,0	0,00	93,16	-	-	0,00	0,00	-
89	13 260	13 261	0,93	106,0	0,00	93,45	-	-	0,00	0,00	-
9	20 958	20 960	0,15	108,9	0,00	97,43	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
90	12 936	12 937	1,22	106,0	0,00	93,24	-	-	0,00	0,00	-
91	13 178	13 179	1,00	106,0	0,00	93,40	-	-	0,00	0,00	-
92	12 517	12 518	1,64	106,0	0,00	92,95	-	-	0,00	0,00	-
93	11 964	11 965	2,17	106,0	0,00	92,56	-	-	0,00	0,00	-
94	11 493	11 494	2,66	106,0	0,00	92,21	-	-	0,00	0,00	-
95	11 007	11 009	3,19	106,0	0,00	91,83	-	-	0,00	0,00	-
96	10 666	10 668	3,57	106,0	0,00	91,56	-	-	0,00	0,00	-
97	11 231	11 233	2,94	106,0	0,00	92,01	-	-	0,00	0,00	-
98	11 552	11 553	2,60	106,0	0,00	92,25	-	-	0,00	0,00	-
99	10 808	10 809	3,41	106,0	0,00	91,68	-	-	0,00	0,00	-
T1	2 625	2 634	26,84	110,1	0,00	79,41	-	-	0,00	0,00	-
T10	3 049	3 056	24,96	110,1	0,00	80,70	-	-	0,00	0,00	-
T11	2 945	2 952	25,40	110,1	0,00	80,40	-	-	0,00	0,00	-
T12	4 055	4 059	21,25	110,1	0,00	83,17	-	-	0,00	0,00	-
T13	4 315	4 320	20,41	110,1	0,00	83,71	-	-	0,00	0,00	-
T14	3 870	3 876	21,86	110,1	0,00	82,77	-	-	0,00	0,00	-
T15	3 806	3 813	22,08	110,1	0,00	82,62	-	-	0,00	0,00	-
T16	5 213	5 217	17,86	110,1	0,00	85,35	-	-	0,00	0,00	-
T17	4 798	4 802	18,99	110,1	0,00	84,63	-	-	0,00	0,00	-
T18	4 661	4 667	19,37	110,1	0,00	84,38	-	-	0,00	0,00	-
T19	6 200	6 203	15,47	110,1	0,00	86,85	-	-	0,00	0,00	-
T2	2 072	2 082	29,73	110,1	0,00	77,37	-	-	0,00	0,00	-
T20	5 814	5 818	16,36	110,1	0,00	86,30	-	-	0,00	0,00	-
T21	5 603	5 607	16,87	110,1	0,00	85,97	-	-	0,00	0,00	-
T22	6 929	6 932	14,04	110,1	0,00	87,82	-	-	0,00	0,00	-
T23	6 481	6 485	14,86	110,1	0,00	87,24	-	-	0,00	0,00	-
T24	6 187	6 190	15,50	110,1	0,00	86,83	-	-	0,00	0,00	-
T25	7 771	7 773	12,64	110,1	0,00	88,81	-	-	0,00	0,00	-
T26	7 177	7 179	13,61	110,1	0,00	88,12	-	-	0,00	0,00	-
T27	7 019	7 022	13,88	110,1	0,00	87,93	-	-	0,00	0,00	-
T28	8 851	8 853	11,02	110,1	0,00	89,94	-	-	0,00	0,00	-
T29	8 087	8 089	12,15	110,1	0,00	89,16	-	-	0,00	0,00	-
T3	2 832	2 840	25,89	110,1	0,00	80,07	-	-	0,00	0,00	-
T4	2 100	2 111	29,57	110,1	0,00	77,49	-	-	0,00	0,00	-
T5	3 534	3 539	23,06	110,1	0,00	81,98	-	-	0,00	0,00	-
T6	2 703	2 711	26,48	110,1	0,00	79,66	-	-	0,00	0,00	-
T7	1 994	2 005	30,19	110,1	0,00	77,04	-	-	0,00	0,00	-
T8	2 093	2 104	29,61	110,1	0,00	77,46	-	-	0,00	0,00	-
T9	3 792	3 797	22,13	110,1	0,00	82,59	-	-	0,00	0,00	-
Sum			38,66								

- Data undefined due to calculation with octave data

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Wind speed: 8,0 m/s

WTG

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]
1	10 816	10 819	8,41	108,9	0,00	91,68	-	-	0,00	0,00	-
10	12 731	12 733	6,42	108,9	0,00	93,10	-	-	0,00	0,00	-
100	5 208	5 212	12,37	106,0	0,00	85,34	-	-	0,00	0,00	-
101	2 849	2 856	20,51	106,0	0,00	80,11	-	-	0,00	0,00	-
102	3 475	3 480	17,87	106,0	0,00	81,83	-	-	0,00	0,00	-
11	12 069	12 072	7,07	108,9	0,00	92,64	-	-	0,00	0,00	-
12	11 863	11 865	7,30	108,9	0,00	92,49	-	-	0,00	0,00	-
13	13 066	13 069	6,10	108,9	0,00	93,32	-	-	0,00	0,00	-
14	15 537	15 539	3,95	108,9	0,00	94,83	-	-	0,00	0,00	-
15	12 753	12 755	6,42	108,9	0,00	93,11	-	-	0,00	0,00	-
16	13 759	13 761	5,50	108,9	0,00	93,77	-	-	0,00	0,00	-
17	13 928	13 930	5,31	108,9	0,00	93,88	-	-	0,00	0,00	-
18	14 795	14 797	4,56	108,9	0,00	94,40	-	-	0,00	0,00	-
19	14 825	14 827	4,56	108,9	0,00	94,42	-	-	0,00	0,00	-
2	11 759	11 762	7,39	108,9	0,00	92,41	-	-	0,00	0,00	-
20	16 409	16 411	3,26	108,9	0,00	95,30	-	-	0,00	0,00	-
21	15 441	15 443	4,02	108,9	0,00	94,77	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
22	17 129	17 130	2,73	108,9	0,00	95,68	-	-	0,00	0,00	-
23	17 275	17 277	2,61	108,9	0,00	95,75	-	-	0,00	0,00	-
24	14 503	14 505	4,81	108,9	0,00	94,23	-	-	0,00	0,00	-
25	16 962	16 964	2,84	108,9	0,00	95,59	-	-	0,00	0,00	-
26	18 060	18 062	2,05	108,9	0,00	96,14	-	-	0,00	0,00	-
27	17 914	17 916	2,15	108,9	0,00	96,06	-	-	0,00	0,00	-
28	16 307	16 309	3,34	108,9	0,00	95,25	-	-	0,00	0,00	-
29	15 598	15 599	3,90	108,9	0,00	94,86	-	-	0,00	0,00	-
3	11 315	11 319	7,86	108,9	0,00	92,08	-	-	0,00	0,00	-
30	13 581	13 584	5,62	108,9	0,00	93,66	-	-	0,00	0,00	-
31	16 227	16 229	3,40	108,9	0,00	95,21	-	-	0,00	0,00	-
4	12 190	12 192	6,95	108,9	0,00	92,72	-	-	0,00	0,00	-
5	13 130	13 133	6,04	108,9	0,00	93,37	-	-	0,00	0,00	-
6	10 815	10 817	8,41	108,9	0,00	91,68	-	-	0,00	0,00	-
61	7 339	7 342	8,08	106,0	0,00	88,32	-	-	0,00	0,00	-
62	6 804	6 807	8,98	106,0	0,00	87,66	-	-	0,00	0,00	-
63	6 172	6 174	10,14	106,0	0,00	86,81	-	-	0,00	0,00	-
64	7 848	7 850	7,27	106,0	0,00	88,90	-	-	0,00	0,00	-
65	8 536	8 539	6,26	106,0	0,00	89,63	-	-	0,00	0,00	-
66	9 288	9 290	5,26	106,0	0,00	90,36	-	-	0,00	0,00	-
67	8 053	8 056	6,98	106,0	0,00	89,12	-	-	0,00	0,00	-
68	9 330	9 332	5,19	106,0	0,00	90,40	-	-	0,00	0,00	-
69	9 956	9 959	4,41	106,0	0,00	90,96	-	-	0,00	0,00	-
7	10 999	11 001	8,20	108,9	0,00	91,83	-	-	0,00	0,00	-
70	8 526	8 528	6,28	106,0	0,00	89,62	-	-	0,00	0,00	-
71	7 356	7 358	8,05	106,0	0,00	88,34	-	-	0,00	0,00	-
72	6 271	6 274	9,96	106,0	0,00	86,95	-	-	0,00	0,00	-
73	6 354	6 357	9,79	106,0	0,00	87,06	-	-	0,00	0,00	-
74	7 790	7 792	7,36	106,0	0,00	88,83	-	-	0,00	0,00	-
75	7 517	7 520	7,79	106,0	0,00	88,52	-	-	0,00	0,00	-
76	6 182	6 185	10,12	106,0	0,00	86,83	-	-	0,00	0,00	-
77	5 584	5 587	11,40	106,0	0,00	85,94	-	-	0,00	0,00	-
78	4 522	4 526	14,29	106,0	0,00	84,11	-	-	0,00	0,00	-
79	3 979	3 984	16,04	106,0	0,00	83,01	-	-	0,00	0,00	-
8	11 749	11 752	7,40	108,9	0,00	92,40	-	-	0,00	0,00	-
80	3 599	3 604	17,40	106,0	0,00	82,14	-	-	0,00	0,00	-
81	4 542	4 547	14,23	106,0	0,00	84,15	-	-	0,00	0,00	-
82	5 187	5 191	12,41	106,0	0,00	85,31	-	-	0,00	0,00	-
83	4 047	4 052	15,81	106,0	0,00	83,15	-	-	0,00	0,00	-
84	4 631	4 635	13,97	106,0	0,00	84,32	-	-	0,00	0,00	-
85	5 054	5 058	12,77	106,0	0,00	85,08	-	-	0,00	0,00	-
86	5 590	5 594	11,38	106,0	0,00	85,95	-	-	0,00	0,00	-
87	3 695	3 700	17,08	106,0	0,00	82,36	-	-	0,00	0,00	-
88	4 242	4 247	15,19	106,0	0,00	83,56	-	-	0,00	0,00	-
89	4 869	4 873	13,29	106,0	0,00	84,76	-	-	0,00	0,00	-
9	13 980	13 982	5,26	108,9	0,00	93,91	-	-	0,00	0,00	-
90	5 336	5 339	12,02	106,0	0,00	85,55	-	-	0,00	0,00	-
91	5 965	5 968	10,54	106,0	0,00	86,52	-	-	0,00	0,00	-
92	4 524	4 529	14,29	106,0	0,00	84,12	-	-	0,00	0,00	-
93	3 832	3 837	16,55	106,0	0,00	82,68	-	-	0,00	0,00	-
94	3 186	3 191	19,04	106,0	0,00	81,08	-	-	0,00	0,00	-
95	3 510	3 515	17,74	106,0	0,00	81,92	-	-	0,00	0,00	-
96	2 929	2 935	20,15	106,0	0,00	80,35	-	-	0,00	0,00	-
97	4 206	4 211	15,28	106,0	0,00	83,49	-	-	0,00	0,00	-
98	5 261	5 264	12,22	106,0	0,00	85,43	-	-	0,00	0,00	-
99	4 706	4 710	13,77	106,0	0,00	84,46	-	-	0,00	0,00	-
T1	10 347	10 350	9,04	110,1	0,00	91,30	-	-	0,00	0,00	-
T10	7 801	7 804	12,59	110,1	0,00	88,85	-	-	0,00	0,00	-
T11	8 471	8 474	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T12	6 911	6 915	14,07	110,1	0,00	87,80	-	-	0,00	0,00	-
T13	6 530	6 534	14,75	110,1	0,00	87,30	-	-	0,00	0,00	-
T14	7 173	7 177	13,62	110,1	0,00	88,12	-	-	0,00	0,00	-
T15	7 793	7 797	12,60	110,1	0,00	88,84	-	-	0,00	0,00	-
T16	5 758	5 762	16,49	110,1	0,00	86,21	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T17	6 144	6 149	15,59	110,1	0,00	86,78	-	-	0,00	0,00	-
T18	6 738	6 742	14,37	110,1	0,00	87,58	-	-	0,00	0,00	-
T19	4 792	4 798	19,00	110,1	0,00	84,62	-	-	0,00	0,00	-
T2	9 915	9 918	9,59	110,1	0,00	90,93	-	-	0,00	0,00	-
T20	5 038	5 043	18,32	110,1	0,00	85,05	-	-	0,00	0,00	-
T21	5 719	5 724	16,58	110,1	0,00	86,15	-	-	0,00	0,00	-
T22	3 932	3 939	21,65	110,1	0,00	82,91	-	-	0,00	0,00	-
T23	4 449	4 455	20,00	110,1	0,00	83,98	-	-	0,00	0,00	-
T24	5 551	5 556	16,99	110,1	0,00	85,90	-	-	0,00	0,00	-
T25	3 090	3 098	24,78	110,1	0,00	80,82	-	-	0,00	0,00	-
T26	3 915	3 922	21,70	110,1	0,00	82,87	-	-	0,00	0,00	-
T27	4 795	4 800	18,99	110,1	0,00	84,62	-	-	0,00	0,00	-
T28	2 023	2 035	30,01	110,1	0,00	77,17	-	-	0,00	0,00	-
T29	3 336	3 343	23,80	110,1	0,00	81,48	-	-	0,00	0,00	-
T3	9 032	9 035	10,77	110,1	0,00	90,12	-	-	0,00	0,00	-
T4	9 042	9 045	10,75	110,1	0,00	90,13	-	-	0,00	0,00	-
T5	8 186	8 189	12,00	110,1	0,00	89,26	-	-	0,00	0,00	-
T6	8 213	8 216	11,95	110,1	0,00	89,29	-	-	0,00	0,00	-
T7	8 871	8 874	10,99	110,1	0,00	89,96	-	-	0,00	0,00	-
T8	9 214	9 217	10,51	110,1	0,00	90,29	-	-	0,00	0,00	-
T9	7 502	7 505	13,07	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			35,82								

- Data undefined due to calculation with octave data

Noise sensitive area: K Asuinrakennus K (Takalo)

Wind speed: 8,0 m/s

WTG

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]
1	9 530	9 534	9,94	108,9	0,00	90,59	-	-	0,00	0,00	-
10	11 401	11 403	7,77	108,9	0,00	92,14	-	-	0,00	0,00	-
100	4 254	4 259	15,13	106,0	0,00	83,59	-	-	0,00	0,00	-
101	2 455	2 463	22,45	106,0	0,00	78,83	-	-	0,00	0,00	-
102	2 754	2 761	20,96	106,0	0,00	79,82	-	-	0,00	0,00	-
11	10 755	10 758	8,47	108,9	0,00	91,63	-	-	0,00	0,00	-
12	10 596	10 599	8,69	108,9	0,00	91,51	-	-	0,00	0,00	-
13	11 756	11 758	7,39	108,9	0,00	92,41	-	-	0,00	0,00	-
14	14 207	14 209	5,06	108,9	0,00	94,05	-	-	0,00	0,00	-
15	11 475	11 478	7,73	108,9	0,00	92,20	-	-	0,00	0,00	-
16	12 470	12 472	6,70	108,9	0,00	92,92	-	-	0,00	0,00	-
17	12 614	12 616	6,53	108,9	0,00	93,02	-	-	0,00	0,00	-
18	13 478	13 480	5,71	108,9	0,00	93,59	-	-	0,00	0,00	-
19	13 538	13 540	5,69	108,9	0,00	93,63	-	-	0,00	0,00	-
2	10 494	10 497	8,79	108,9	0,00	91,42	-	-	0,00	0,00	-
20	15 102	15 104	4,30	108,9	0,00	94,58	-	-	0,00	0,00	-
21	14 115	14 117	5,14	108,9	0,00	93,99	-	-	0,00	0,00	-
22	15 810	15 812	3,75	108,9	0,00	94,98	-	-	0,00	0,00	-
23	15 946	15 948	3,62	108,9	0,00	95,05	-	-	0,00	0,00	-
24	13 174	13 176	6,00	108,9	0,00	93,40	-	-	0,00	0,00	-
25	15 633	15 634	3,87	108,9	0,00	94,88	-	-	0,00	0,00	-
26	16 736	16 738	3,01	108,9	0,00	95,47	-	-	0,00	0,00	-
27	16 584	16 586	3,13	108,9	0,00	95,39	-	-	0,00	0,00	-
28	14 979	14 981	4,40	108,9	0,00	94,51	-	-	0,00	0,00	-
29	14 283	14 285	5,00	108,9	0,00	94,10	-	-	0,00	0,00	-
3	9 994	9 998	9,36	108,9	0,00	91,00	-	-	0,00	0,00	-
30	12 252	12 255	6,89	108,9	0,00	92,77	-	-	0,00	0,00	-
31	14 900	14 902	4,47	108,9	0,00	94,47	-	-	0,00	0,00	-
4	10 868	10 871	8,35	108,9	0,00	91,73	-	-	0,00	0,00	-
5	11 807	11 810	7,34	108,9	0,00	92,44	-	-	0,00	0,00	-
6	9 484	9 488	9,98	108,9	0,00	90,54	-	-	0,00	0,00	-
61	6 011	6 014	10,45	106,0	0,00	86,58	-	-	0,00	0,00	-
62	5 477	5 480	11,66	106,0	0,00	85,78	-	-	0,00	0,00	-
63	4 843	4 847	13,35	106,0	0,00	84,71	-	-	0,00	0,00	-
64	6 523	6 526	9,48	106,0	0,00	87,29	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

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]
65	7 219	7 222	8,27	106,0	0,00	88,17	-	-	0,00	0,00	-
66	7 977	7 980	7,08	106,0	0,00	89,04	-	-	0,00	0,00	-
67	6 751	6 754	9,07	106,0	0,00	87,59	-	-	0,00	0,00	-
68	8 045	8 047	7,00	106,0	0,00	89,11	-	-	0,00	0,00	-
69	8 666	8 668	6,10	106,0	0,00	89,76	-	-	0,00	0,00	-
7	9 683	9 685	9,74	108,9	0,00	90,72	-	-	0,00	0,00	-
70	7 246	7 249	8,25	106,0	0,00	88,21	-	-	0,00	0,00	-
71	6 073	6 076	10,34	106,0	0,00	86,67	-	-	0,00	0,00	-
72	4 964	4 967	13,02	106,0	0,00	84,92	-	-	0,00	0,00	-
73	5 079	5 083	12,72	106,0	0,00	85,12	-	-	0,00	0,00	-
74	6 543	6 546	9,46	106,0	0,00	87,32	-	-	0,00	0,00	-
75	6 301	6 304	9,89	106,0	0,00	86,99	-	-	0,00	0,00	-
76	5 309	5 313	12,10	106,0	0,00	85,51	-	-	0,00	0,00	-
77	4 749	4 754	13,64	106,0	0,00	84,54	-	-	0,00	0,00	-
78	3 830	3 835	16,56	106,0	0,00	82,68	-	-	0,00	0,00	-
79	3 457	3 462	17,94	106,0	0,00	81,79	-	-	0,00	0,00	-
8	10 419	10 422	8,86	108,9	0,00	91,36	-	-	0,00	0,00	-
80	3 233	3 239	18,84	106,0	0,00	81,21	-	-	0,00	0,00	-
81	4 063	4 068	15,75	106,0	0,00	83,19	-	-	0,00	0,00	-
82	4 480	4 485	14,42	106,0	0,00	84,03	-	-	0,00	0,00	-
83	2 717	2 724	21,14	106,0	0,00	79,70	-	-	0,00	0,00	-
84	3 301	3 306	18,56	106,0	0,00	81,39	-	-	0,00	0,00	-
85	3 725	3 730	16,94	106,0	0,00	82,43	-	-	0,00	0,00	-
86	4 269	4 273	15,08	106,0	0,00	83,61	-	-	0,00	0,00	-
87	2 393	2 401	22,81	106,0	0,00	78,61	-	-	0,00	0,00	-
88	2 936	2 943	20,12	106,0	0,00	80,37	-	-	0,00	0,00	-
89	3 557	3 563	17,56	106,0	0,00	82,04	-	-	0,00	0,00	-
9	12 651	12 654	6,49	108,9	0,00	93,04	-	-	0,00	0,00	-
90	4 079	4 084	15,73	106,0	0,00	83,22	-	-	0,00	0,00	-
91	4 719	4 723	13,72	106,0	0,00	84,48	-	-	0,00	0,00	-
92	3 269	3 275	18,72	106,0	0,00	81,30	-	-	0,00	0,00	-
93	2 618	2 626	21,61	106,0	0,00	79,39	-	-	0,00	0,00	-
94	2 038	2 047	24,81	106,0	0,00	77,22	-	-	0,00	0,00	-
95	2 516	2 524	22,13	106,0	0,00	79,04	-	-	0,00	0,00	-
96	2 062	2 071	24,67	106,0	0,00	77,32	-	-	0,00	0,00	-
97	3 174	3 180	19,08	106,0	0,00	81,05	-	-	0,00	0,00	-
98	4 211	4 215	15,27	106,0	0,00	83,50	-	-	0,00	0,00	-
99	3 789	3 794	16,70	106,0	0,00	82,58	-	-	0,00	0,00	-
T1	11 268	11 270	7,95	110,1	0,00	92,04	-	-	0,00	0,00	-
T10	8 473	8 476	11,57	110,1	0,00	89,56	-	-	0,00	0,00	-
T11	8 946	8 949	10,89	110,1	0,00	90,04	-	-	0,00	0,00	-
T12	7 729	7 732	12,70	110,1	0,00	88,77	-	-	0,00	0,00	-
T13	7 234	7 238	13,51	110,1	0,00	88,19	-	-	0,00	0,00	-
T14	7 715	7 719	12,73	110,1	0,00	88,75	-	-	0,00	0,00	-
T15	8 196	8 199	11,98	110,1	0,00	89,28	-	-	0,00	0,00	-
T16	6 619	6 623	14,59	110,1	0,00	87,42	-	-	0,00	0,00	-
T17	6 726	6 730	14,39	110,1	0,00	87,56	-	-	0,00	0,00	-
T18	7 142	7 147	13,67	110,1	0,00	88,08	-	-	0,00	0,00	-
T19	5 706	5 711	16,62	110,1	0,00	86,13	-	-	0,00	0,00	-
T2	10 776	10 779	8,52	110,1	0,00	91,65	-	-	0,00	0,00	-
T20	5 729	5 734	16,56	110,1	0,00	86,17	-	-	0,00	0,00	-
T21	6 108	6 112	15,68	110,1	0,00	86,72	-	-	0,00	0,00	-
T22	4 762	4 768	19,08	110,1	0,00	84,57	-	-	0,00	0,00	-
T23	5 033	5 038	18,33	110,1	0,00	85,05	-	-	0,00	0,00	-
T24	5 785	5 789	16,43	110,1	0,00	86,25	-	-	0,00	0,00	-
T25	3 801	3 808	22,09	110,1	0,00	82,61	-	-	0,00	0,00	-
T26	4 364	4 370	20,26	110,1	0,00	83,81	-	-	0,00	0,00	-
T27	4 946	4 951	18,57	110,1	0,00	84,89	-	-	0,00	0,00	-
T28	2 753	2 761	26,25	110,1	0,00	79,82	-	-	0,00	0,00	-
T29	3 555	3 562	22,97	110,1	0,00	82,03	-	-	0,00	0,00	-
T3	9 937	9 939	9,56	110,1	0,00	90,95	-	-	0,00	0,00	-
T4	9 838	9 841	9,69	110,1	0,00	90,86	-	-	0,00	0,00	-
T5	9 120	9 123	10,64	110,1	0,00	90,20	-	-	0,00	0,00	-
T6	8 970	8 972	10,85	110,1	0,00	90,06	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T7	9 521	9 524	10,10	110,1	0,00	90,58	-	-	0,00	0,00	-
T8	9 743	9 746	9,81	110,1	0,00	90,78	-	-	0,00	0,00	-
T9	8 396	8 399	11,68	110,1	0,00	89,48	-	-	0,00	0,00	-
Sum			36,36								

- Data undefined due to calculation with octave data

Noise sensitive area: L Lomarakenus L (Haukijärvi)

Wind speed: 8,0 m/s

WTG

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]
1	16 500	16 502	3,21	108,9	0,00	95,35	-	-	0,00	0,00	-
10	17 677	17 678	2,32	108,9	0,00	95,95	-	-	0,00	0,00	-
100	11 513	11 514	3,25	106,0	0,00	92,22	-	-	0,00	0,00	-
101	9 132	9 134	6,25	106,0	0,00	90,21	-	-	0,00	0,00	-
102	9 806	9 808	5,30	106,0	0,00	90,83	-	-	0,00	0,00	-
11	16 528	16 530	3,17	108,9	0,00	95,37	-	-	0,00	0,00	-
12	15 748	15 749	3,79	108,9	0,00	94,95	-	-	0,00	0,00	-
13	17 412	17 414	2,55	108,9	0,00	95,82	-	-	0,00	0,00	-
14	20 455	20 457	0,49	108,9	0,00	97,22	-	-	0,00	0,00	-
15	16 689	16 690	3,06	108,9	0,00	95,45	-	-	0,00	0,00	-
16	17 765	17 767	2,27	108,9	0,00	95,99	-	-	0,00	0,00	-
17	18 305	18 306	1,91	108,9	0,00	96,25	-	-	0,00	0,00	-
18	19 197	19 198	1,30	108,9	0,00	96,67	-	-	0,00	0,00	-
19	18 758	18 760	1,57	108,9	0,00	96,46	-	-	0,00	0,00	-
2	17 541	17 543	2,45	108,9	0,00	95,88	-	-	0,00	0,00	-
20	20 564	20 565	0,41	108,9	0,00	97,26	-	-	0,00	0,00	-
21	20 046	20 047	0,73	108,9	0,00	97,04	-	-	0,00	0,00	-
22	21 464	21 465	-0,12	108,9	0,00	97,63	-	-	0,00	0,00	-
23	21 938	21 939	-0,43	108,9	0,00	97,82	-	-	0,00	0,00	-
24	19 263	19 265	1,27	108,9	0,00	96,70	-	-	0,00	0,00	-
25	21 917	21 919	-0,41	108,9	0,00	97,82	-	-	0,00	0,00	-
26	22 518	22 519	-0,76	108,9	0,00	98,05	-	-	0,00	0,00	-
27	22 757	22 759	-0,89	108,9	0,00	98,14	-	-	0,00	0,00	-
28	20 931	20 932	0,18	108,9	0,00	97,42	-	-	0,00	0,00	-
29	19 914	19 915	0,84	108,9	0,00	96,98	-	-	0,00	0,00	-
3	16 648	16 650	3,08	108,9	0,00	95,43	-	-	0,00	0,00	-
30	18 388	18 390	1,87	108,9	0,00	96,29	-	-	0,00	0,00	-
31	21 305	21 307	-0,07	108,9	0,00	97,57	-	-	0,00	0,00	-
4	17 482	17 484	2,46	108,9	0,00	95,85	-	-	0,00	0,00	-
5	18 378	18 380	1,83	108,9	0,00	96,29	-	-	0,00	0,00	-
6	15 818	15 820	3,77	108,9	0,00	94,98	-	-	0,00	0,00	-
61	12 678	12 679	1,51	106,0	0,00	93,06	-	-	0,00	0,00	-
62	12 203	12 205	1,96	106,0	0,00	92,73	-	-	0,00	0,00	-
63	11 585	11 586	2,60	106,0	0,00	92,28	-	-	0,00	0,00	-
64	13 244	13 246	0,97	106,0	0,00	93,44	-	-	0,00	0,00	-
65	14 016	14 017	0,27	106,0	0,00	93,93	-	-	0,00	0,00	-
66	14 820	14 822	-0,41	106,0	0,00	94,42	-	-	0,00	0,00	-
67	13 693	13 694	0,56	106,0	0,00	93,73	-	-	0,00	0,00	-
68	15 048	15 049	-0,59	106,0	0,00	94,55	-	-	0,00	0,00	-
69	15 628	15 629	-1,06	106,0	0,00	94,88	-	-	0,00	0,00	-
7	15 555	15 557	4,00	108,9	0,00	94,84	-	-	0,00	0,00	-
70	14 291	14 292	0,05	106,0	0,00	94,10	-	-	0,00	0,00	-
71	13 134	13 135	1,08	106,0	0,00	93,37	-	-	0,00	0,00	-
72	11 944	11 945	2,24	106,0	0,00	92,54	-	-	0,00	0,00	-
73	12 198	12 200	1,99	106,0	0,00	92,73	-	-	0,00	0,00	-
74	13 706	13 707	0,57	106,0	0,00	93,74	-	-	0,00	0,00	-
75	13 526	13 527	0,75	106,0	0,00	93,62	-	-	0,00	0,00	-
76	12 510	12 512	2,25	106,0	0,00	92,95	-	-	0,00	0,00	-
77	11 915	11 916	2,87	106,0	0,00	92,52	-	-	0,00	0,00	-
78	10 845	10 847	4,09	106,0	0,00	91,71	-	-	0,00	0,00	-
79	10 265	10 266	4,81	106,0	0,00	91,23	-	-	0,00	0,00	-
8	16 730	16 731	3,03	108,9	0,00	95,47	-	-	0,00	0,00	-
80	9 832	9 834	5,37	106,0	0,00	90,85	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
81	10 793	10 795	4,21	106,0	0,00	91,66	-	-	0,00	0,00	-
82	11 509	11 510	3,35	106,0	0,00	92,22	-	-	0,00	0,00	-
83	9 588	9 589	4,92	106,0	0,00	90,64	-	-	0,00	0,00	-
84	10 070	10 072	4,31	106,0	0,00	91,06	-	-	0,00	0,00	-
85	10 542	10 544	3,75	106,0	0,00	91,46	-	-	0,00	0,00	-
86	11 168	11 169	3,06	106,0	0,00	91,96	-	-	0,00	0,00	-
87	9 541	9 542	5,03	106,0	0,00	90,59	-	-	0,00	0,00	-
88	10 030	10 032	4,39	106,0	0,00	91,03	-	-	0,00	0,00	-
89	10 585	10 586	3,72	106,0	0,00	91,49	-	-	0,00	0,00	-
9	19 046	19 048	1,39	108,9	0,00	96,60	-	-	0,00	0,00	-
90	11 272	11 273	2,99	106,0	0,00	92,04	-	-	0,00	0,00	-
91	11 917	11 919	2,31	106,0	0,00	92,52	-	-	0,00	0,00	-
92	10 487	10 489	3,89	106,0	0,00	91,41	-	-	0,00	0,00	-
93	9 901	9 902	4,86	106,0	0,00	90,91	-	-	0,00	0,00	-
94	9 346	9 348	5,70	106,0	0,00	90,41	-	-	0,00	0,00	-
95	9 784	9 786	5,25	106,0	0,00	90,81	-	-	0,00	0,00	-
96	9 240	9 242	5,99	106,0	0,00	90,32	-	-	0,00	0,00	-
97	10 466	10 467	4,39	106,0	0,00	91,40	-	-	0,00	0,00	-
98	11 512	11 514	3,18	106,0	0,00	92,22	-	-	0,00	0,00	-
99	11 020	11 022	3,82	106,0	0,00	91,85	-	-	0,00	0,00	-
T1	12 636	12 638	7,85	110,1	0,00	93,03	-	-	0,00	0,00	-
T10	11 638	11 640	8,74	110,1	0,00	92,32	-	-	0,00	0,00	-
T11	12 857	12 859	7,39	110,1	0,00	93,18	-	-	0,00	0,00	-
T12	10 368	10 370	10,26	110,1	0,00	91,32	-	-	0,00	0,00	-
T13	10 507	10 509	10,04	110,1	0,00	91,43	-	-	0,00	0,00	-
T14	11 547	11 549	8,81	110,1	0,00	92,25	-	-	0,00	0,00	-
T15	12 471	12 473	7,78	110,1	0,00	92,92	-	-	0,00	0,00	-
T16	9 350	9 352	11,55	110,1	0,00	90,42	-	-	0,00	0,00	-
T17	10 591	10 594	9,92	110,1	0,00	91,50	-	-	0,00	0,00	-
T18	11 555	11 557	8,75	110,1	0,00	92,26	-	-	0,00	0,00	-
T19	8 505	8 507	12,74	110,1	0,00	89,60	-	-	0,00	0,00	-
T2	12 590	12 592	7,85	110,1	0,00	93,00	-	-	0,00	0,00	-
T20	9 434	9 436	11,38	110,1	0,00	90,50	-	-	0,00	0,00	-
T21	10 738	10 741	9,69	110,1	0,00	91,62	-	-	0,00	0,00	-
T22	8 288	8 291	13,00	110,1	0,00	89,37	-	-	0,00	0,00	-
T23	9 295	9 298	11,54	110,1	0,00	90,37	-	-	0,00	0,00	-
T24	10 912	10 914	9,46	110,1	0,00	91,76	-	-	0,00	0,00	-
T25	8 107	8 110	13,23	110,1	0,00	89,18	-	-	0,00	0,00	-
T26	9 191	9 194	11,65	110,1	0,00	90,27	-	-	0,00	0,00	-
T27	10 402	10 404	10,05	110,1	0,00	91,34	-	-	0,00	0,00	-
T28	7 498	7 501	14,15	110,1	0,00	88,50	-	-	0,00	0,00	-
T29	9 098	9 101	11,74	110,1	0,00	90,18	-	-	0,00	0,00	-
T3	11 631	11 633	8,89	110,1	0,00	92,31	-	-	0,00	0,00	-
T4	12 167	12 169	8,25	110,1	0,00	92,71	-	-	0,00	0,00	-
T5	10 799	10 801	9,84	110,1	0,00	91,67	-	-	0,00	0,00	-
T6	11 650	11 653	8,75	110,1	0,00	92,33	-	-	0,00	0,00	-
T7	12 619	12 621	7,69	110,1	0,00	93,02	-	-	0,00	0,00	-
T8	13 338	13 340	6,92	110,1	0,00	93,50	-	-	0,00	0,00	-
T9	10 475	10 477	10,19	110,1	0,00	91,40	-	-	0,00	0,00	-
Sum			26,58								

- Data undefined due to calculation with octave data

Noise sensitive area: M Lomarakennus M (Haukilahti)

Wind speed: 8,0 m/s

WTG

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]
1	18 226	18 228	2,09	108,9	0,00	96,21	-	-	0,00	0,00	-
10	20 098	20 099	0,72	108,9	0,00	97,06	-	-	0,00	0,00	-
100	12 222	12 223	2,47	106,0	0,00	92,74	-	-	0,00	0,00	-
101	9 499	9 501	5,59	106,0	0,00	90,56	-	-	0,00	0,00	-
102	10 376	10 378	4,51	106,0	0,00	91,32	-	-	0,00	0,00	-
11	19 284	19 286	1,33	108,9	0,00	96,70	-	-	0,00	0,00	-
12	18 831	18 832	1,56	108,9	0,00	96,50	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
13	20 250	20 252	0,64	108,9	0,00	97,13	-	-	0,00	0,00	-
14	22 912	22 913	-0,98	108,9	0,00	98,20	-	-	0,00	0,00	-
15	19 759	19 760	0,94	108,9	0,00	96,92	-	-	0,00	0,00	-
16	20 810	20 811	0,27	108,9	0,00	97,37	-	-	0,00	0,00	-
17	21 133	21 134	0,10	108,9	0,00	97,50	-	-	0,00	0,00	-
18	22 016	22 018	-0,42	108,9	0,00	97,86	-	-	0,00	0,00	-
19	21 856	21 857	-0,37	108,9	0,00	97,79	-	-	0,00	0,00	-
2	19 141	19 142	1,51	108,9	0,00	96,64	-	-	0,00	0,00	-
20	23 550	23 551	-1,37	108,9	0,00	98,44	-	-	0,00	0,00	-
21	22 735	22 736	-0,88	108,9	0,00	98,13	-	-	0,00	0,00	-
22	24 344	24 345	-1,77	108,9	0,00	98,73	-	-	0,00	0,00	-
23	24 596	24 597	-1,92	108,9	0,00	98,82	-	-	0,00	0,00	-
24	21 835	21 836	-0,37	108,9	0,00	97,78	-	-	0,00	0,00	-
25	24 349	24 351	-1,78	108,9	0,00	98,73	-	-	0,00	0,00	-
26	25 323	25 324	-2,25	108,9	0,00	99,07	-	-	0,00	0,00	-
27	25 282	25 283	-2,28	108,9	0,00	99,06	-	-	0,00	0,00	-
28	23 611	23 613	-1,38	108,9	0,00	98,46	-	-	0,00	0,00	-
29	22 795	22 796	-0,91	108,9	0,00	98,16	-	-	0,00	0,00	-
3	18 737	18 739	1,65	108,9	0,00	96,45	-	-	0,00	0,00	-
30	20 920	20 921	0,18	108,9	0,00	97,41	-	-	0,00	0,00	-
31	23 633	23 634	-1,37	108,9	0,00	98,47	-	-	0,00	0,00	-
4	19 610	19 611	1,06	108,9	0,00	96,85	-	-	0,00	0,00	-
5	20 548	20 550	0,46	108,9	0,00	97,26	-	-	0,00	0,00	-
6	18 181	18 183	2,00	108,9	0,00	96,19	-	-	0,00	0,00	-
61	14 743	14 744	-0,31	106,0	0,00	94,37	-	-	0,00	0,00	-
62	14 213	14 214	0,14	106,0	0,00	94,05	-	-	0,00	0,00	-
63	13 577	13 578	0,70	106,0	0,00	93,66	-	-	0,00	0,00	-
64	15 263	15 264	-0,73	106,0	0,00	94,67	-	-	0,00	0,00	-
65	15 961	15 962	-1,27	106,0	0,00	95,06	-	-	0,00	0,00	-
66	16 714	16 715	-1,82	106,0	0,00	95,46	-	-	0,00	0,00	-
67	15 478	15 479	-0,85	106,0	0,00	94,80	-	-	0,00	0,00	-
68	16 741	16 742	-1,79	106,0	0,00	95,48	-	-	0,00	0,00	-
69	17 372	17 373	-2,25	106,0	0,00	95,80	-	-	0,00	0,00	-
7	18 235	18 237	2,04	108,9	0,00	96,22	-	-	0,00	0,00	-
70	15 933	15 934	-1,17	106,0	0,00	95,05	-	-	0,00	0,00	-
71	14 769	14 770	-0,24	106,0	0,00	94,39	-	-	0,00	0,00	-
72	13 697	13 698	0,64	106,0	0,00	93,73	-	-	0,00	0,00	-
73	13 763	13 764	0,63	106,0	0,00	93,77	-	-	0,00	0,00	-
74	15 162	15 163	-0,50	106,0	0,00	94,62	-	-	0,00	0,00	-
75	14 850	14 851	-0,21	106,0	0,00	94,44	-	-	0,00	0,00	-
76	12 977	12 979	1,75	106,0	0,00	93,26	-	-	0,00	0,00	-
77	12 365	12 366	2,35	106,0	0,00	92,84	-	-	0,00	0,00	-
78	11 197	11 199	3,59	106,0	0,00	91,98	-	-	0,00	0,00	-
79	10 486	10 487	4,42	106,0	0,00	91,41	-	-	0,00	0,00	-
8	19 118	19 119	1,36	108,9	0,00	96,63	-	-	0,00	0,00	-
80	9 956	9 958	5,06	106,0	0,00	90,96	-	-	0,00	0,00	-
81	10 838	10 840	4,04	106,0	0,00	91,70	-	-	0,00	0,00	-
82	11 786	11 788	2,97	106,0	0,00	92,43	-	-	0,00	0,00	-
83	11 445	11 446	2,78	106,0	0,00	92,17	-	-	0,00	0,00	-
84	12 019	12 020	2,18	106,0	0,00	92,60	-	-	0,00	0,00	-
85	12 458	12 460	1,75	106,0	0,00	92,91	-	-	0,00	0,00	-
86	13 012	13 013	1,23	106,0	0,00	93,29	-	-	0,00	0,00	-
87	11 121	11 122	3,18	106,0	0,00	91,92	-	-	0,00	0,00	-
88	11 669	11 670	2,59	106,0	0,00	92,34	-	-	0,00	0,00	-
89	12 295	12 297	1,94	106,0	0,00	92,80	-	-	0,00	0,00	-
9	21 376	21 378	-0,07	108,9	0,00	97,60	-	-	0,00	0,00	-
90	12 734	12 736	1,60	106,0	0,00	93,10	-	-	0,00	0,00	-
91	13 350	13 351	1,04	106,0	0,00	93,51	-	-	0,00	0,00	-
92	11 928	11 929	2,39	106,0	0,00	92,53	-	-	0,00	0,00	-
93	11 214	11 215	3,17	106,0	0,00	92,00	-	-	0,00	0,00	-
94	10 539	10 541	3,98	106,0	0,00	91,46	-	-	0,00	0,00	-
95	10 713	10 714	3,87	106,0	0,00	91,60	-	-	0,00	0,00	-
96	10 079	10 081	4,63	106,0	0,00	91,07	-	-	0,00	0,00	-
97	11 398	11 400	3,14	106,0	0,00	92,14	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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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]
98	12 413	12 415	2,23	106,0	0,00	92,88	-	-	0,00	0,00	-
99	11 707	11 709	3,01	106,0	0,00	92,37	-	-	0,00	0,00	-
T1	8 960	8 963	12,33	110,1	0,00	90,05	-	-	0,00	0,00	-
T10	9 035	9 038	12,29	110,1	0,00	90,12	-	-	0,00	0,00	-
T11	10 479	10 481	10,37	110,1	0,00	91,41	-	-	0,00	0,00	-
T12	7 744	7 747	14,21	110,1	0,00	88,78	-	-	0,00	0,00	-
T13	8 221	8 224	13,43	110,1	0,00	89,30	-	-	0,00	0,00	-
T14	9 357	9 360	11,80	110,1	0,00	90,43	-	-	0,00	0,00	-
T15	10 380	10 383	10,44	110,1	0,00	91,33	-	-	0,00	0,00	-
T16	7 082	7 086	15,11	110,1	0,00	88,01	-	-	0,00	0,00	-
T17	8 642	8 645	12,63	110,1	0,00	89,74	-	-	0,00	0,00	-
T18	9 724	9 726	11,12	110,1	0,00	90,76	-	-	0,00	0,00	-
T19	6 612	6 615	15,77	110,1	0,00	87,41	-	-	0,00	0,00	-
T2	9 123	9 126	12,11	110,1	0,00	90,21	-	-	0,00	0,00	-
T20	7 735	7 738	13,91	110,1	0,00	88,77	-	-	0,00	0,00	-
T21	9 235	9 237	11,67	110,1	0,00	90,31	-	-	0,00	0,00	-
T22	6 954	6 958	15,01	110,1	0,00	87,85	-	-	0,00	0,00	-
T23	7 994	7 997	13,36	110,1	0,00	89,06	-	-	0,00	0,00	-
T24	9 693	9 696	10,94	110,1	0,00	90,73	-	-	0,00	0,00	-
T25	7 352	7 355	14,28	110,1	0,00	88,33	-	-	0,00	0,00	-
T26	8 286	8 288	12,85	110,1	0,00	89,37	-	-	0,00	0,00	-
T27	9 533	9 536	11,07	110,1	0,00	90,59	-	-	0,00	0,00	-
T28	7 363	7 366	14,12	110,1	0,00	88,34	-	-	0,00	0,00	-
T29	8 685	8 688	12,17	110,1	0,00	89,78	-	-	0,00	0,00	-
T3	8 241	8 244	13,43	110,1	0,00	89,32	-	-	0,00	0,00	-
T4	9 015	9 018	12,33	110,1	0,00	90,10	-	-	0,00	0,00	-
T5	7 547	7 550	14,53	110,1	0,00	88,56	-	-	0,00	0,00	-
T6	8 773	8 776	12,68	110,1	0,00	89,87	-	-	0,00	0,00	-
T7	9 809	9 812	11,25	110,1	0,00	90,83	-	-	0,00	0,00	-
T8	10 705	10 707	10,09	110,1	0,00	91,59	-	-	0,00	0,00	-
T9	7 508	7 510	14,60	110,1	0,00	88,51	-	-	0,00	0,00	-
Sum			28,35								

- Data undefined due to calculation with octave data

Noise sensitive area: N Lomarakennus N (Kuusela)

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]
1	17 629	17 630	2,38	108,9	0,00	95,93	-	-	0,00	0,00	-
10	19 514	19 515	1,06	108,9	0,00	96,81	-	-	0,00	0,00	-
100	11 625	11 626	2,57	106,0	0,00	92,31	-	-	0,00	0,00	-
101	8 904	8 906	5,79	106,0	0,00	89,99	-	-	0,00	0,00	-
102	9 779	9 781	4,68	106,0	0,00	90,81	-	-	0,00	0,00	-
11	18 715	18 716	1,70	108,9	0,00	96,44	-	-	0,00	0,00	-
12	18 280	18 282	1,94	108,9	0,00	96,24	-	-	0,00	0,00	-
13	19 684	19 685	1,03	108,9	0,00	96,88	-	-	0,00	0,00	-
14	22 327	22 329	-0,67	108,9	0,00	97,98	-	-	0,00	0,00	-
15	19 206	19 208	1,30	108,9	0,00	96,67	-	-	0,00	0,00	-
16	20 255	20 256	0,62	108,9	0,00	97,13	-	-	0,00	0,00	-
17	20 565	20 566	0,48	108,9	0,00	97,26	-	-	0,00	0,00	-
18	21 447	21 449	-0,08	108,9	0,00	97,63	-	-	0,00	0,00	-
19	21 303	21 304	-0,04	108,9	0,00	97,57	-	-	0,00	0,00	-
2	18 542	18 543	1,76	108,9	0,00	96,36	-	-	0,00	0,00	-
20	22 989	22 990	-1,05	108,9	0,00	98,23	-	-	0,00	0,00	-
21	22 159	22 160	-0,55	108,9	0,00	97,91	-	-	0,00	0,00	-
22	23 776	23 777	-1,44	108,9	0,00	98,52	-	-	0,00	0,00	-
23	24 018	24 019	-1,62	108,9	0,00	98,61	-	-	0,00	0,00	-
24	21 255	21 257	-0,03	108,9	0,00	97,55	-	-	0,00	0,00	-
25	23 763	23 765	-1,49	108,9	0,00	98,52	-	-	0,00	0,00	-
26	24 751	24 752	-1,96	108,9	0,00	98,87	-	-	0,00	0,00	-
27	24 699	24 700	-2,00	108,9	0,00	98,85	-	-	0,00	0,00	-
28	23 035	23 036	-1,07	108,9	0,00	98,25	-	-	0,00	0,00	-
29	22 228	22 229	-0,56	108,9	0,00	97,94	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
3	18 145	18 146	1,99	108,9	0,00	96,18	-	-	0,00	0,00	-
30	20 339	20 341	0,53	108,9	0,00	97,17	-	-	0,00	0,00	-
31	23 044	23 045	-1,09	108,9	0,00	98,25	-	-	0,00	0,00	-
4	19 018	19 019	1,39	108,9	0,00	96,58	-	-	0,00	0,00	-
5	19 957	19 958	0,78	108,9	0,00	97,00	-	-	0,00	0,00	-
6	17 597	17 599	2,38	108,9	0,00	95,91	-	-	0,00	0,00	-
61	14 154	14 155	0,13	106,0	0,00	94,02	-	-	0,00	0,00	-
62	13 623	13 624	0,60	106,0	0,00	93,69	-	-	0,00	0,00	-
63	12 987	12 988	1,18	106,0	0,00	93,27	-	-	0,00	0,00	-
64	14 672	14 673	-0,31	106,0	0,00	94,33	-	-	0,00	0,00	-
65	15 368	15 369	-0,87	106,0	0,00	94,73	-	-	0,00	0,00	-
66	16 119	16 121	-1,44	106,0	0,00	95,15	-	-	0,00	0,00	-
67	14 882	14 883	-0,45	106,0	0,00	94,45	-	-	0,00	0,00	-
68	16 143	16 145	-1,45	106,0	0,00	95,16	-	-	0,00	0,00	-
69	16 775	16 776	-1,93	106,0	0,00	95,49	-	-	0,00	0,00	-
7	17 663	17 665	2,43	108,9	0,00	95,94	-	-	0,00	0,00	-
70	15 335	15 337	-0,82	106,0	0,00	94,71	-	-	0,00	0,00	-
71	14 171	14 173	0,14	106,0	0,00	94,03	-	-	0,00	0,00	-
72	13 102	13 103	1,10	106,0	0,00	93,35	-	-	0,00	0,00	-
73	13 165	13 166	1,05	106,0	0,00	93,39	-	-	0,00	0,00	-
74	14 563	14 564	-0,16	106,0	0,00	94,27	-	-	0,00	0,00	-
75	14 251	14 252	0,11	106,0	0,00	94,08	-	-	0,00	0,00	-
76	12 386	12 387	1,77	106,0	0,00	92,86	-	-	0,00	0,00	-
77	11 772	11 774	2,38	106,0	0,00	92,42	-	-	0,00	0,00	-
78	10 605	10 606	3,65	106,0	0,00	91,51	-	-	0,00	0,00	-
79	9 895	9 897	4,50	106,0	0,00	90,91	-	-	0,00	0,00	-
8	18 533	18 535	1,72	108,9	0,00	96,36	-	-	0,00	0,00	-
80	9 367	9 369	5,16	106,0	0,00	90,43	-	-	0,00	0,00	-
81	10 253	10 255	4,07	106,0	0,00	91,22	-	-	0,00	0,00	-
82	11 197	11 198	3,00	106,0	0,00	91,98	-	-	0,00	0,00	-
83	10 855	10 857	3,35	106,0	0,00	91,71	-	-	0,00	0,00	-
84	11 430	11 431	2,73	106,0	0,00	92,16	-	-	0,00	0,00	-
85	11 868	11 870	2,27	106,0	0,00	92,49	-	-	0,00	0,00	-
86	12 419	12 420	1,72	106,0	0,00	92,88	-	-	0,00	0,00	-
87	10 526	10 528	3,77	106,0	0,00	91,45	-	-	0,00	0,00	-
88	11 074	11 076	3,15	106,0	0,00	91,89	-	-	0,00	0,00	-
89	11 701	11 703	2,45	106,0	0,00	92,37	-	-	0,00	0,00	-
9	20 789	20 790	0,25	108,9	0,00	97,36	-	-	0,00	0,00	-
90	12 136	12 138	2,04	106,0	0,00	92,68	-	-	0,00	0,00	-
91	12 751	12 752	1,46	106,0	0,00	93,11	-	-	0,00	0,00	-
92	11 330	11 332	2,88	106,0	0,00	92,09	-	-	0,00	0,00	-
93	10 615	10 617	3,70	106,0	0,00	91,52	-	-	0,00	0,00	-
94	9 940	9 942	4,52	106,0	0,00	90,95	-	-	0,00	0,00	-
95	10 113	10 115	4,32	106,0	0,00	91,10	-	-	0,00	0,00	-
96	9 480	9 481	5,11	106,0	0,00	90,54	-	-	0,00	0,00	-
97	10 799	10 800	3,51	106,0	0,00	91,67	-	-	0,00	0,00	-
98	11 815	11 816	2,39	106,0	0,00	92,45	-	-	0,00	0,00	-
99	11 110	11 112	3,12	106,0	0,00	91,92	-	-	0,00	0,00	-
T1	8 779	8 782	12,71	110,1	0,00	89,87	-	-	0,00	0,00	-
T10	8 649	8 652	11,97	110,1	0,00	89,74	-	-	0,00	0,00	-
T11	10 073	10 075	9,90	110,1	0,00	91,07	-	-	0,00	0,00	-
T12	7 349	7 352	13,93	110,1	0,00	88,33	-	-	0,00	0,00	-
T13	7 785	7 788	12,96	110,1	0,00	88,83	-	-	0,00	0,00	-
T14	8 920	8 923	11,25	110,1	0,00	90,01	-	-	0,00	0,00	-
T15	9 939	9 941	9,82	110,1	0,00	90,95	-	-	0,00	0,00	-
T16	6 632	6 635	14,80	110,1	0,00	87,44	-	-	0,00	0,00	-
T17	8 172	8 175	12,18	110,1	0,00	89,25	-	-	0,00	0,00	-
T18	9 250	9 253	10,62	110,1	0,00	90,33	-	-	0,00	0,00	-
T19	6 113	6 117	15,75	110,1	0,00	86,73	-	-	0,00	0,00	-
T2	8 894	8 896	12,43	110,1	0,00	89,98	-	-	0,00	0,00	-
T20	7 232	7 235	13,60	110,1	0,00	88,19	-	-	0,00	0,00	-
T21	8 727	8 730	11,25	110,1	0,00	89,82	-	-	0,00	0,00	-
T22	6 413	6 417	15,04	110,1	0,00	87,15	-	-	0,00	0,00	-
T23	7 461	7 464	13,20	110,1	0,00	88,46	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

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WTG

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]
T24	9 167	9 169	10,63	110,1	0,00	90,25	-	-	0,00	0,00	-
T25	6 781	6 784	14,33	110,1	0,00	87,63	-	-	0,00	0,00	-
T26	7 729	7 732	12,75	110,1	0,00	88,77	-	-	0,00	0,00	-
T27	8 983	8 986	10,87	110,1	0,00	90,07	-	-	0,00	0,00	-
T28	6 771	6 774	14,34	110,1	0,00	87,62	-	-	0,00	0,00	-
T29	8 108	8 111	12,15	110,1	0,00	89,18	-	-	0,00	0,00	-
T3	7 988	7 991	13,69	110,1	0,00	89,05	-	-	0,00	0,00	-
T4	8 720	8 723	12,40	110,1	0,00	89,81	-	-	0,00	0,00	-
T5	7 259	7 262	14,70	110,1	0,00	88,22	-	-	0,00	0,00	-
T6	8 428	8 431	12,52	110,1	0,00	89,52	-	-	0,00	0,00	-
T7	9 461	9 463	11,02	110,1	0,00	90,52	-	-	0,00	0,00	-
T8	10 335	10 338	9,77	110,1	0,00	91,29	-	-	0,00	0,00	-
T9	7 165	7 168	14,53	110,1	0,00	88,11	-	-	0,00	0,00	-
Sum			28,30								

- Data undefined due to calculation with octave data

Noise sensitive area: O Lomarakennus O (Kuusela)

Wind speed: 8,0 m/s

WTG

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]
1	17 567	17 569	2,43	108,9	0,00	95,89	-	-	0,00	0,00	-
10	19 459	19 460	1,10	108,9	0,00	96,78	-	-	0,00	0,00	-
100	11 559	11 560	2,64	106,0	0,00	92,26	-	-	0,00	0,00	-
101	8 837	8 839	5,87	106,0	0,00	89,93	-	-	0,00	0,00	-
102	9 713	9 715	4,77	106,0	0,00	90,75	-	-	0,00	0,00	-
11	18 664	18 665	1,74	108,9	0,00	96,42	-	-	0,00	0,00	-
12	18 234	18 235	1,98	108,9	0,00	96,22	-	-	0,00	0,00	-
13	19 634	19 635	1,07	108,9	0,00	96,86	-	-	0,00	0,00	-
14	22 272	22 273	-0,64	108,9	0,00	97,96	-	-	0,00	0,00	-
15	19 159	19 161	1,34	108,9	0,00	96,65	-	-	0,00	0,00	-
16	20 207	20 209	0,65	108,9	0,00	97,11	-	-	0,00	0,00	-
17	20 514	20 516	0,51	108,9	0,00	97,24	-	-	0,00	0,00	-
18	21 397	21 398	-0,05	108,9	0,00	97,61	-	-	0,00	0,00	-
19	21 256	21 257	-0,01	108,9	0,00	97,55	-	-	0,00	0,00	-
2	18 479	18 481	1,80	108,9	0,00	96,33	-	-	0,00	0,00	-
20	22 940	22 941	-1,02	108,9	0,00	98,21	-	-	0,00	0,00	-
21	22 107	22 108	-0,53	108,9	0,00	97,89	-	-	0,00	0,00	-
22	23 726	23 727	-1,40	108,9	0,00	98,50	-	-	0,00	0,00	-
23	23 964	23 966	-1,59	108,9	0,00	98,59	-	-	0,00	0,00	-
24	21 202	21 203	0,00	108,9	0,00	97,53	-	-	0,00	0,00	-
25	23 708	23 709	-1,46	108,9	0,00	98,50	-	-	0,00	0,00	-
26	24 700	24 701	-1,93	108,9	0,00	98,85	-	-	0,00	0,00	-
27	24 644	24 645	-1,97	108,9	0,00	98,83	-	-	0,00	0,00	-
28	22 982	22 983	-1,04	108,9	0,00	98,23	-	-	0,00	0,00	-
29	22 178	22 179	-0,52	108,9	0,00	97,92	-	-	0,00	0,00	-
3	18 086	18 088	2,03	108,9	0,00	96,15	-	-	0,00	0,00	-
30	20 285	20 287	0,57	108,9	0,00	97,14	-	-	0,00	0,00	-
31	22 987	22 988	-1,05	108,9	0,00	98,23	-	-	0,00	0,00	-
4	18 960	18 961	1,43	108,9	0,00	96,56	-	-	0,00	0,00	-
5	19 899	19 901	0,81	108,9	0,00	96,98	-	-	0,00	0,00	-
6	17 542	17 544	2,42	108,9	0,00	95,88	-	-	0,00	0,00	-
61	14 097	14 098	0,18	106,0	0,00	93,98	-	-	0,00	0,00	-
62	13 565	13 567	0,65	106,0	0,00	93,65	-	-	0,00	0,00	-
63	12 930	12 931	1,23	106,0	0,00	93,23	-	-	0,00	0,00	-
64	14 614	14 616	-0,26	106,0	0,00	94,30	-	-	0,00	0,00	-
65	15 309	15 310	-0,82	106,0	0,00	94,70	-	-	0,00	0,00	-
66	16 060	16 061	-1,39	106,0	0,00	95,12	-	-	0,00	0,00	-
67	14 822	14 824	-0,40	106,0	0,00	94,42	-	-	0,00	0,00	-
68	16 082	16 084	-1,41	106,0	0,00	95,13	-	-	0,00	0,00	-
69	16 714	16 715	-1,88	106,0	0,00	95,46	-	-	0,00	0,00	-
7	17 612	17 613	2,46	108,9	0,00	95,92	-	-	0,00	0,00	-
70	15 274	15 275	-0,77	106,0	0,00	94,68	-	-	0,00	0,00	-
71	14 111	14 112	0,20	106,0	0,00	93,99	-	-	0,00	0,00	-

To be continued on next page...

DECIBEL - Detailed results

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiakangas Noise calculation model: ISO 9613-2 General 8,0 m/s

...continued from previous page

WTG

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]
72	13 043	13 044	1,16	106,0	0,00	93,31	-	-	0,00	0,00	-
73	13 104	13 105	1,10	106,0	0,00	93,35	-	-	0,00	0,00	-
74	14 501	14 502	-0,11	106,0	0,00	94,23	-	-	0,00	0,00	-
75	14 187	14 189	0,16	106,0	0,00	94,04	-	-	0,00	0,00	-
76	12 318	12 319	1,84	106,0	0,00	92,81	-	-	0,00	0,00	-
77	11 705	11 706	2,46	106,0	0,00	92,37	-	-	0,00	0,00	-
78	10 537	10 539	3,73	106,0	0,00	91,46	-	-	0,00	0,00	-
79	9 827	9 829	4,58	106,0	0,00	90,85	-	-	0,00	0,00	-
8	18 478	18 480	1,76	108,9	0,00	96,33	-	-	0,00	0,00	-
80	9 299	9 301	5,25	106,0	0,00	90,37	-	-	0,00	0,00	-
81	10 184	10 186	4,15	106,0	0,00	91,16	-	-	0,00	0,00	-
82	11 129	11 130	3,07	106,0	0,00	91,93	-	-	0,00	0,00	-
83	10 798	10 800	3,42	106,0	0,00	91,67	-	-	0,00	0,00	-
84	11 374	11 375	2,79	106,0	0,00	92,12	-	-	0,00	0,00	-
85	11 811	11 812	2,33	106,0	0,00	92,45	-	-	0,00	0,00	-
86	12 361	12 362	1,78	106,0	0,00	92,84	-	-	0,00	0,00	-
87	10 467	10 468	3,85	106,0	0,00	91,40	-	-	0,00	0,00	-
88	11 015	11 017	3,22	106,0	0,00	91,84	-	-	0,00	0,00	-
89	11 642	11 644	2,54	106,0	0,00	92,32	-	-	0,00	0,00	-
9	20 732	20 734	0,29	108,9	0,00	97,33	-	-	0,00	0,00	-
90	12 075	12 077	2,12	106,0	0,00	92,64	-	-	0,00	0,00	-
91	12 689	12 690	1,53	106,0	0,00	93,07	-	-	0,00	0,00	-
92	11 269	11 271	2,95	106,0	0,00	92,04	-	-	0,00	0,00	-
93	10 554	10 556	3,78	106,0	0,00	91,47	-	-	0,00	0,00	-
94	9 878	9 880	4,60	106,0	0,00	90,90	-	-	0,00	0,00	-
95	10 049	10 051	4,40	106,0	0,00	91,04	-	-	0,00	0,00	-
96	9 416	9 417	5,20	106,0	0,00	90,48	-	-	0,00	0,00	-
97	10 735	10 736	3,59	106,0	0,00	91,62	-	-	0,00	0,00	-
98	11 750	11 751	2,46	106,0	0,00	92,40	-	-	0,00	0,00	-
99	11 044	11 046	3,20	106,0	0,00	91,86	-	-	0,00	0,00	-
T1	8 734	8 737	12,50	110,1	0,00	89,83	-	-	0,00	0,00	-
T10	8 587	8 589	12,36	110,1	0,00	89,68	-	-	0,00	0,00	-
T11	10 009	10 011	10,24	110,1	0,00	91,01	-	-	0,00	0,00	-
T12	7 286	7 289	14,33	110,1	0,00	88,25	-	-	0,00	0,00	-
T13	7 719	7 722	13,24	110,1	0,00	88,75	-	-	0,00	0,00	-
T14	8 854	8 857	11,51	110,1	0,00	89,95	-	-	0,00	0,00	-
T15	9 872	9 875	10,08	110,1	0,00	90,89	-	-	0,00	0,00	-
T16	6 565	6 569	15,10	110,1	0,00	87,35	-	-	0,00	0,00	-
T17	8 105	8 108	12,47	110,1	0,00	89,18	-	-	0,00	0,00	-
T18	9 182	9 185	10,87	110,1	0,00	90,26	-	-	0,00	0,00	-
T19	6 045	6 048	15,94	110,1	0,00	86,63	-	-	0,00	0,00	-
T2	8 844	8 846	12,35	110,1	0,00	89,94	-	-	0,00	0,00	-
T20	7 163	7 166	13,71	110,1	0,00	88,11	-	-	0,00	0,00	-
T21	8 658	8 661	11,35	110,1	0,00	89,75	-	-	0,00	0,00	-
T22	6 343	6 347	15,19	110,1	0,00	87,05	-	-	0,00	0,00	-
T23	7 391	7 394	13,31	110,1	0,00	88,38	-	-	0,00	0,00	-
T24	9 097	9 099	10,72	110,1	0,00	90,18	-	-	0,00	0,00	-
T25	6 711	6 714	14,45	110,1	0,00	87,54	-	-	0,00	0,00	-
T26	7 659	7 662	12,86	110,1	0,00	88,69	-	-	0,00	0,00	-
T27	8 913	8 916	10,97	110,1	0,00	90,00	-	-	0,00	0,00	-
T28	6 703	6 707	14,46	110,1	0,00	87,53	-	-	0,00	0,00	-
T29	8 039	8 042	12,26	110,1	0,00	89,11	-	-	0,00	0,00	-
T3	7 936	7 939	13,68	110,1	0,00	89,00	-	-	0,00	0,00	-
T4	8 664	8 667	12,54	110,1	0,00	89,76	-	-	0,00	0,00	-
T5	7 204	7 207	14,81	110,1	0,00	88,16	-	-	0,00	0,00	-
T6	8 368	8 371	12,80	110,1	0,00	89,46	-	-	0,00	0,00	-
T7	9 401	9 403	11,32	110,1	0,00	90,47	-	-	0,00	0,00	-
T8	10 274	10 276	10,11	110,1	0,00	91,24	-	-	0,00	0,00	-
T9	7 106	7 109	14,84	110,1	0,00	88,04	-	-	0,00	0,00	-
Sum			28,46								

- Data undefined due to calculation with octave data

Project:
Haarasuonkangas

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 19.07/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise calculation model:

ISO 9613-2 General

Wind speed (in 10 m height):

8,0 m/s

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 0,4

Area object with hard ground: Area object (Roughness): REGIONS_Haarasuonkangas_melu ja varjot_1.w2r (11)

Area type with hard ground: Vesistöt

Ground factor for hard ground: 0,0

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:

Ignore pure tones setting on WTG

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

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

0,0 dB; Uncertainty margin in NSA 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]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 7200 250.0 !O!

Noise: V172 - 7,2 MW PO7200 STE + 2dB

Source Source/Date Creator Edited

Vestas 15.11.2022 USER 29.11.2022 14.53

DMS no.: 0128-4336_00

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63	125	250	500	1000	2000	4000	8000	
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	225,0	8,0	108,9	No	92,4	100,0	103,3	103,5	101,9	97,4	89,9	79,2	

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited

Manufacturer 8.7.2022 USER 8.5.2023 15.45

Based on Document no.: 0127-1584 V01.

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	110,1	No	91,5	100,2	104,1	105,0	103,7	99,3	91,6	80,8

WTG: NORDEX N149/4.0-4.5 4500 180.0 !O!

Noise: Serrations Mode 00 - 106.0 dB(A) octave data only

Source Source/Date Creator Edited

F008_271_A13_R01 30.6.2017 USER 10.11.2022 10.32

Mode available on request

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data							
					63	125	250	500	1000	2000	4000	8000
					[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	190,0	8,0	106,0	No	88,0	94,0	98,0	100,0	101,0	98,0	91,0	83,0

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: B Asuinrakennus B (Syväänlahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 19.07/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiankangas

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard:

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

Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard:

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

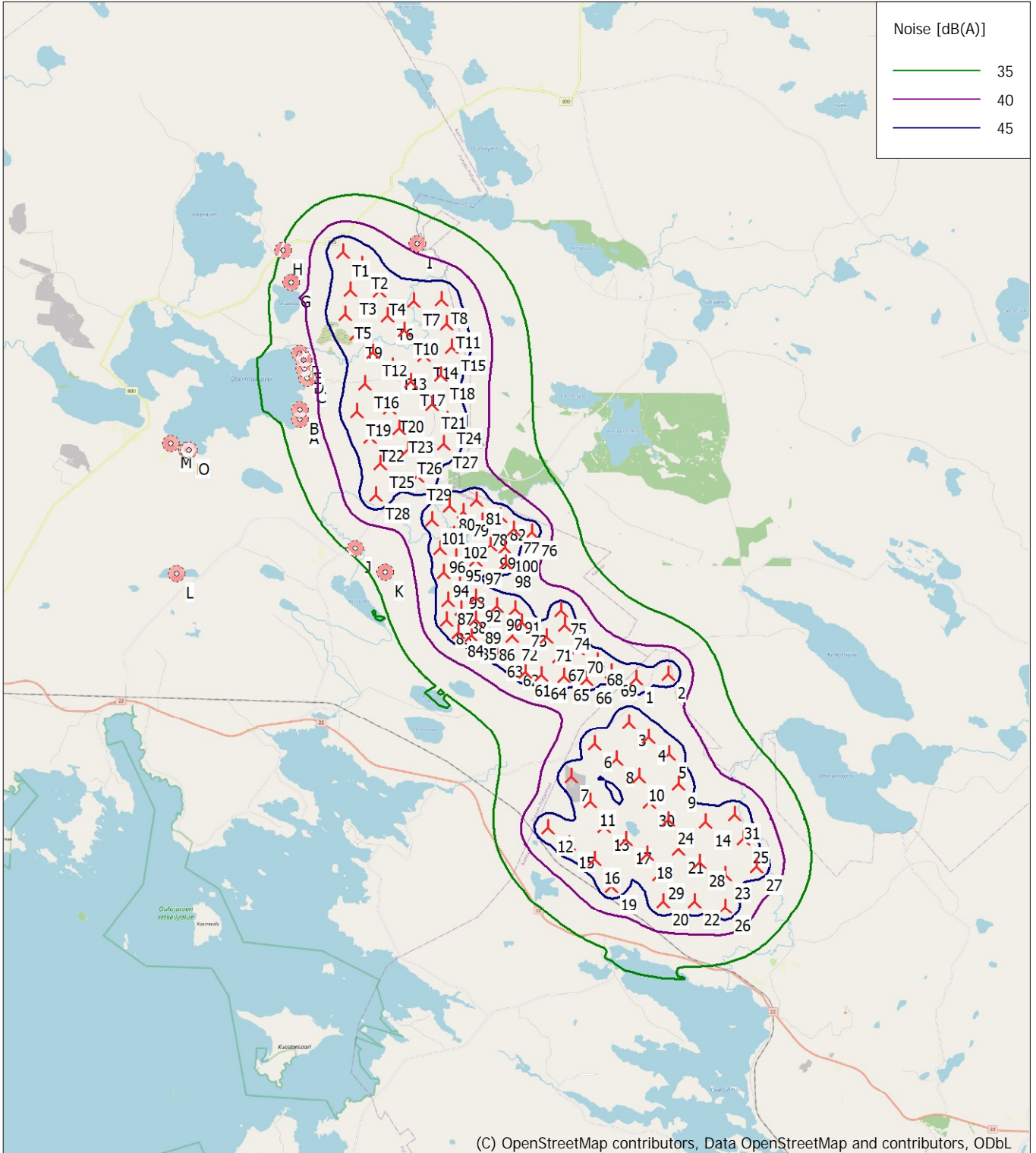
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)

No distance demand

DECIBEL - Map 8,0 m/s

Calculation: Haarasuonkangas_VE2_V172x39xHH214_2023058 + Turkkiselkä + Takiangkangas



Map: EMD OpenStreetMap, Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 514 339 North: 7 163 440
 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

Liite 9. Matalataajuisen melun yhteisvaikutuksen rakennuskohtaiset arvot – VE1

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 20.42/3.5.584

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 m; Don't allow override of model height with height from NSA object

Uncertainty margin:

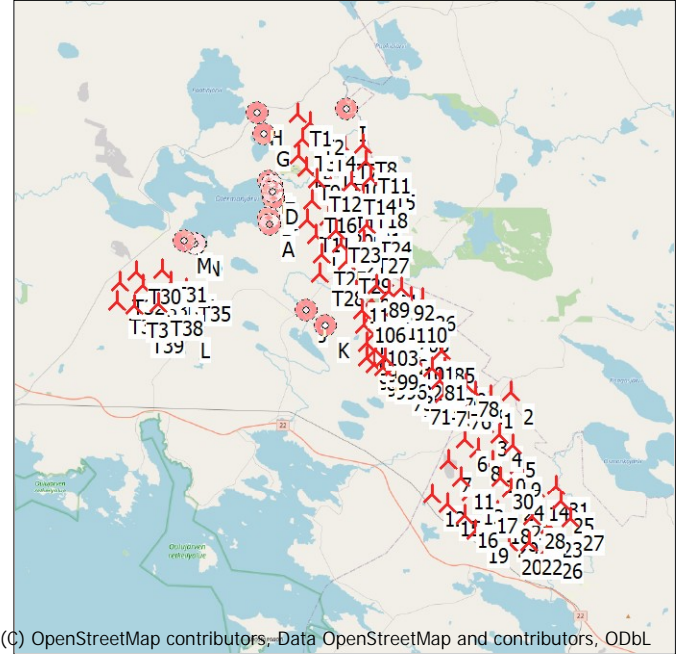
0,0 dB; Uncertainty margin in model has priority

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

0,0 dB(A)

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:400 000

New WTG

Noise sensitive area

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTGs

Table with columns: East, North, Z, Row data/Description, WTG type, Valid, Manufact., Type-generator, Power, rated, Rotor diameter, Hub height, Noise data, Creator, Name, First wind speed, LwaRef, Last wind speed, LwaRef.

To be continued on next page...

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+ 358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 20.42/3.5.584

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

...continued from previous page

	East	North	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]							
82	514 251	7 161 482	138,1	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
83	514 587	7 161 973	140,0	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
84	516 095	7 161 880	142,5	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
85	515 968	7 162 365	143,8	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
86	514 920	7 165 135	143,3	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
87	514 309	7 165 216	143,5	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
88	513 180	7 165 515	143,2	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
89	512 525	7 165 835	140,7	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
9	520 096	7 156 333	164,3	VESTAS V172-7.2 7200 250.0 IOI Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	USER	V172 - 7,2 MW PO7200 STE + 2dB	8,0	102,6	8,0	102,6	
90	512 030	7 166 046	139,7	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
91	512 970	7 166 250	144,6	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
92	513 824	7 165 685	143,8	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
93	511 955	7 162 030	134,6	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
94	512 368	7 161 612	135,2	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
95	512 831	7 161 519	136,4	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
96	513 463	7 161 490	137,5	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
97	512 000	7 162 735	139,8	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
98	512 460	7 162 435	142,8	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
99	512 970	7 162 065	141,5	NORDEX N149/4.0-4.5 4500 180.... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	USER	Serrations Mode 00 - 106.0 dB(A) octave data only	8,0	96,4	8,0	96,4	
T0	508 282	7 174 861	157,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T10	510 426	7 172 148	146,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T11	511 902	7 172 395	147,2	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T12	509 346	7 171 412	143,2	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T13	510 056	7 170 927	146,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T14	511 130	7 171 298	148,8	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T15	512 122	7 171 550	159,0	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T16	509 073	7 170 275	147,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T17	510 668	7 170 368	152,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T18	511 731	7 170 576	165,0	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T19	508 820	7 169 317	148,1	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T2	508 948	7 174 439	157,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T20	509 941	7 169 425	149,8	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T21	511 434	7 169 585	157,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T22	509 256	7 168 427	147,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T23	510 283	7 168 708	149,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T24	511 959	7 169 067	152,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T25	509 625	7 167 494	142,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T26	510 589	7 167 991	147,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T27	511 839	7 168 207	148,1	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T28	509 456	7 166 427	142,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T29	510 920	7 167 074	142,1	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T3	508 557	7 173 555	151,9	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T30	499 777	7 166 541	137,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T31	501 112	7 166 571	140,0	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T32	498 884	7 165 924	140,0	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T33	500 060	7 165 826	146,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T34	501 577	7 165 939	141,7	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T35	502 368	7 165 645	147,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T36	498 706	7 164 985	147,2	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T37	499 643	7 164 765	154,4	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T38	500 913	7 164 850	150,0	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T39	499 856	7 163 927	147,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T4	509 564	7 173 532	152,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T5	508 354	7 172 700	144,8	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T6	509 849	7 172 666	152,5	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T7	510 753	7 173 171	147,6	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0	102,8	
T8	511 738	7 173 247	154,9	VESTAS V172-7.2 HH214 7200 17.... Yes	VESTAS	V172-7.2 HH214-7 200	7 200	172,0	214,0	USER	Level OS - Measured - PO7200-05 - 07-2022	8,0	102,8	8,0		

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas
Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	14841	15043	15555	15832	16100	16350	18351	19383	16989	10816	9530	16500	18226	17629	17567
10	17232	17467	18116	18417	18710	18968	21130	22204	20165	12731	11401	17677	20098	19514	19459
100	9485	9710	10340	10640	10935	11193	13393	14485	12936	5336	4079	11272	12734	12136	12075
101	10019	10237	10830	11124	11412	11669	13822	14903	13178	5965	4719	11917	13350	12751	12689
102	8745	8978	9643	9950	10252	10511	12757	13860	12517	4524	3269	10487	11928	11330	11269
103	8012	8247	8925	9234	9538	9798	12065	13173	11964	3832	2618	9901	11214	10615	10554
104	7332	7570	8265	8577	8885	9145	11438	12551	11493	3186	2038	9346	10539	9940	9878
105	7264	7483	8101	8402	8698	8957	11180	12280	11007	3510	2516	9784	10713	10113	10049
106	6650	6875	7521	7827	8128	8388	10648	11756	10666	2929	2062	9240	10079	9480	9416
107	7868	8076	8648	8941	9228	9484	11649	12736	11231	4206	3174	10466	11398	10799	10735
108	8760	8953	9454	9734	10006	10258	12329	13392	11552	5261	4211	11512	12413	11815	11750
109	7965	8152	8636	8913	9184	9436	11505	12570	10808	4706	3789	11020	11707	11110	11044
11	16785	17040	17781	18096	18406	18666	20940	22042	20393	12069	10755	16528	19284	18715	18664
110	8450	8631	9089	9361	9626	9875	11904	12958	11047	5208	4254	11513	12222	11625	11559
111	5792	5996	6570	6868	7160	7417	9634	10736	9635	2849	2455	9132	9499	8904	8837
112	6696	6896	7446	7737	8023	8279	10449	11539	10184	3475	2754	9806	10376	9779	9713
12	16716	16987	17809	18134	18455	18716	21074	22195	20906	11863	10596	15748	18831	18280	18234
13	17797	18053	18799	19114	19424	19684	21958	23061	21386	13066	11756	17412	20250	19684	19634
14	19986	20215	20832	21126	21413	21669	23776	24834	22562	15537	14207	20455	22912	22327	22272
15	17585	17853	18659	18982	19301	19562	21901	23018	21618	12753	11475	16689	19759	19206	19159
16	18564	18829	19614	19935	20250	20512	22827	23939	22411	13759	12470	17765	20810	20255	20207
17	18634	18887	19618	19931	20239	20499	22753	23851	22080	13928	12614	18305	21133	20565	20514
18	19479	19729	20447	20757	21062	21322	23558	24650	22793	14795	13478	19197	22016	21447	21397
19	19633	19898	20682	21002	21318	21579	23891	25002	23435	14825	13538	18758	21856	21303	21256
2	15625	15815	16273	16539	16796	17041	18961	19969	17355	11759	10494	17541	19141	18542	18479
20	21146	21401	22141	22455	22763	23023	25280	26378	24561	16409	15102	20564	23550	22989	22940
21	20039	20281	20958	21262	21560	21818	24002	25081	23038	15441	14115	20046	22735	22159	22107
22	21801	22049	22754	23063	23365	23625	25839	26925	24943	17129	15810	21464	24344	23776	23726
23	21818	22054	22702	23001	23293	23550	25691	26757	24542	17275	15946	21938	24596	24018	23964
24	19052	19290	19950	20251	20546	20804	22971	24046	21972	14503	13174	19263	21835	21255	21202
25	21363	21587	22180	22470	22751	23006	25075	26122	23715	16962	15633	21917	24349	23763	23708
26	22677	22919	23596	23900	24197	24455	26631	27707	25584	18060	16736	22518	25323	24751	24700
27	22360	22587	23193	23486	23770	24025	26109	27159	24772	17914	16584	22757	25282	24699	24644
28	20882	21122	21786	22088	22383	22641	24806	25880	23759	16307	14979	20931	23611	23035	22982
29	20297	20549	21271	21582	21888	22148	24387	25480	23617	15598	14283	19914	22795	22228	22178
3	15627	15848	16441	16733	17016	17271	19371	20431	18265	11315	9994	16648	18737	18145	18086
30	18129	18367	19031	19333	19629	19887	22062	23140	21115	13581	12252	18388	20920	20339	20285
31	20570	20789	21364	21651	21930	22183	24231	25272	22826	16227	14900	21305	23633	23044	22987
4	16498	16718	17304	17594	17876	18130	20215	21270	19032	12190	10868	17482	19610	19018	18960
5	17439	17658	18238	18527	18807	19061	21132	22182	19878	13130	11807	18378	20548	19957	19899
6	15344	15583	16254	16559	16857	17115	19313	20399	18535	10815	9484	15818	18181	17597	17542
7	15707	15962	16705	17020	17330	17591	19869	20974	19379	10999	9683	15555	18235	17663	17612
71	11839	12081	12772	13080	13384	13643	15885	16984	15421	7339	6011	12678	14743	14154	14097
72	11301	11543	12239	12549	12853	13113	15365	16466	14966	6804	5477	12203	14213	13623	13565
73	10704	10950	11665	11978	12286	12546	14822	15929	14551	6172	4843	11585	13577	12987	12930
74	12280	12516	13179	13484	13782	14041	16250	17340	15644	7848	6523	13244	15263	14672	14614
75	12868	13096	13721	14019	14310	14567	16728	17806	15930	8536	7219	14016	15961	15368	15309
76	13535	13755	14347	14639	14923	15179	17293	18359	16319	9288	7977	14820	16714	16119	16060
77	12280	12501	13102	13396	13684	13940	16076	17149	15235	8053	6751	13693	15478	14882	14822
78	13397	13605	14145	14428	14703	14955	17007	18056	15854	9330	8045	15048	16741	16143	16082
79	14038	14245	14782	15065	15338	15590	17631	18677	16417	9956	8666	15628	17372	16775	16714
8	16261	16497	17156	17458	17754	18012	20190	21270	19312	11749	10419	16730	19118	18533	18478
80	12592	12802	13353	13638	13916	14169	16242	17298	15192	8526	7246	14291	15933	15335	15274
81	11494	11712	12299	12591	12877	13132	15261	16334	14441	7356	6073	13134	14769	14171	14111
82	10603	10836	11492	11796	12095	12353	14569	15663	14086	6271	4964	11944	13697	13102	13043
83	10505	10726	11335	11631	11921	12178	14343	15425	13696	6354	5079	12198	13763	13165	13104
84	11721	11925	12453	12735	13009	13261	15316	16368	14264	7790	6543	13706	15162	14563	14501
85	11329	11526	12030	12308	12578	12828	14860	15907	13767	7517	6301	13526	14850	14251	14187
86	8996	9149	9491	9740	9980	10220	12094	13107	10806	6182	5309	12510	12977	12386	12318
87	8413	8572	8943	9199	9447	9690	11617	12646	10516	5584	4749	11915	12365	11772	11705
88	7276	7444	7863	8130	8391	8638	10656	11711	9914	4522	3830	10845	11197	10605	10537
89	6548	6718	7154	7426	7691	7941	10001	11069	9468	3979	3457	10265	10486	9895	9827
9	18381	18607	19214	19507	19792	20047	22149	23206	20958	13980	12651	19046	21376	20789	20732
90	6013	6186	6641	6917	7188	7440	9539	10616	9186	3599	3233	9832	9956	9367	9299
91	6757	6905	7253	7507	7755	7999	9956	10999	9150	4542	4063	10793	10838	10253	10184
92	7770	7923	8276	8530	8776	9018	10944	11975	9920	5187	4480	11509	11786	11197	11129

To be continued on next page...

DECIBEL - Main Result

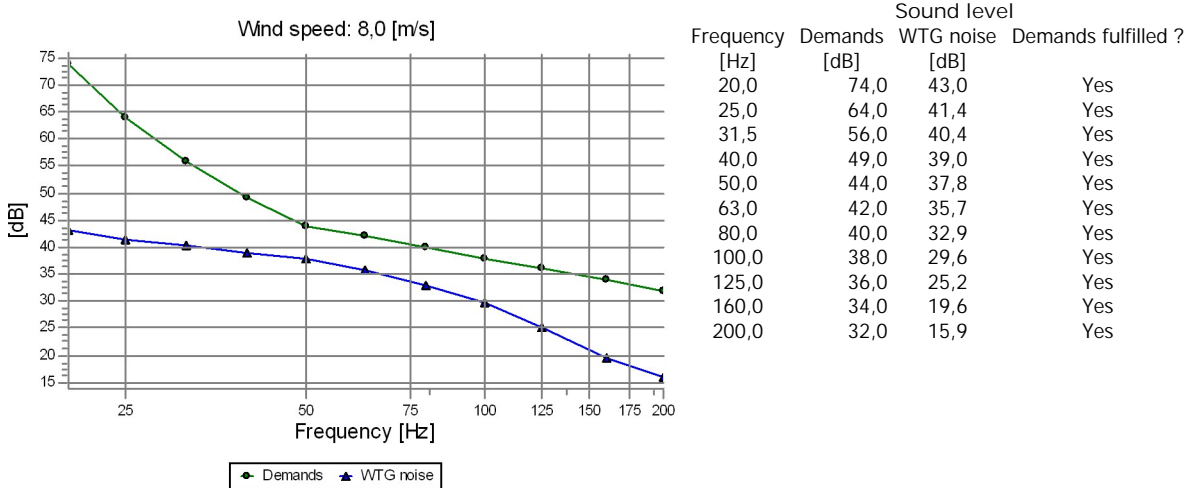
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

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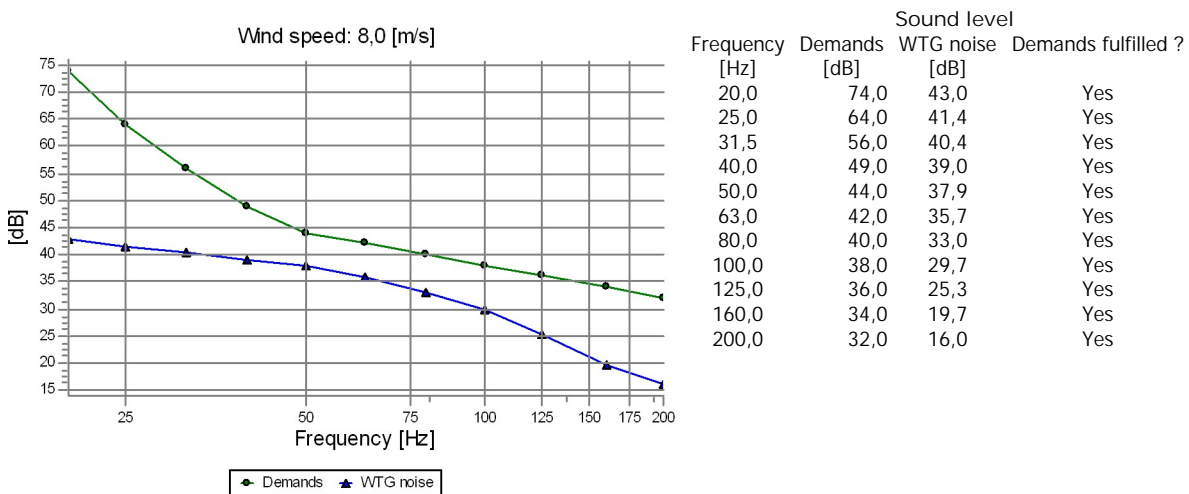
WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
93	8694	8953	9734	10056	10375	10636	12990	14113	13174	4047	2717	9588	11445	10855	10798
94	9275	9533	10304	10625	10942	11203	13544	14665	13629	4631	3301	10070	12019	11430	11374
95	9632	9884	10629	10946	11259	11520	13834	14949	13779	5054	3725	10542	12458	11868	11811
96	10061	10304	11009	11321	11627	11888	14159	15266	13911	5590	4269	11168	13012	12419	12361
97	8164	8414	9156	9474	9788	10049	12373	13492	12475	3695	2393	9541	11121	10526	10467
98	8690	8936	9660	9975	10286	10547	12850	13964	12822	4242	2936	10030	11669	11074	11015
99	9303	9547	10254	10567	10875	11135	13417	14526	13260	4869	3557	10585	12295	11701	11642
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T30	7471	7562	8247	8343	8473	8491	9912	10547	14064	9214	10427	3990	3016	3392	3457
T31	6218	6329	7083	7206	7365	7407	9035	9767	13015	7925	9160	3257	2008	2230	2287
T32	8524	8625	9327	9426	9559	9577	10974	11585	15148	9983	11150	4286	4102	4465	4529
T33	7483	7604	8370	8495	8652	8692	10268	10962	14297	8804	9978	3287	3257	3517	3575
T34	6090	6237	7081	7239	7429	7498	9295	10091	13106	7329	8532	2492	2361	2390	2431
T35	5598	5775	6697	6886	7105	7201	9163	10026	12774	6497	7692	2024	2541	2363	2381
T36	9070	9195	9964	10087	10240	10276	11785	12434	15875	10073	11178	4031	4817	5107	5166
T37	8353	8499	9327	9472	9649	9704	11362	12078	15316	9129	10222	3077	4335	4532	4584
T38	7241	7409	8296	8468	8669	8747	10571	11364	14348	7862	8970	2006	3614	3666	3706
T39	8639	8809	9699	9869	10067	10142	11920	12682	15746	8932	9956	2662	4913	5026	5070
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results, graphic

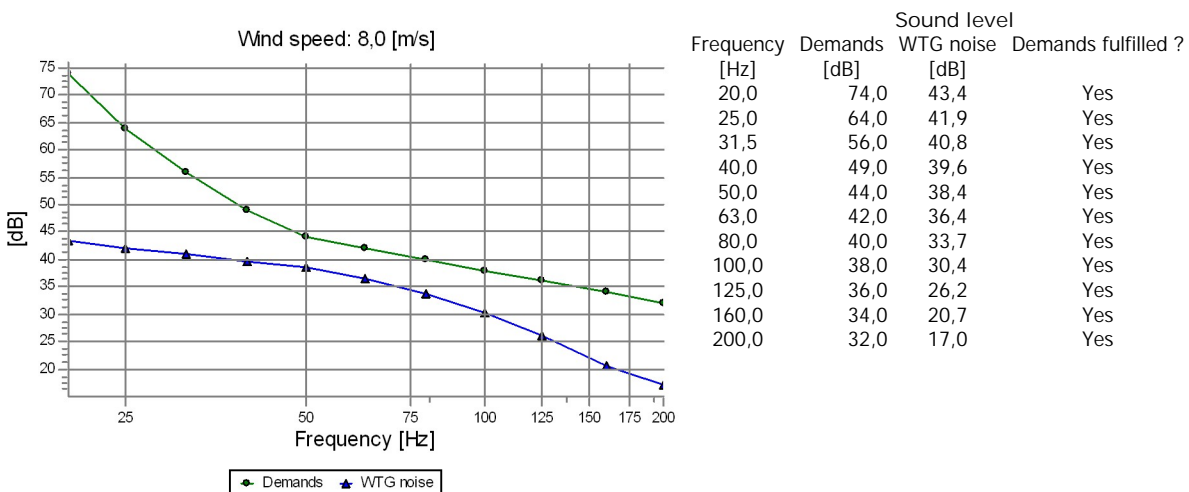
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
A Lomarakennus A (Syvälahti)



B Asuinrakennus B (Syväänlahti)

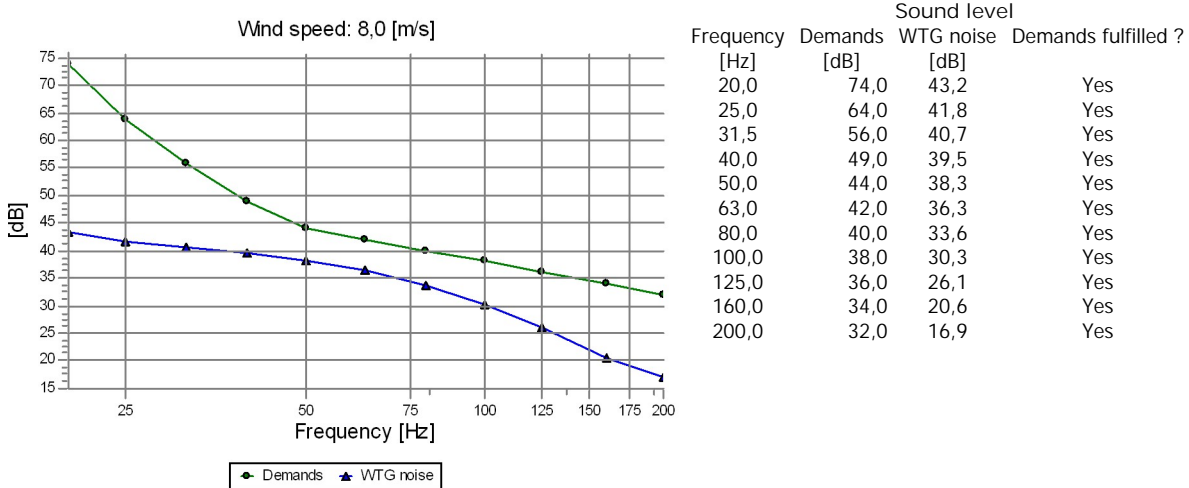


C Lomarakennus C (Mutalahti)

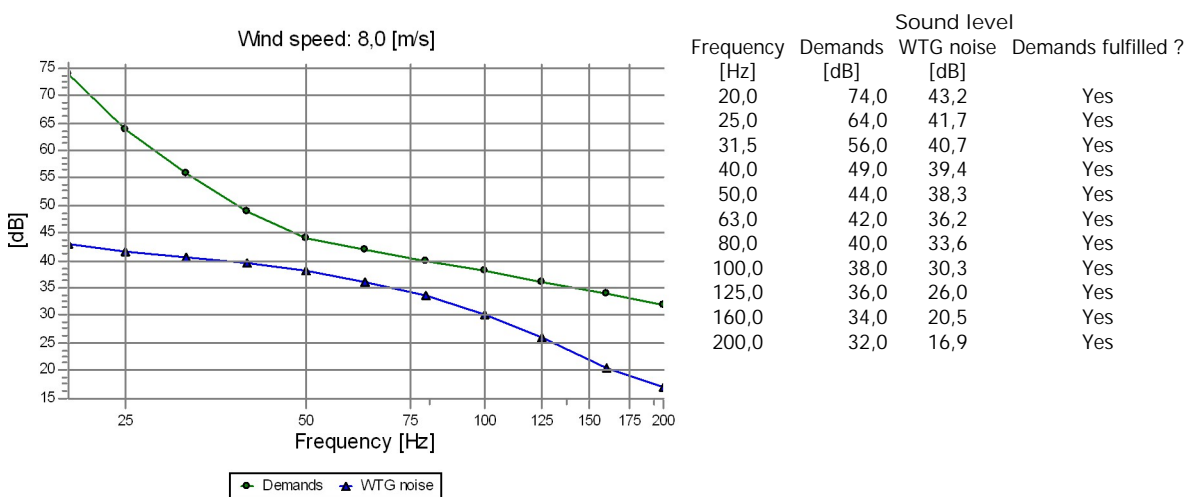


DECIBEL - Detailed results, graphic

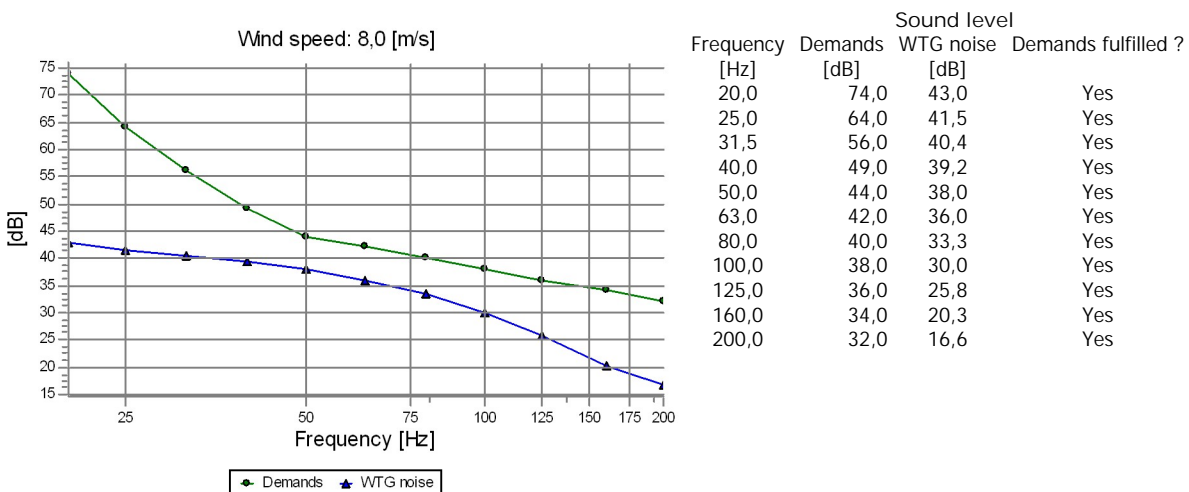
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
D Lomarakennus D (Mutaniemi)



E Asuinrakennus E (Alanko)

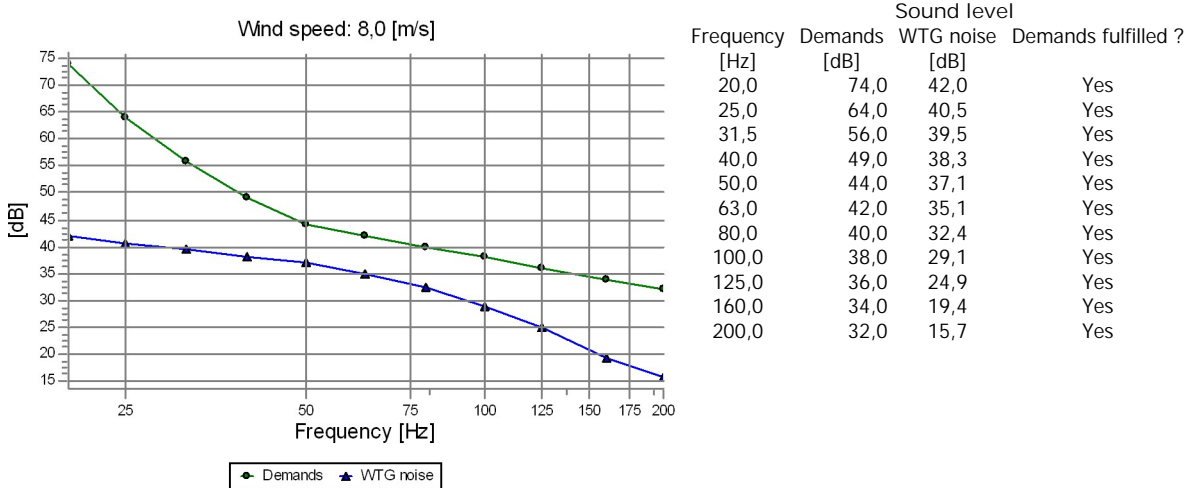


F Asuinrakennus F (Joensuu)

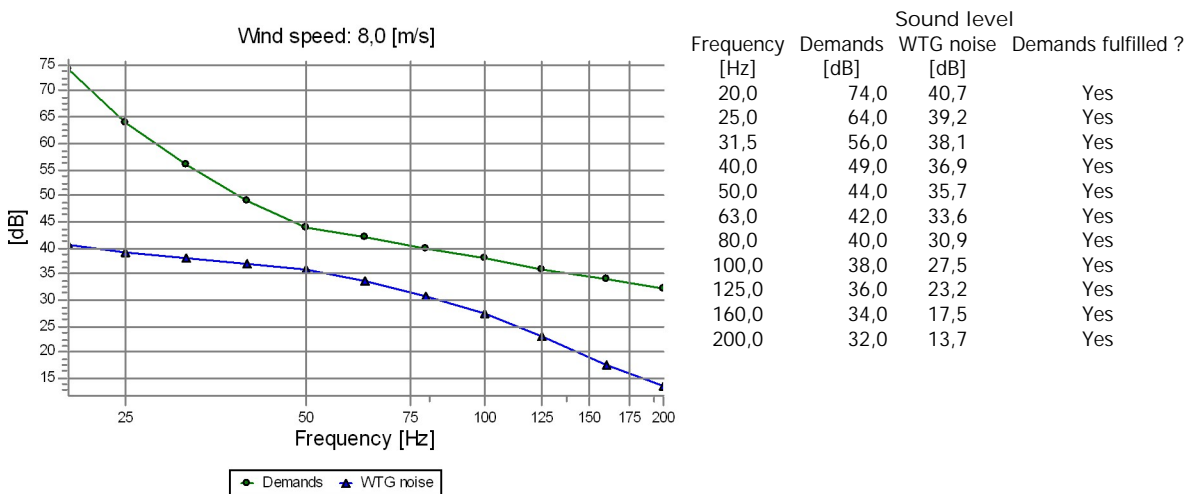


DECIBEL - Detailed results, graphic

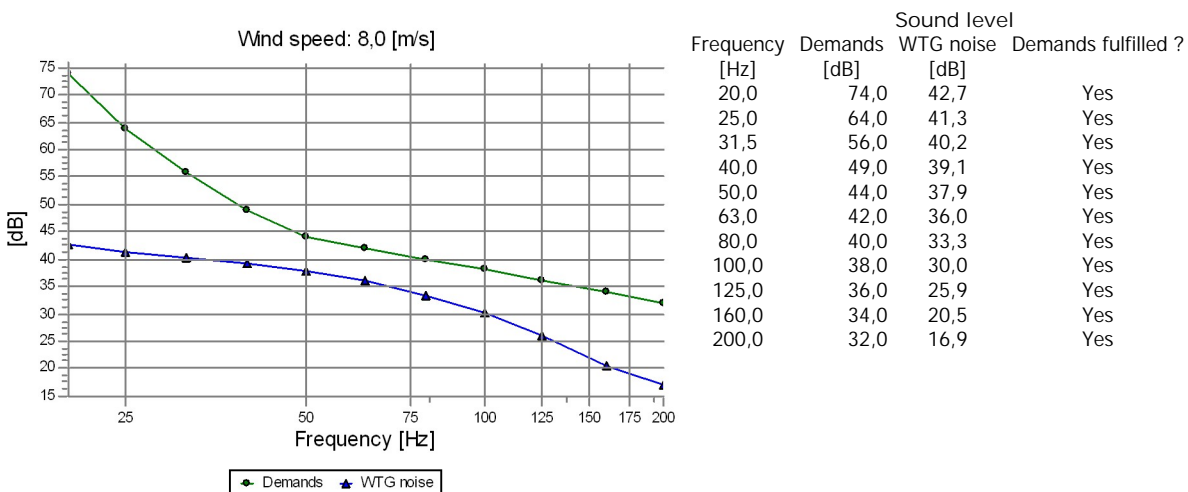
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
G Asuinrakennus G (Heiniäho)



H Asuinrakennus H (Mäkelä)

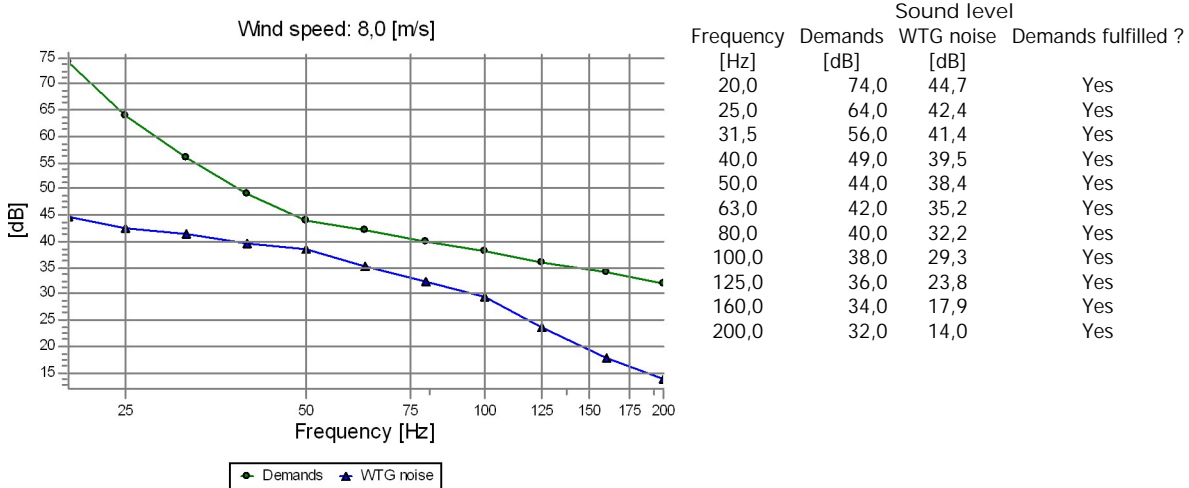


I Lomarakennus I

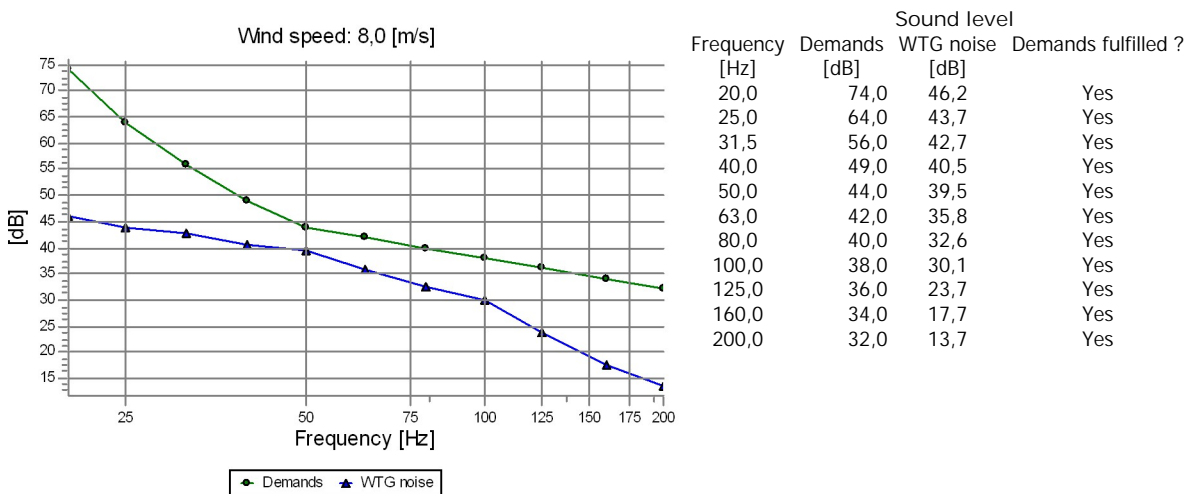


DECIBEL - Detailed results, graphic

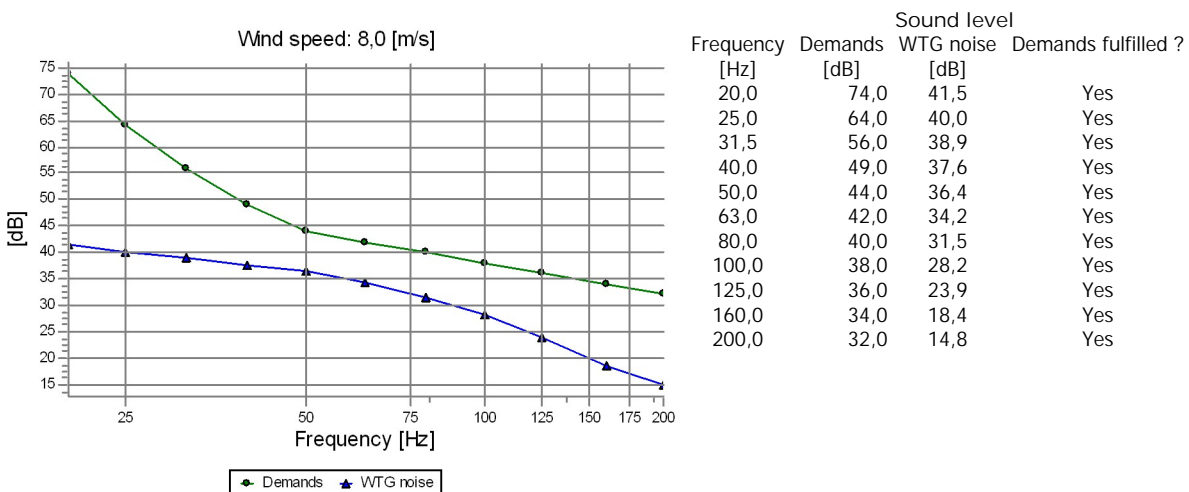
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
J Lomarakennus J (Hautakaarto)



K Asuinrakennus K (Takalo)

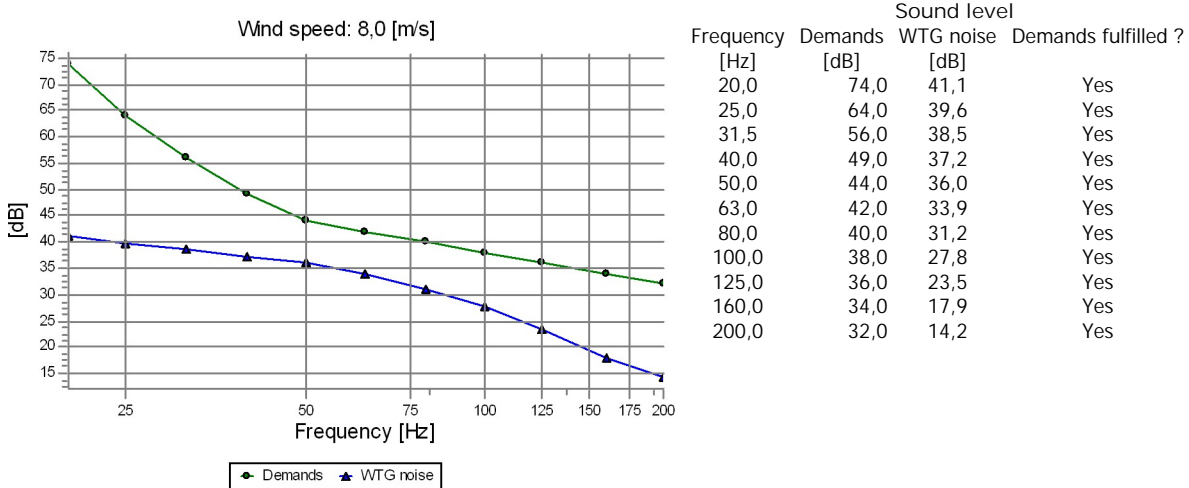


L Lomarakennus L (Haukijärvi)

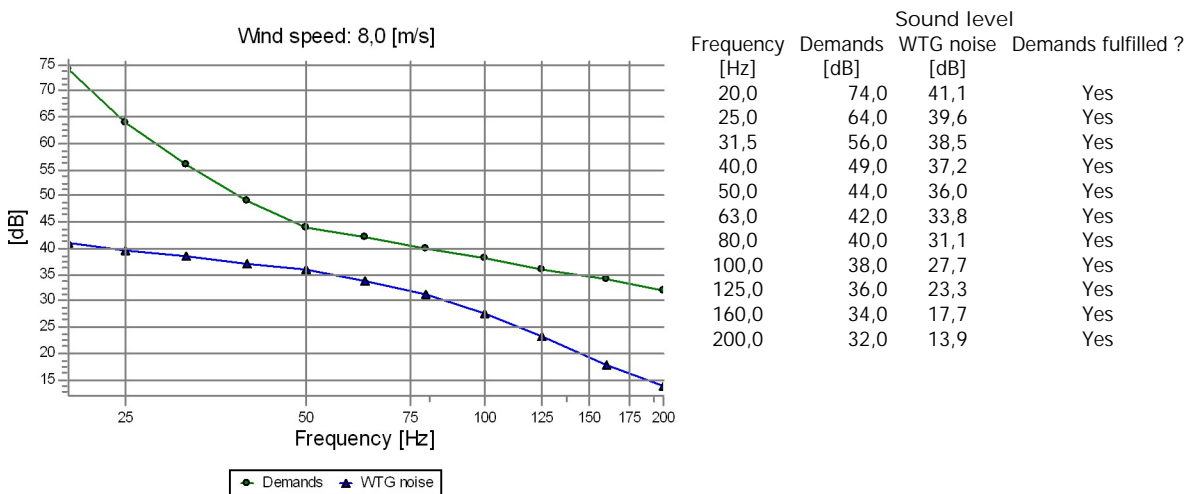


DECIBEL - Detailed results, graphic

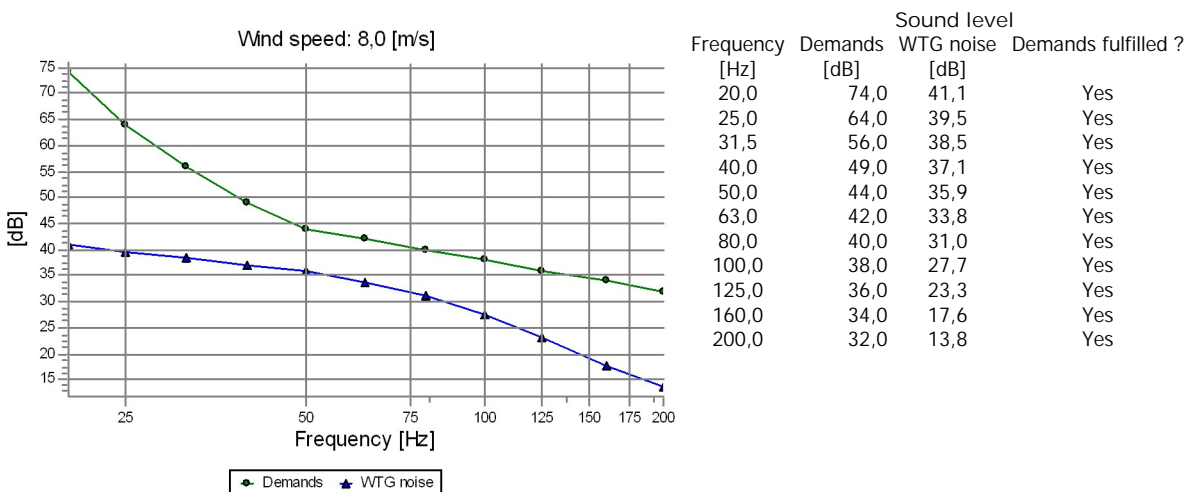
Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
M Lomarakennus M (Haukilahti)



N Lomarakennus N (Kuusela)



O Lomarakennus O (Kuusela)



Project:
Haarasuonkangas

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 20.42/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 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)

Low frequency calculation

dLsigma

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	200,0 Hz
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
7,6	8,3	9,2	10,3	11,5	13,0	14,8	16,8	18,8	21,1	22,8

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 7200 250.0 !O!

Noise: V172 - 7,2 MW PO7200 STE + 2dB

Source Source/Date Creator Edited

Vestas 15.11.2022 USER 29.11.2022 14.53

DMS no.: 0128-4336_00

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	225,0	8,0	102,6	63,7	68,9	73,8	78,6	83,0	86,8	90,2	92,9	95,2	96,8	98,0

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited

Manufacturer 8.7.2022 USER 8.5.2023 15.45

Based on Document no.: 0127-1584 V01.

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	102,8	60,4	66,1	71,5	76,7	81,5	85,8	89,5	92,6	95,2	97,2	98,6

WTG: NORDEX N149/4.0-4.5 4500 180.0 !O!

Noise: Serrations Mode 00 - 106.0 dB(A) octave data only

Source Source/Date Creator Edited

F008_271_A13_R01 30.6.2017 USER 9.5.2023 20.33

Mode available on request

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	190,0	8,0	96,4	62,8	66,7	72,2	75,8	80,9	82,2	85,0	89,7	88,2	89,5	90,8

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 20.42/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: B Asuinrakennus B (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 20.42/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE1_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Liite 10. Matalataajuisen melun yhteisvaikutuksen rakennuskohtaiset arvot - VE2

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Mikka Saranpää / mikka.saranpaa@fcg.fi
Calculated:
9.5.2023 20.43/3.5.584

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 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)

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

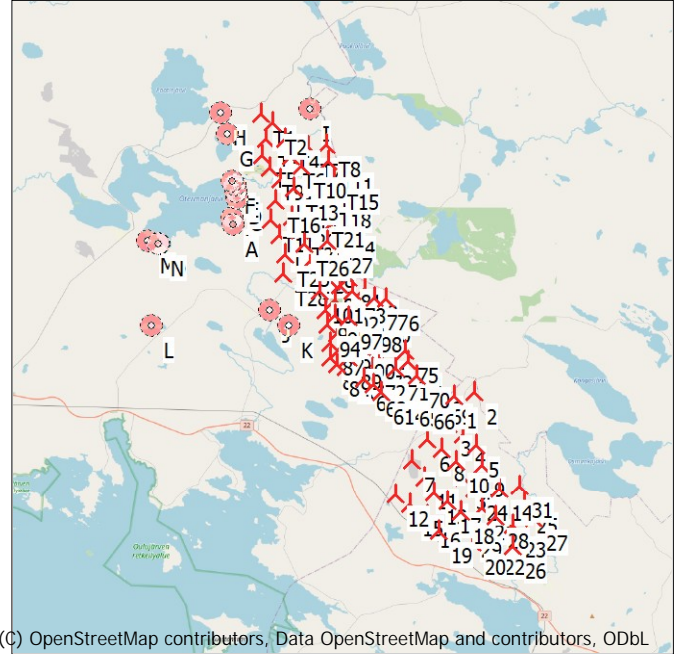
All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89

WTGs

Table with 17 columns: East, North, Z, Row data/Description, WTG type (Valid, Manufact., Type-generator), Power, rated, Rotor diameter, Hub height, Noise data (Creator, Name), First wind speed, LwaRef, Last wind speed, LwaRef. Contains 81 rows of turbine data.

To be continued on next page...



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:400 000
New WTG
Noise sensitive area

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

...continued from previous page

Table with columns: East, North, Z, Row data/Description, WTG type, Power, Rotor, Hub, Noise data, First wind speed, LwaRef, Last wind speed, LwaRef. Contains 19 rows of detailed noise calculation data for various turbine models and configurations.

Calculation Results

Sound level

Table with columns: No., Name, East, North, Z, Immission height, Frequency, Noise, WTG noise. Lists noise levels for various locations (A-O) relative to turbines, including predicted sound level and WTG noise.

*)Spectral distribution, please see details in report "Detailed results"

Distances (m)

Distance matrix table with columns: WTG, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O. Shows distances between turbine groups A through O.

To be continued on next page...

DECIBEL - Main Result

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiankangas

...continued from previous page

WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
12	16716	16987	17809	18134	18455	18716	21074	22195	20906	11863	10596	15748	18831	18280	18234
13	17797	18053	18799	19114	19424	19684	21958	23061	21386	13066	11756	17412	20250	19684	19634
14	19986	20215	20832	21126	21413	21669	23776	24834	22562	15537	14207	20455	22912	22327	22272
15	17585	17853	18659	18982	19301	19562	21901	23018	21618	12753	11475	16689	19759	19206	19159
16	18564	18829	19614	19935	20250	20512	22827	23939	22411	13759	12470	17765	20810	20255	20207
17	18634	18887	19618	19931	20239	20499	22753	23851	22080	13928	12614	18305	21133	20565	20514
18	19479	19729	20447	20757	21062	21322	23558	24650	22793	14795	13478	19197	22016	21447	21397
19	19633	19898	20682	21002	21318	21579	23891	25002	23435	14825	13538	18758	21856	21303	21256
2	15625	15815	16273	16539	16796	17041	18961	19969	17355	11759	10494	17541	19141	18542	18479
20	21146	21401	22141	22455	22763	23023	25280	26378	24561	16409	15102	20564	23550	22989	22940
21	20039	20281	20958	21262	21560	21818	24002	25081	23038	15441	14115	20046	22735	22159	22107
22	21801	22049	22754	23063	23365	23625	25839	26925	24943	17129	15810	21464	24344	23776	23726
23	21818	22054	22702	23001	23293	23550	25691	26757	24542	17275	15946	21938	24596	24018	23964
24	19052	19290	19950	20251	20546	20804	22971	24046	21972	14503	13174	19263	21835	21255	21202
25	21363	21587	22180	22470	22751	23006	25075	26122	23715	16962	15633	21917	24349	23763	23708
26	22677	22919	23596	23900	24197	24455	26631	27707	25584	18060	16736	22518	25323	24751	24700
27	22360	22587	23193	23486	23770	24025	26109	27159	24772	17914	16584	22757	25282	24699	24644
28	20882	21122	21786	22088	22383	22641	24806	25880	23759	16307	14979	20931	23611	23035	22982
29	20297	20549	21271	21582	21888	22148	24387	25480	23617	15598	14283	19914	22795	22228	22178
3	15627	15848	16441	16733	17016	17271	19371	20431	18265	11315	9994	16648	18737	18145	18086
30	18129	18367	19031	19333	19629	19887	22062	23140	21115	13581	12252	18388	20920	20339	20285
31	20570	20789	21364	21651	21930	22183	24231	25272	22826	16227	14900	21305	23633	23044	22987
4	16498	16718	17304	17594	17876	18130	20215	21270	19032	12190	10868	17482	19610	19018	18960
5	17439	17658	18238	18527	18807	19061	21132	22182	19878	13130	11807	18378	20548	19957	19899
6	15344	15583	16254	16559	16857	17115	19313	20399	18535	10815	9484	15818	18181	17597	17542
61	11839	12081	12772	13080	13384	13643	15885	16984	15421	7339	6011	12678	14743	14154	14097
62	11301	11543	12239	12549	12853	13113	15365	16466	14966	6804	5477	12203	14213	13623	13565
63	10704	10950	11665	11978	12286	12546	14822	15929	14551	6172	4843	11585	13577	12987	12930
64	12280	12516	13179	13484	13782	14041	16250	17340	15644	7848	6523	13244	15263	14672	14614
65	12868	13096	13721	14019	14310	14567	16728	17806	15930	8536	7219	14016	15961	15368	15309
66	13535	13755	14347	14639	14923	15179	17293	18359	16319	9288	7977	14820	16714	16119	16060
67	12280	12501	13102	13396	13684	13940	16076	17149	15235	8053	6751	13693	15478	14882	14822
68	13397	13605	14145	14428	14703	14955	17007	18056	15854	9330	8045	15048	16741	16143	16082
69	14038	14245	14782	15065	15338	15590	17631	18677	16417	9956	8666	15628	17372	16775	16714
7	15707	15962	16705	17020	17330	17591	19869	20974	19379	10999	9683	15555	18235	17663	17612
70	12592	12802	13353	13638	13916	14169	16242	17298	15192	8526	7246	14291	15933	15335	15274
71	11494	11712	12299	12591	12877	13132	15261	16334	14441	7356	6073	13134	14769	14171	14111
72	10603	10836	11492	11796	12095	12353	14569	15663	14086	6271	4964	11944	13697	13102	13043
73	10505	10726	11335	11631	11921	12178	14343	15425	13696	6354	5079	12198	13763	13165	13104
74	11721	11925	12453	12735	13009	13261	15316	16368	14264	7790	6543	13706	15162	14563	14501
75	11329	11526	12030	12308	12578	12828	14860	15907	13767	7517	6301	13526	14850	14251	14187
76	8996	9149	9491	9740	9980	10220	12094	13107	10806	6182	5309	12510	12977	12386	12318
77	8413	8572	8943	9199	9447	9690	11617	12646	10516	5584	4749	11915	12365	11772	11705
78	7276	7444	7863	8130	8391	8638	10656	11711	9914	4522	3830	10845	11197	10605	10537
79	6548	6718	7154	7426	7691	7941	10001	11069	9468	3979	3457	10265	10486	9895	9827
8	16261	16497	17156	17458	17754	18012	20190	21270	19312	11749	10419	16730	19118	18533	18478
80	6013	6186	6641	6917	7188	7440	9539	10616	9186	3599	3233	9832	9956	9367	9299
81	6757	6905	7253	7507	7755	7999	9956	10999	9150	4542	4063	10793	10838	10253	10184
82	7770	7923	8276	8530	8776	9018	10944	11975	9920	5187	4480	11509	11786	11197	11129
83	8694	8953	9734	10056	10375	10636	12990	14113	13174	4047	2717	9588	11445	10855	10798
84	9275	9533	10304	10625	10942	11203	13544	14665	13629	4631	3301	10070	12019	11430	11374
85	9632	9884	10629	10946	11259	11520	13834	14949	13779	5054	3725	10542	12458	11868	11811
86	10061	10304	11009	11321	11627	11888	14159	15266	13911	5590	4269	11168	13012	12419	12361
87	8164	8414	9156	9474	9788	10049	12373	13492	12475	3695	2393	9541	11121	10526	10467
88	8690	8936	9660	9975	10286	10547	12850	13964	12822	4242	2936	10030	11669	11074	11015
89	9303	9547	10254	10567	10875	11135	13417	14526	13260	4869	3557	10585	12295	11701	11642
9	18381	18607	19214	19507	19792	20047	22149	23206	20958	13980	12651	19046	21376	20789	20732
90	9485	9710	10340	10640	10935	11193	13393	14485	12936	5336	4079	11272	12734	12136	12075
91	10019	10237	10830	11124	11412	11669	13822	14903	13178	5965	4719	11917	13350	12751	12689
92	8745	8978	9643	9950	10252	10511	12757	13860	12517	4524	3269	10487	11928	11330	11269
93	8012	8247	8925	9234	9538	9798	12065	13173	11964	3832	2618	9901	11214	10615	10554
94	7332	7570	8265	8577	8885	9145	11438	12551	11493	3186	2038	9346	10539	9940	9878
95	7264	7483	8101	8402	8698	8957	11180	12280	11007	3510	2516	9784	10713	10113	10049
96	6650	6875	7521	7827	8128	8388	10648	11756	10666	2929	2062	9240	10079	9480	9416
97	7868	8076	8648	8941	9228	9484	11649	12736	11231	4206	3174	10466	11398	10799	10735
98	8760	8953	9454	9734	10006	10258	12329	13392	11552	5261	4211	11512	12413	11815	11750

To be continued on next page...

DECIBEL - Main Result

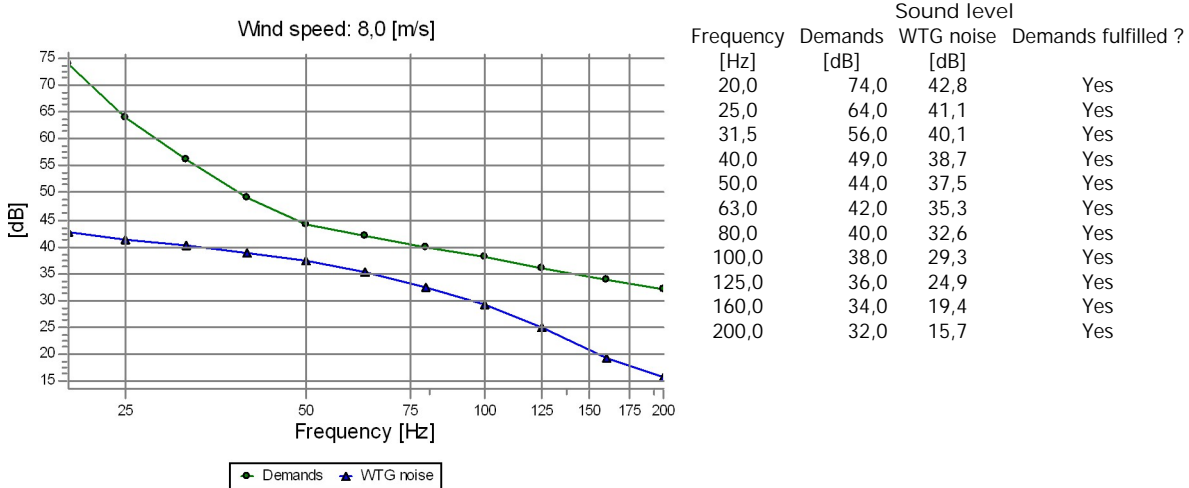
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

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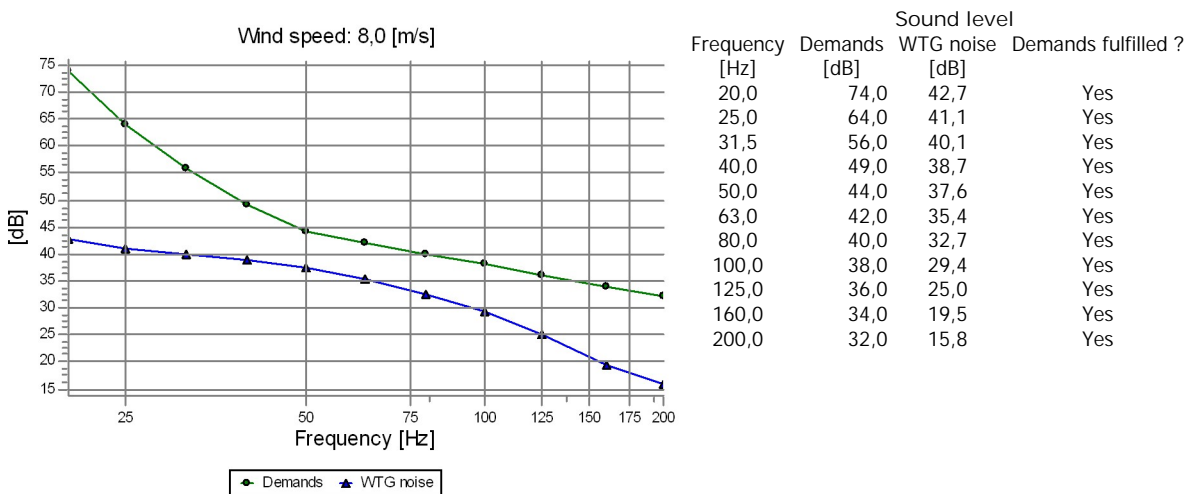
WTG	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
99	7965	8152	8636	8913	9184	9436	11505	12570	10808	4706	3789	11020	11707	11110	11044
T1	6000	5708	4594	4300	3999	3835	2060	2090	2625	10347	11268	12636	8960	8779	8734
T10	4760	4581	3787	3720	3660	3727	4264	5057	3049	7801	8473	11638	9035	8649	8587
T11	6091	5943	5236	5193	5149	5222	5583	6241	2945	8471	8946	12857	10479	10073	10009
T12	3465	3277	2497	2460	2446	2557	3725	4712	4055	6911	7729	10368	7744	7349	7286
T13	3747	3619	3049	3088	3142	3291	4582	5551	4315	6530	7234	10507	8221	7785	7719
T14	4867	4750	4173	4192	4216	4340	5269	6120	3870	7173	7715	11547	9357	8920	8854
T15	5872	5764	5198	5211	5224	5338	6057	6813	3806	7793	8196	12471	10380	9939	9872
T16	2570	2455	2032	2157	2307	2514	4379	5460	5213	5758	6619	9350	7082	6632	6565
T17	4073	4001	3622	3717	3820	3995	5410	6379	4798	6144	6726	10591	8642	8172	8105
T18	5148	5082	4686	4763	4841	4998	6152	7035	4661	6738	7142	11555	9724	9250	9182
T19	2022	2021	2097	2348	2607	2857	5065	6182	6200	4792	5706	8505	6612	6113	6045
T2	5802	5525	4431	4172	3906	3786	2521	2797	2072	9915	10776	12590	9123	8894	8844
T20	3148	3143	3066	3258	3456	3682	5581	6647	5814	5038	5729	9434	7735	7232	7163
T21	4649	4641	4469	4615	4763	4960	6500	7475	5603	5719	6108	10738	9235	8727	8658
T22	2516	2624	2986	3268	3551	3807	6055	7173	6929	3932	4762	8288	6954	6413	6343
T23	3482	3542	3668	3898	4128	4366	6358	7432	6481	4449	5033	9295	7994	7461	7391
T24	5142	5168	5099	5268	5435	5642	7236	8212	6187	5551	5785	10912	9693	9167	9097
T25	3207	3380	3912	4212	4509	4768	7055	8175	7771	3090	3801	8107	7352	6781	6711
T26	3916	4026	4304	4559	4811	5057	7119	8201	7177	3915	4364	9191	8286	7729	7659
T27	5092	5168	5286	5499	5709	5936	7745	8768	7019	4795	4946	10402	9533	8983	8913
T28	3716	3949	4677	4999	5318	5579	7962	9092	8851	2023	2753	7498	7363	6771	6703
T29	4551	4707	5129	5405	5677	5929	8064	9154	8087	3336	3555	9098	8685	8108	8039
T3	4836	4558	3465	3209	2950	2843	2071	2728	2832	9032	9937	11631	8241	7988	7936
T4	5263	5014	3990	3792	3593	3543	3074	3644	2100	9042	9838	12167	9015	8720	8664
T5	3967	3694	2614	2378	2149	2081	2163	3094	3534	8186	9120	10799	7547	7259	7204
T6	4724	4506	3581	3448	3322	3339	3538	4292	2703	8213	8970	11650	8773	8428	8368
T7	5704	5500	4606	4482	4358	4371	4299	4883	1994	8871	9521	12619	9809	9461	9401
T8	6472	6292	5469	5374	5275	5307	5266	5791	2093	9214	9743	13338	10705	10335	10274
T9	3559	3317	2335	2185	2057	2087	2879	3860	3792	7502	8396	10475	7508	7165	7106

DECIBEL - Detailed results, graphic

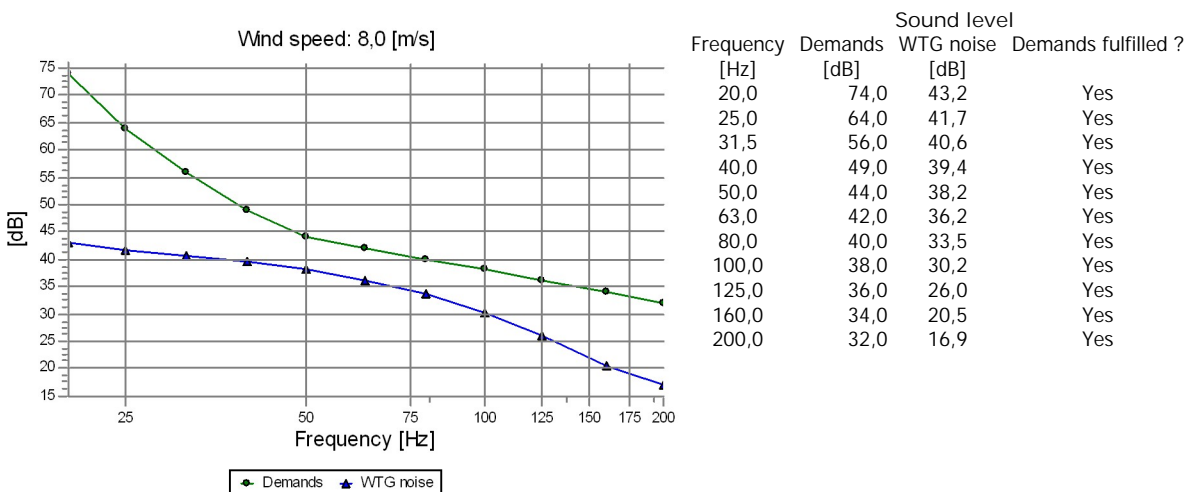
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
A Lomarakennus A (Syvälahti)



B Asuinrakennus B (Syväänlahti)

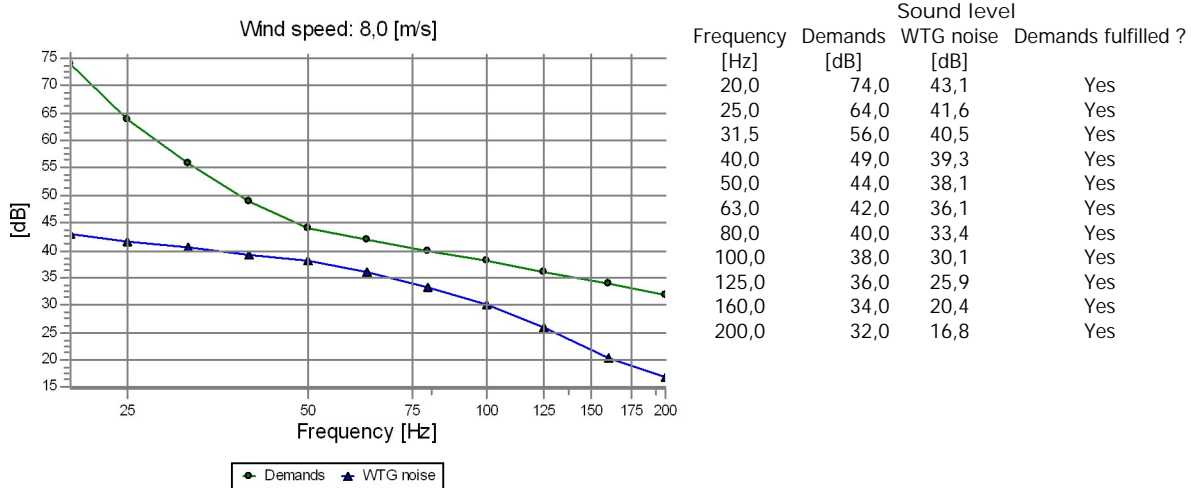


C Lomarakennus C (Mutalahti)

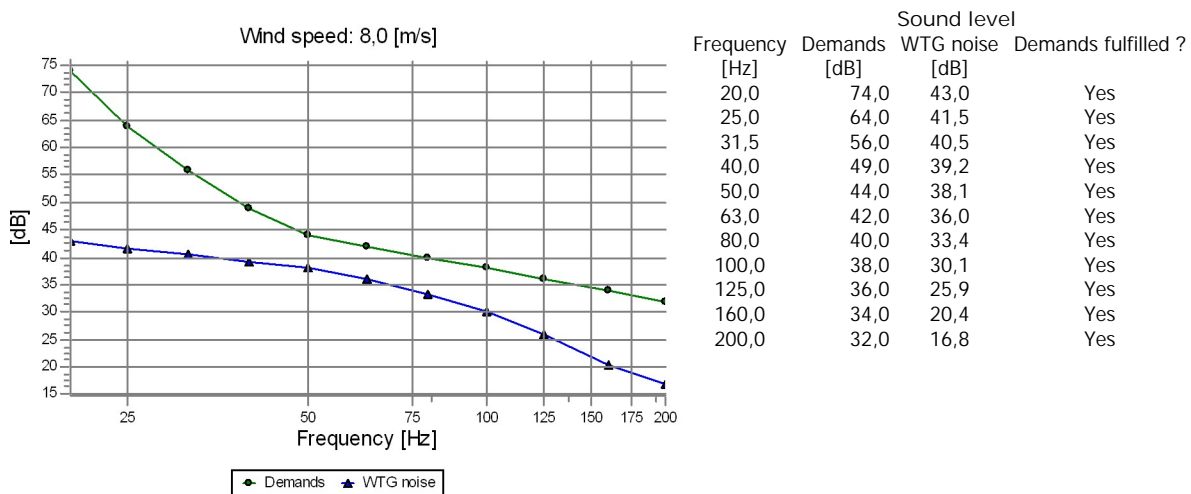


DECIBEL - Detailed results, graphic

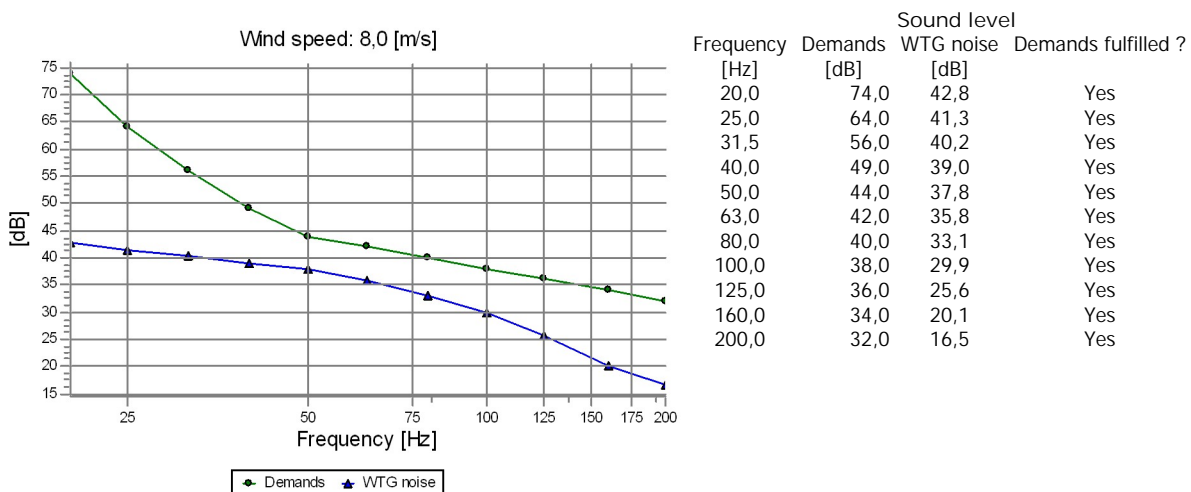
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
D Lomarakennus D (Mutaniemi)



E Asuinrakennus E (Alanko)

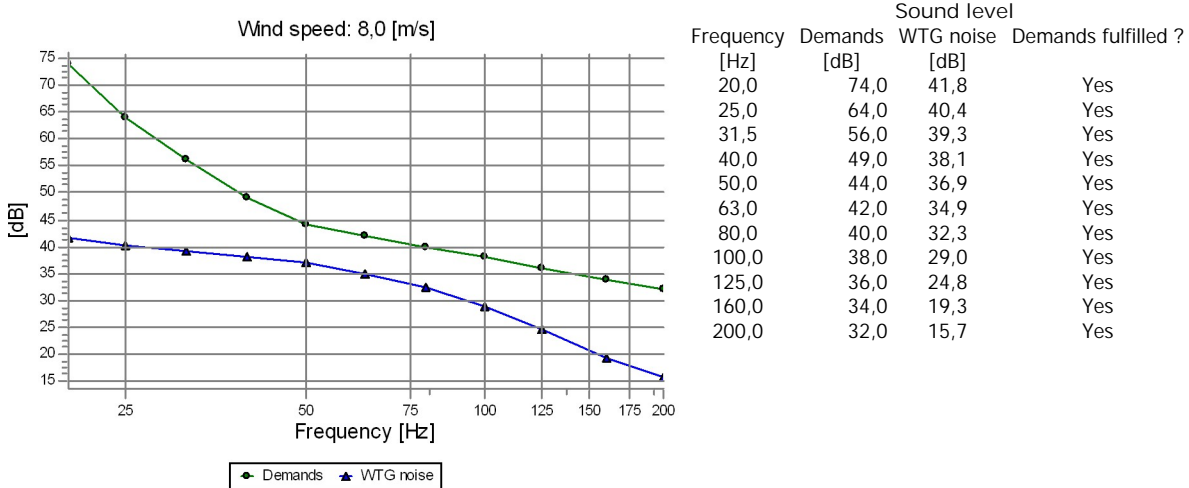


F Asuinrakennus F (Joensuu)

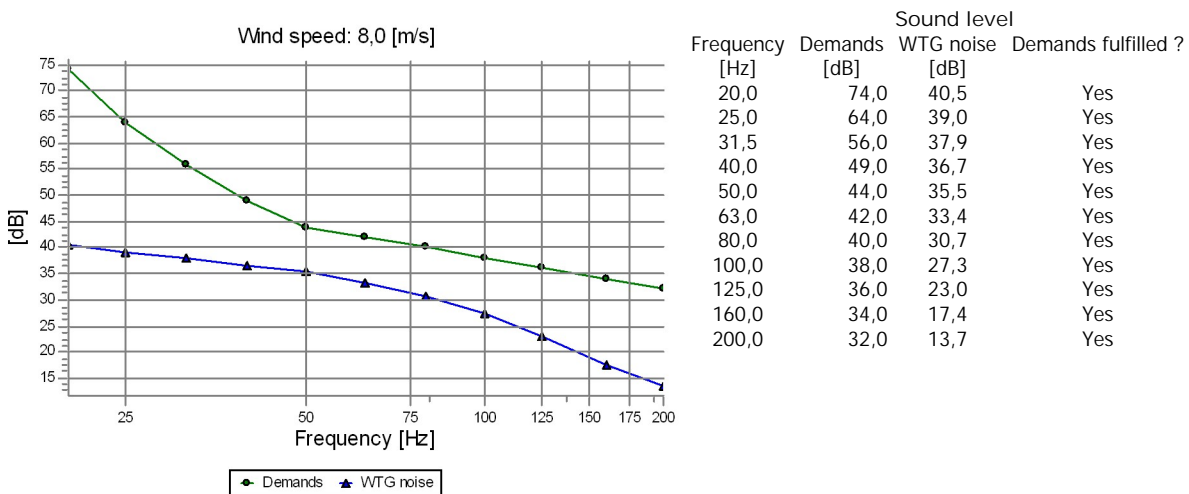


DECIBEL - Detailed results, graphic

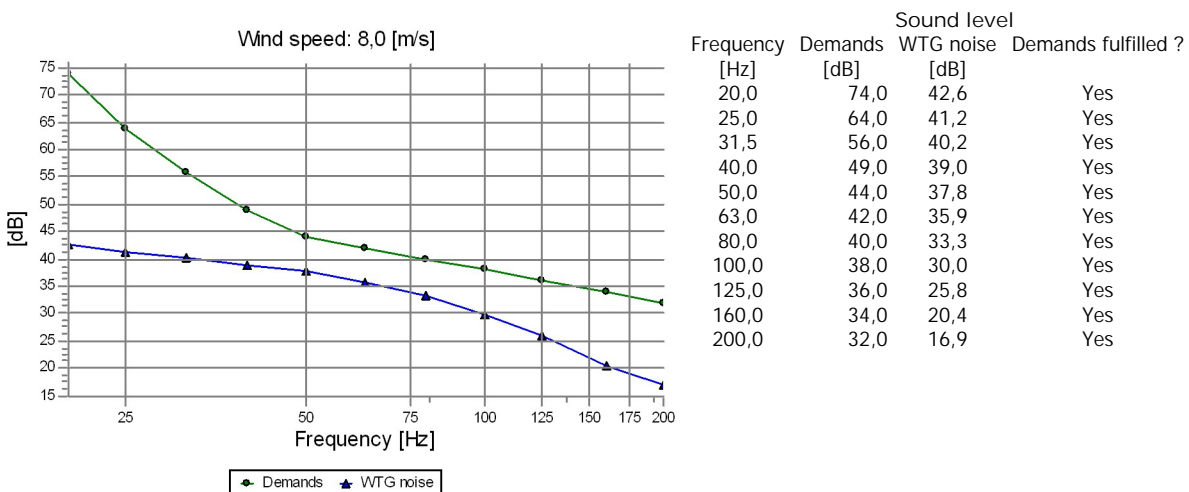
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
G Asuinrakennus G (Heiniäho)



H Asuinrakennus H (Mäkelä)

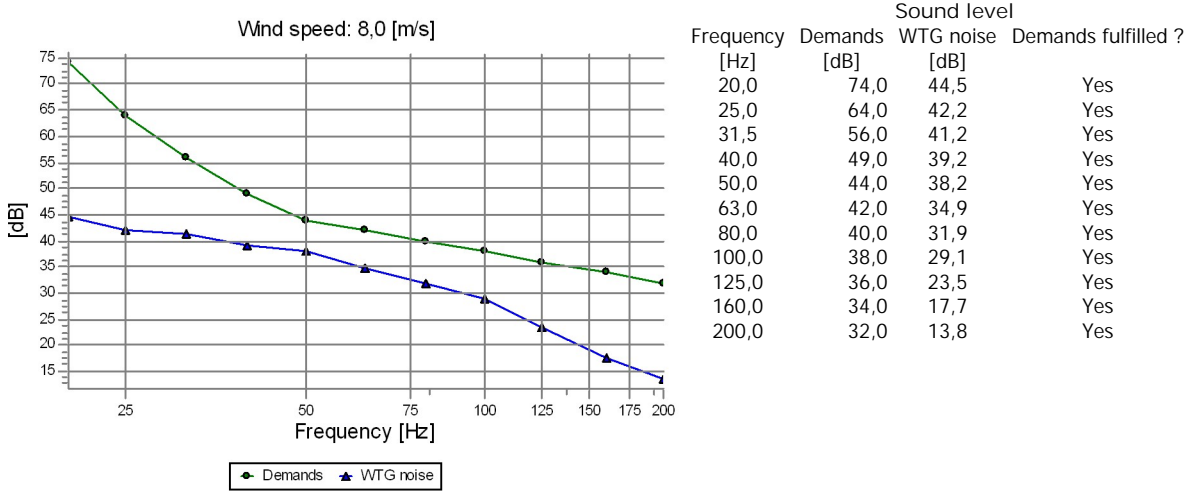


I Lomarakennus I

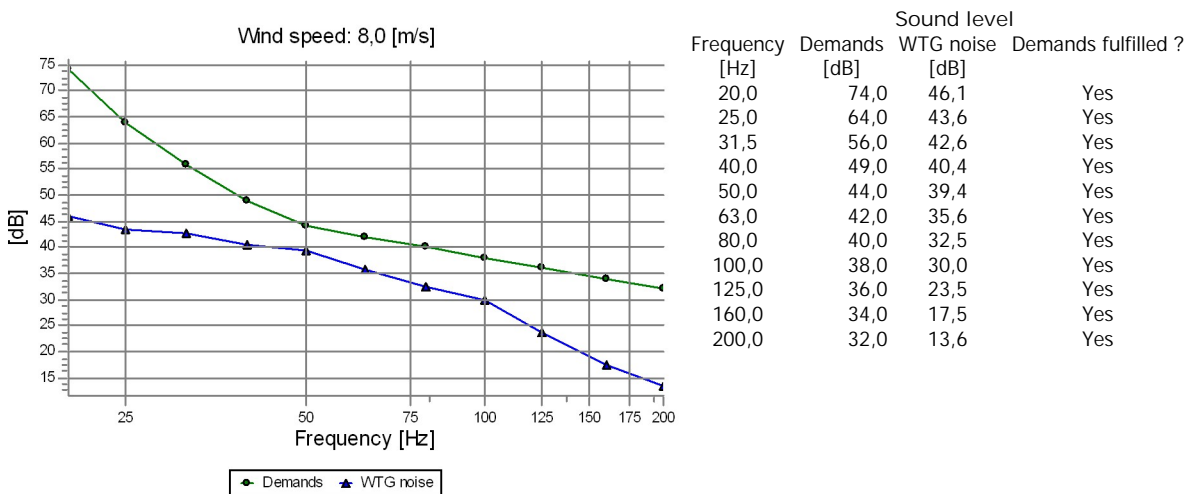


DECIBEL - Detailed results, graphic

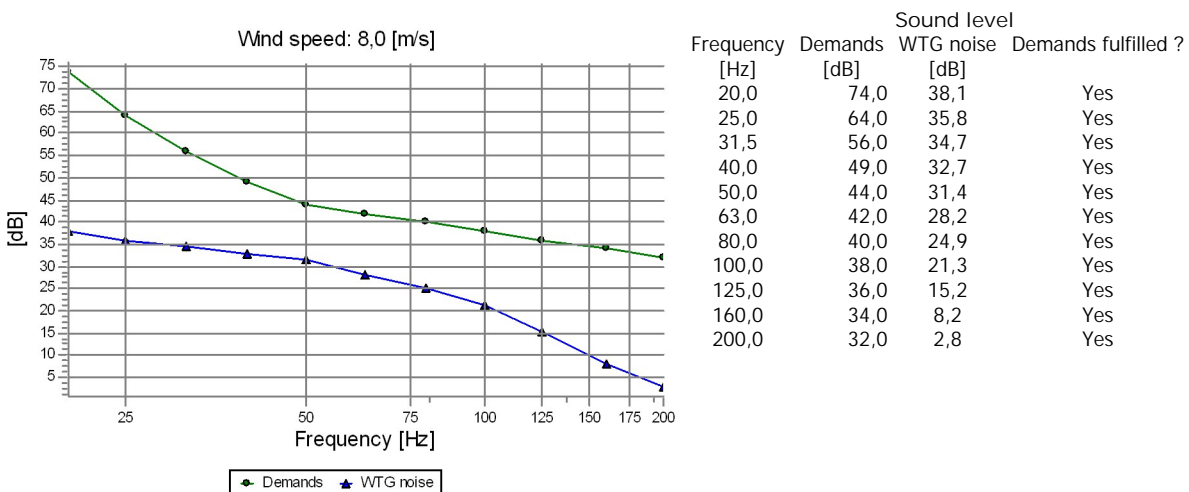
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
J Lomarakennus J (Hautakaarto)



K Asuinrakennus K (Takalo)

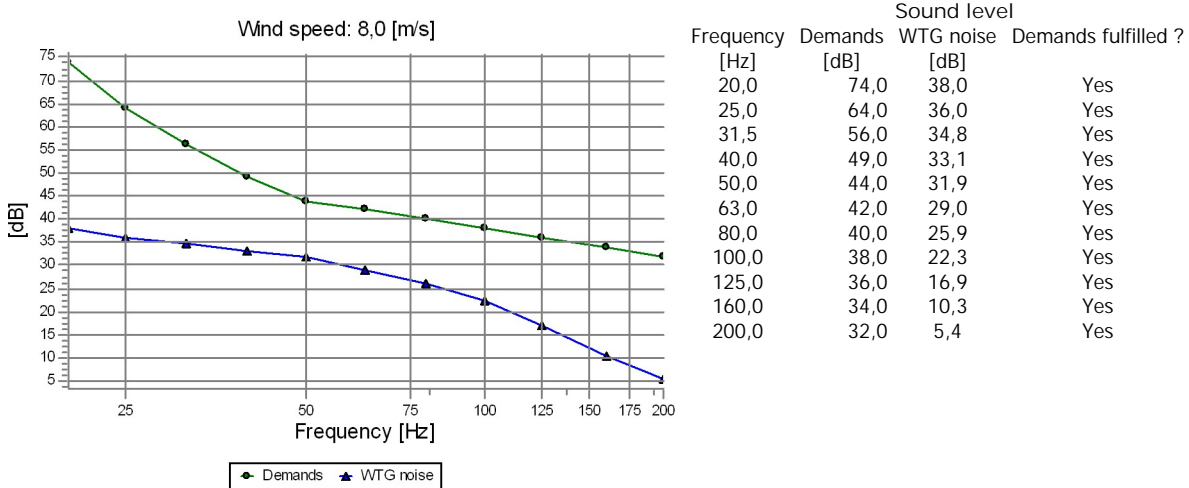


L Lomarakennus L (Haukijärvi)

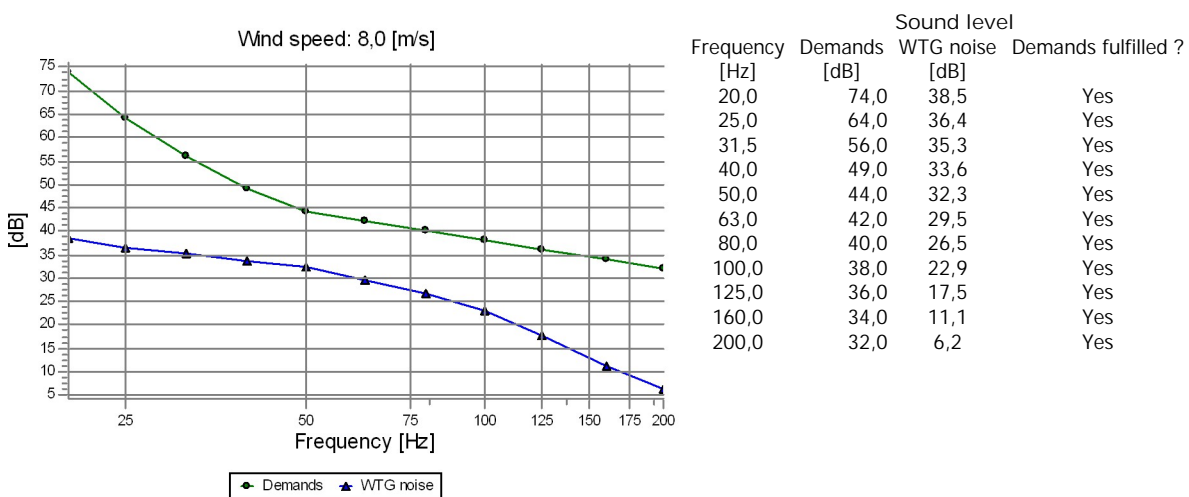


DECIBEL - Detailed results, graphic

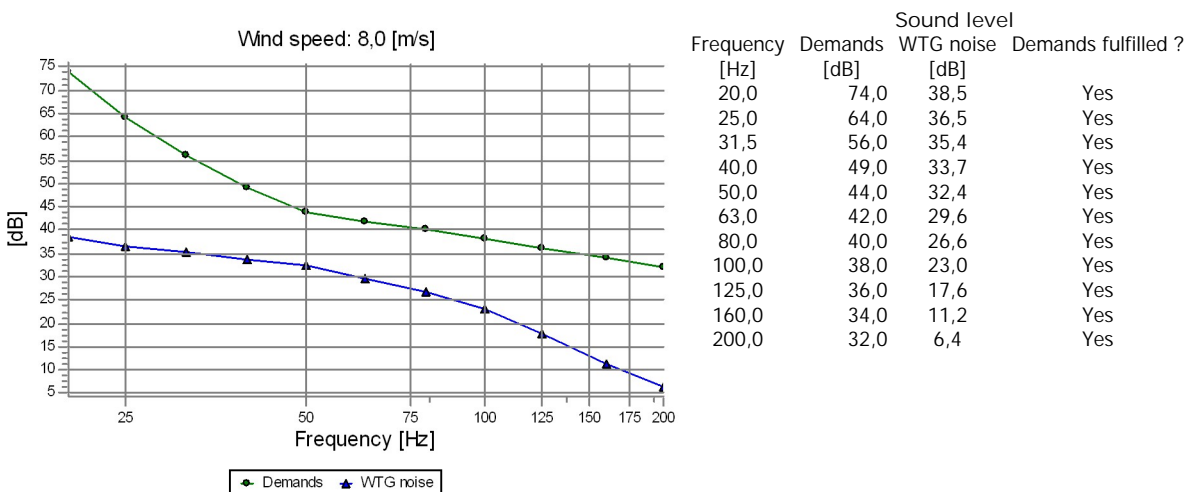
Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas Noise calculation model: Finland Low frequency
M Lomarakennus M (Haukilahti)



N Lomarakennus N (Kuusela)



O Lomarakennus O (Kuusela)



DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise calculation model:

Finland Low frequency

Wind speed (in 10 m height):

Highest noise value at receptor

Spectral distribution:

From 20,0 Hz to 200,0 Hz

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 tone penalty is subtracted from demand

Model: 5,0 dB(A)

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

4,0 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)

Low frequency calculation

dLsigma

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	200,0 Hz
[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
7,6	8,3	9,2	10,3	11,5	13,0	14,8	16,8	18,8	21,1	22,8

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: VESTAS V172-7.2 7200 250.0 !O!

Noise: V172 - 7,2 MW PO7200 STE + 2dB

Source Source/Date Creator Edited
Vestas 15.11.2022 USER 29.11.2022 14.53
DMS no.: 0128-4336_00

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	225,0	8,0	102,6	63,7	68,9	73,8	78,6	83,0	86,8	90,2	92,9	95,2	96,8	98,0

WTG: VESTAS V172-7.2 HH214 7200 172.0 !O!

Noise: Level 0S - Measured - PO7200-0S - 07-2022

Source Source/Date Creator Edited
Manufacturer 8.7.2022 USER 8.5.2023 15.45
Based on Document no.: 0127-1584 V01.

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	214,0	8,0	102,8	60,4	66,1	71,5	76,7	81,5	85,8	89,5	92,6	95,2	97,2	98,6

WTG: NORDEX N149/4.0-4.5 4500 180.0 !O!

Noise: Serrations Mode 00 - 106.0 dB(A) octave data only

Source Source/Date Creator Edited
F008_271_A13_R01 30.6.2017 USER 9.5.2023 20.33
Mode available on request

Status	Hub height	Wind speed	LwA,ref	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	200,0 Hz
	[m]	[m/s]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
From Windcat	190,0	8,0	96,4	62,8	66,7	72,2	75,8	80,9	82,2	85,0	89,7	88,2	89,5	90,8

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiakangas

Noise sensitive area: A Lomarakennus A (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: B Asuinrakennus B (Syvälahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: C Lomarakennus C (Mutalahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: D Lomarakennus D (Mutaniemi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: E Asuinrakennus E (Alanko)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: F Asuinrakennus F (Joensuu)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: G Asuinrakennus G (Heiniäho)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: H Asuinrakennus H (Mäkelä)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: I Lomarakennus I

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: J Lomarakennus J (Hautakaarto)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: K Asuinrakennus K (Takalo)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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 200,0 Hz
 74,0 dB 64,0 dB 56,0 dB 49,0 dB 44,0 dB 42,0 dB 40,0 dB 38,0 dB 36,0 dB 34,0 dB 32,0 dB

No distance demand

Noise sensitive area: L Lomarakennus L (Haukijärvi)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Miikka Saranpää / miikka.saranpaa@fcg.fi

Calculated:

9.5.2023 20.43/3.5.584

DECIBEL - Assumptions for noise calculation

Calculation: Matalataajuinen_Haarasuonkangas_VE2_V172-7,2MW_No_STE+Turkkiselkä+Takiangkangas

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: M Lomarakennus M (Haukilahti)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: N Lomarakennus N (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: O Lomarakennus O (Kuusela)

Predefined calculation standard: Residential health guide 2003, indoor - night

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

Uncertainty margin: Use default value from calculation model

Noise demand:

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	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Liite 11. Yhteisvaikutus varjostusmallinnuksen tulokset "Real Case, No Forest" - VE1

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiiselkä + Takiangkangas

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

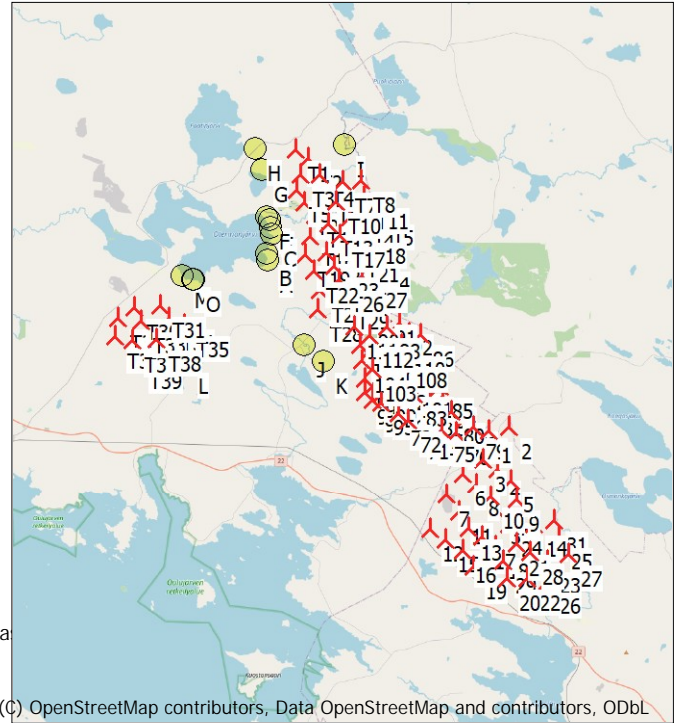
Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_N64,50_E027,335 (12)

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas
Obstacles used in calculation
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTGs



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:400 000
New WTG Shadow receptor

	East	North	Z	Row data/Description	WTG type			Shadow data						
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]		
				[m]										
1	518 603	7 160 024	164,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
10	518 711	7 156 574	157,6	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
100	513 720	7 162 538	142,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
101	514 360	7 162 448	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
102	512 957	7 162 816	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
103	512 396	7 163 292	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
104	511 847	7 163 708	136,2	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
105	512 266	7 164 240	144,4	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
106	511 697	7 164 525	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
107	512 955	7 164 121	140,7	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
108	514 006	7 164 037	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
109	513 472	7 164 666	141,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
11	517 010	7 155 708	145,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
110	513 976	7 164 554	141,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
111	511 430	7 165 541	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
112	512 201	7 165 062	137,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7		
12	515 527	7 154 776	152,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
13	517 530	7 154 832	146,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
14	521 058	7 155 020	164,8	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
15	516 293	7 154 229	165,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
16	517 207	7 153 659	146,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
17	518 286	7 154 356	145,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
18	519 036	7 153 873	147,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
19	517 798	7 152 768	147,2	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
2	519 707	7 160 212	181,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
20	519 595	7 152 194	138,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
21	520 112	7 154 049	153,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
22	520 685	7 152 221	143,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
23	521 787	7 153 171	156,9	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
24	519 754	7 155 057	147,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		
25	522 393	7 154 422	158,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4		

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
				[m]								
26	521 798	7 152 019	160,0	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
27	522 872	7 153 480	157,2	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
28	520 875	7 153 602	157,5	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
29	519 434	7 153 144	142,6	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
3	518 335	7 158 482	177,5	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
30	519 097	7 155 706	152,4	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
31	522 104	7 155 279	160,3	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
4	519 041	7 157 963	170,0	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
5	519 788	7 157 386	171,2	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
6	517 177	7 157 725	162,5	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
7	516 365	7 156 572	143,6	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
71	514 713	7 160 221	138,9	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
72	514 322	7 160 594	136,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
73	513 760	7 160 896	134,6	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
74	515 280	7 160 145	142,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
75	516 065	7 160 095	148,9	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
76	516 865	7 159 975	150,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
77	515 893	7 160 771	145,1	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
78	517 250	7 160 639	147,2	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
79	517 760	7 160 250	152,8	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
8	517 940	7 157 182	154,8	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
80	516 561	7 161 067	145,4	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
81	515 455	7 161 460	140,3	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
82	514 251	7 161 482	138,1	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
83	514 587	7 161 973	140,0	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
84	516 095	7 161 880	142,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
85	515 968	7 162 365	143,8	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
86	514 920	7 165 135	143,3	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
87	514 309	7 165 216	143,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
88	513 180	7 165 515	143,2	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
89	512 525	7 165 835	140,7	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
9	520 096	7 156 333	164,3	VESTAS V172-7.2 7200 250.0...Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
90	512 030	7 166 046	139,7	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
91	512 970	7 166 250	144,6	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
92	513 824	7 165 685	143,8	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
93	511 955	7 162 030	134,6	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
94	512 368	7 161 612	135,2	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
95	512 831	7 161 519	136,4	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
96	513 463	7 161 490	137,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
97	512 000	7 162 735	139,8	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
98	512 460	7 162 435	142,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
99	512 970	7 162 065	141,5	NORDEX N149/4.0-4.5 4500 ... Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
T1	508 282	7 174 861	157,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T10	510 426	7 172 148	146,6	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T11	511 902	7 172 395	147,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T12	509 346	7 171 412	143,2	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T13	510 056	7 170 927	146,6	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T14	511 130	7 171 298	148,8	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T15	512 122	7 171 560	159,0	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T16	509 073	7 170 275	147,6	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T17	510 668	7 170 368	152,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T18	511 731	7 170 576	165,0	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T19	508 820	7 169 317	148,1	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T2	508 948	7 174 439	157,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T20	509 941	7 169 425	149,8	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T21	511 434	7 169 585	157,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T22	509 256	7 168 427	147,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T23	510 283	7 168 708	149,6	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T24	511 959	7 169 067	152,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T25	509 625	7 167 494	142,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T26	510 589	7 167 991	147,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T27	511 839	7 168 207	148,1	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T28	509 456	7 166 427	142,5	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	
T29	510 920	7 167 074	142,1	Generic RD200 7200 200.0 !... Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4	

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM
			[m]									
T3	508 557	7 173 555	151,9	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T30	499 777	7 166 541	137,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T31	501 112	7 166 571	140,0	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T32	498 884	7 165 924	140,0	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T33	500 060	7 165 826	146,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T34	501 577	7 165 939	141,7	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T35	502 368	7 165 645	147,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T36	498 706	7 164 985	147,2	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T37	499 643	7 164 765	154,4	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T38	500 913	7 164 850	150,0	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T39	499 856	7 163 927	147,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T4	509 564	7 173 532	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T5	508 354	7 172 700	144,8	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T6	509 849	7 172 666	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T7	510 753	7 173 171	147,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T8	511 738	7 173 247	154,9	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T9	508 756	7 172 027	142,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Lomarakennus I	510 890	7 175 161	155,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values
		Shadow hours
		per year
		[h/year]
A	Lomarakennus A (Syvälahti)	2:21
B	Asuinrakennus B (Syväänlahti)	2:01
C	Lomarakennus C (Mutalahti)	1:53
D	Lomarakennus D (Mutaniemi)	0:00
E	Asuinrakennus E (Alanko)	3:16
F	Asuinrakennus F (Joensuu)	0:00
G	Asuinrakennus G (Heiniäho)	5:44
H	Asuinrakennus H (Mäkelä)	0:00
I	Lomarakennus I	3:19
J	Lomarakennus J (Hautakaarto)	0:00
K	Asuinrakennus K (Takalo)	0:00
L	Lomarakennus L (Haukijärvi)	7:40
M	Lomarakennus M (Haukilahti)	1:53
N	Lomarakennus N (Kuusela)	0:00
O	Lomarakennus O (Kuusela)	0:00

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiankangas

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Expected [h/year]
1	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (217)	0:00
10	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (226)	0:00
100	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (917)	0:00
101	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (918)	0:00
102	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (919)	0:00
103	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (920)	0:00
104	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (921)	0:00
105	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (922)	0:00
106	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (923)	0:00
107	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (924)	0:00
108	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (925)	0:00
109	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (926)	0:00
11	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (227)	0:00
110	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (927)	0:00
111	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (928)	0:00
112	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (929)	0:00
12	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (228)	0:00
13	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (229)	0:00
14	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (230)	0:00
15	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (232)	0:00
16	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (233)	0:00
17	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (234)	0:00
18	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (235)	0:00
19	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (236)	0:00
2	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (218)	0:00
20	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (237)	0:00
21	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (238)	0:00
22	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (239)	0:00
23	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (240)	0:00
24	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (241)	0:00
25	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (242)	0:00
26	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (243)	0:00
27	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (244)	0:00
28	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (245)	0:00
29	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (247)	0:00
3	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (219)	0:00
30	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (246)	0:00
31	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (231)	0:00
4	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (220)	0:00
5	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (221)	0:00
6	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (222)	0:00
7	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (223)	0:00
71	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (888)	0:00
72	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (889)	0:00
73	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (890)	0:00
74	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (891)	0:00
75	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (892)	0:00
76	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (893)	0:00
77	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (894)	0:00
78	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (895)	0:00
79	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (896)	0:00
8	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (224)	0:00
80	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (897)	0:00
81	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (898)	0:00
82	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (899)	0:00
83	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (900)	0:00
84	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (901)	0:00
85	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (902)	0:00
86	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (903)	0:00
87	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (904)	0:00
88	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (905)	0:00
89	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (906)	0:00
9	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (225)	0:00
90	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (907)	0:00
91	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (908)	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

No.	Name	Expected [h/year]
92	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (909)	0:00
93	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (910)	0:00
94	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (911)	0:00
95	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (912)	0:00
96	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (913)	0:00
97	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (914)	0:00
98	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (915)	0:00
99	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (916)	0:00
T1	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (678)	3:58
T10	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (671)	0:00
T11	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (673)	0:00
T12	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (668)	0:00
T13	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (666)	0:00
T14	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (667)	0:00
T15	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (669)	0:00
T16	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (663)	1:53
T17	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (664)	0:00
T18	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (665)	0:00
T19	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (660)	4:22
T2	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (677)	1:39
T20	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (662)	0:00
T21	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (661)	0:00
T22	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (657)	0:00
T23	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (658)	0:00
T24	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (659)	0:00
T25	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (654)	0:00
T26	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (655)	0:00
T27	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (656)	0:00
T28	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (651)	0:00
T29	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (653)	0:00
T3	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (681)	1:46
T30	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (649)	0:00
T31	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (652)	1:53
T32	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (680)	0:00
T33	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (679)	0:00
T34	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (650)	0:00
T35	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (648)	0:00
T36	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (647)	0:00
T37	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (645)	0:00
T38	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (646)	7:40
T39	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (644)	0:00
T4	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (676)	0:00
T5	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (674)	0:00
T6	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (672)	0:00
T7	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (682)	1:37
T8	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (675)	0:00
T9	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (670)	3:16

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Miikka Saranpää / miikka.saranpaa@fcg.fi
 Calculated:
 9.5.2023 19.20/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: A - Lomarakenus A (Syyvähti)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1108 1065 893 815 711 642 8619

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	08.59	07.24	06.33	04.44	03.00	02.37	04.10	05.49	06.42 (T19)	07.18	07.55	09.34	
	14.18	15.53	17.26	20.01	21.37	23.21	23.55	22.24	20.33	23	07.05 (T19)	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.40	02.55	02.39	04.13	05.52	06.42 (T19)	07.21	07.58	09.37	
	14.20	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	23	07.05 (T19)	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.42	04.17	05.55	06.42 (T19)	07.24	08.02	09.40	
	14.22	16.00	17.32	20.08	21.43	23.28	23.51	22.17	20.26	22	07.04 (T19)	18.37	15.48	14.22
4	10.09	08.50	07.14	06.22	04.33	02.49	02.44	04.20	05.58	06.41 (T19)	07.27	08.05	09.43	
	14.24	16.03	17.36	20.11	6	07.00 (T19)	21.47	23.31	20.22	22	07.03 (T19)	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	02.47	02.47	04.23	06.01	06.42 (T19)	07.30	08.08	09.46	
	14.27	16.06	17.39	20.14	12	07.03 (T19)	21.50	23.34	20.18	20	07.02 (T19)	18.30	15.42	14.18
6	10.06	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	06.43 (T19)	07.33	08.12	09.48	
	14.29	16.10	17.42	20.17	17	07.04 (T19)	21.54	23.36	20.15	17	07.00 (T19)	18.26	15.38	14.17
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	06.46 (T19)	07.36	08.15	09.51	
	14.32	16.13	17.45	20.20	19	07.05 (T19)	21.57	23.39	20.11	12	06.58 (T19)	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	04.19	02.40	02.55	04.33	06.10	06.49 (T19)	07.39	08.18	09.53	
	14.34	16.17	17.48	20.23	22	07.06 (T19)	22.00	23.42	20.08	7	06.56 (T19)	18.19	15.32	14.13
9	10.01	08.33	06.56	06.04	04.16	02.38	02.58	04.37	06.13	07.42	08.22	09.56		
	14.37	16.20	17.51	20.26	22	07.06 (T19)	22.04	23.44	20.04	18.15	15.29	14.12		
10	09.59	08.30	06.52	06.00	04.12	02.36	03.01	04.40	06.16	07.45	08.25	09.58		
	14.40	16.24	17.54	20.29	23	07.06 (T19)	22.07	23.47	20.00	18.12	15.25	14.10		
11	09.57	08.27	06.49	05.56	04.09	02.34	03.01	04.43	06.19	07.48	08.29	10.00		
	14.43	16.27	17.57	20.32	23	07.06 (T19)	22.11	23.49	20.00	18.08	15.22	14.09		
12	09.55	08.23	06.45	05.53	04.05	02.32	03.04	04.47	06.22	07.51	08.32	10.02		
	14.46	16.30	18.00	20.35	24	07.06 (T19)	22.14	23.51	20.00	18.05	15.19	14.08		
13	09.52	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.54	08.35	10.04		
	14.49	16.34	18.04	20.39	24	07.06 (T19)	22.17	23.53	20.00	18.01	15.16	14.07		
14	09.50	08.17	06.38	05.45	04.02	02.29	03.10	04.53	06.28	07.58	08.39	10.06		
	14.52	16.37	18.07	20.42	22	07.04 (T19)	22.21	23.55	20.00	18.01	15.13	14.06		
15	09.48	08.13	06.34	05.42	04.03	02.28	03.13	04.56	06.31	08.01	08.42	10.08		
	14.55	16.40	18.10	20.45	21	07.04 (T19)	22.24	23.57	20.00	18.01	15.10	14.05		
16	09.45	08.10	06.31	05.38	04.03	02.27	03.16	04.59	06.34	08.04	08.46	10.10		
	14.58	16.44	18.13	20.48	19	07.02 (T19)	22.28	23.58	20.00	18.01	15.07	14.05		
17	09.43	08.06	06.27	05.34	04.02	02.26	03.20	05.03	06.37	08.07	08.49	10.11		
	15.02	16.47	18.16	20.51	17	07.01 (T19)	22.31	23.59	20.00	18.01	15.04	14.04		
18	09.40	08.03	06.23	05.31	04.05	02.25	03.23	05.06	06.40	08.10	08.52	10.12		
	15.05	16.50	18.19	20.54	13	06.59 (T19)	22.35	23.61	20.00	18.01	15.01	14.04		
19	09.38	07.59	06.20	05.27	04.01	02.25	03.26	05.09	06.43	08.13	08.56	10.13		
	15.08	16.54	18.22	20.58	8	06.56 (T19)	22.38	23.63	20.00	18.01	15.01	14.04		
20	09.35	07.56	06.16	05.24	03.38	02.25	03.30	05.12	06.46	08.16	08.59	10.14		
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.36	14.55	14.04		
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.15	06.49	08.19	09.02	10.15		
	15.15	17.00	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.52	14.04		
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.19	06.52	08.23	09.06	10.16		
	15.18	17.04	18.31	21.07	22.48	00.03	22.58	21.09	19.17	17.29	14.49	14.05		
23	09.27	07.46	06.05	05.13	03.28	02.26	03.40	05.22	06.55	08.26	09.09	10.16		
	15.22	17.07	18.34	21.10	22.52	00.02	22.54	21.06	19.13	17.26	14.47	14.05		
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17		
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	9	07.00 (T19)	19.09	17.22	14.44	14.06
25	09.21	07.39	05.58	05.05	03.22	02.27	03.46	05.28	07.01	07.32	09.15	10.17		
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.58	14	07.02 (T19)	19.06	16.19	14.41	14.07
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03	07.35	09.19	10.17		
	15.32	17.16	18.43	21.20	23.02	00.01	22.45	20.55	17	07.04 (T19)	19.02	16.15	14.39	14.08
27	09.15	07.31	05.51	04.58	03.15	02.30	03.53	05.34	07.06	07.39	09.22	10.16		
	15.35	17.20	18.46	21.24	23.05	00.00	22.41	20.51	19	07.05 (T19)	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.16		
	15.39	17.23	18.49	21.27	23.09	23.59	22.38	20.48	21	07.06 (T19)	18.55	16.09	14.34	14.10
29	09.09	07.24	05.44	04.51	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16		
	15.42	17.26	18.51	21.30	23.12	23.58	22.34	20.44	22	07.05 (T19)	18.51	16.05	14.31	14.12
30	09.06	07.20	05.40	04.48	03.06	02.35	04.03	05.43	07.15	07.48	09.31	10.15		
	15.46	17.29	18.55	21.33	23.15	23.56	22.31	20.40	23	07.05 (T19)	18.48	16.02	14.29	14.13
31	09.02	07.14	05.36	04.44	03.03	02.36	04.07	05.46	07.18	07.52	09.34	10.14		
	15.49	17.32	18.58	21.36	23.18	23.58	22.27	20.37	23	07.05 (T19)	18.45	15.58	14.27	14.15
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	127		
Total, worst case				292					148					
Sun reduction				0.43					0.42					
Oper. time red.				0.98					0.98					
Wind dir. red.				0.62					0.62					
Total reduction				0.26					0.25					
Total, real				76					37					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: B - Asuinrakennus B (Syväänlahti)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December				
1	10.13	08.59	07.24	06.33	07.17 (T19)	04.44	03.00	02.37	04.10	05.49		07.18	07.55	09.34		
	14.18	15.53	17.26	20.01	23	07.40 (T19)	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27		
2	10.12	08.56	07.21	06.29	07.17 (T19)	04.40	02.55	02.39	04.13	05.52		07.21	07.58	09.37		
	14.20	15.56	17.29	20.05	24	07.41 (T19)	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24		
3	10.11	08.53	07.17	06.25	07.17 (T19)	04.37	02.52	02.42	04.17	05.55	07.23 (T19)	07.24	08.02	09.40		
	14.22	16.00	17.32	20.08	23	07.40 (T19)	21.43	23.28	23.51	22.17	20.26	3	07.26 (T19)	18.37	15.48	14.22
4	10.09	08.50	07.14	06.22	07.17 (T19)	04.33	02.49	02.44	04.20	05.58		07.17 (T19)	07.27	08.05	09.43	
	14.24	16.03	17.36	20.11	22	07.39 (T19)	21.47	23.31	23.49	22.14	20.22	12	07.29 (T19)	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	07.17 (T19)	04.30	02.47	02.47	04.23	06.01		07.15 (T19)	07.30	08.08	09.46	
	14.27	16.06	17.39	20.14	21	07.38 (T19)	21.50	23.34	23.47	22.10	20.18	16	07.31 (T19)	18.30	15.42	14.18
6	10.06	08.43	07.07	06.14	07.18 (T19)	04.26	02.44	02.49	04.27	06.04		07.14 (T19)	07.33	08.12	09.48	
	14.29	16.10	17.42	20.17	18	07.36 (T19)	21.54	23.36	23.44	22.07	20.15	18	07.32 (T19)	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	07.19 (T19)	04.23	02.42	02.52	04.30	06.07		07.13 (T19)	07.36	08.15	09.51	
	14.32	16.13	17.45	20.20	16	07.35 (T19)	21.57	23.39	23.42	22.03	20.11	20	07.33 (T19)	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	07.20 (T19)	04.19	02.40	02.55	04.33	06.10		07.12 (T19)	07.39	08.18	09.54	
	14.34	16.17	17.48	20.23	12	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	22	07.34 (T19)	18.19	15.32	14.13
9	10.01	08.33	06.56	06.03	07.24 (T19)	04.16	02.38	02.58	04.37	06.13		07.11 (T19)	07.42	08.22	09.56	
	14.37	16.20	17.51	20.26	4	07.28 (T19)	22.04	23.44	23.37	21.56	20.04	23	07.34 (T19)	18.15	15.29	14.12
10	09.59	08.30	06.52	06.00	04.12	02.36	03.01	04.40	06.16	07.10 (T19)		07.45	08.25	09.58		
	14.40	16.24	17.54	20.29	22.07	23.47	23.34	21.52	20.00	23	07.33 (T19)	18.12	15.25	14.10		
11	09.57	08.27	06.49	05.56	04.09	02.34	03.01	04.43	06.19	07.09 (T19)		07.48	08.29	10.00		
	14.43	16.27	17.57	20.32	22.11	23.49	23.31	21.49	19.57	24	07.33 (T19)	18.08	15.22	14.09		
12	09.55	08.23	06.45	05.53	04.05	02.32	03.04	04.47	06.22	07.09 (T19)		07.51	08.32	10.03		
	14.46	16.30	18.00	20.36	22.14	23.51	23.29	21.45	19.53	23	07.32 (T19)	18.04	15.19	14.08		
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.10 (T19)		07.55	08.35	10.04		
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.49	22	07.32 (T19)	18.01	15.16	14.07		
14	09.50	08.17	06.38	05.45	03.58	02.29	03.10	04.53	06.28	07.10 (T19)		07.58	08.39	10.06		
	14.52	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	21	07.31 (T19)	17.57	15.13	14.06		
15	09.48	08.13	06.34	05.42	03.55	02.28	03.13	04.56	06.31	07.11 (T19)		08.01	08.42	10.08		
	14.55	16.40	18.10	20.45	22.24	23.57	23.20	21.35	19.42	19	07.30 (T19)	17.54	15.10	14.05		
16	09.45	08.10	06.31	05.38	03.51	02.27	03.16	04.59	06.34	07.12 (T19)		08.04	08.46	10.10		
	14.58	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.38	16	07.28 (T19)	17.50	15.07	14.05		
17	09.43	08.06	06.27	05.34	03.48	02.26	03.20	05.03	06.37	07.14 (T19)		08.07	08.49	10.11		
	15.02	16.47	18.16	20.51	22.31	00.00	23.14	21.27	19.35	11	07.25 (T19)	17.47	15.04	14.04		
18	09.40	08.03	06.23	05.31	03.45	02.25	03.23	05.06	06.40	07.17 (T19)		08.10	08.52	10.12		
	15.05	16.50	18.19	20.54	22.35	00.01	23.11	21.24	19.31	4	07.21 (T19)	17.43	15.01	14.04		
19	09.38	07.59	06.20	05.27	03.41	02.25	03.26	05.09	06.43			08.13	08.56	10.13		
	15.08	16.54	18.22	20.58	22.38	00.01	23.07	21.20	19.27			17.40	14.58	14.04		
20	09.35	07.56	06.16	05.24	03.38	02.25	03.30	05.12	06.46			08.16	08.59	10.14		
	15.11	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24			17.36	14.55	14.04		
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.15	06.49			08.19	09.02	10.15		
	15.15	17.00	18.28	21.04	22.45	00.02	23.01	21.13	19.20			17.33	14.52	14.04		
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.18	06.52			08.23	09.06	10.16		
	15.18	17.03	18.31	21.07	22.48	00.03	22.58	21.09	19.17			17.29	14.49	14.04		
23	09.27	07.46	06.05	05.13	03.28	02.26	03.40	05.22	06.55			08.26	09.09	10.16		
	15.22	17.07	18.34	21.10	22.52	00.03	22.55	21.06	19.13			17.26	14.47	14.05		
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58			08.29	09.12	10.17		
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.09			17.22	14.44	14.06		
25	09.21	07.39	05.58	05.05	03.22	02.27	03.46	05.28	07.01			07.32	09.16	10.17		
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.58	19.06			16.19	14.41	14.07		
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03			07.35	09.19	10.17		
	15.32	17.16	18.43	10 06.27 (T19)	21.20	23.02	00.01	22.45	20.55	19.02		16.15	14.39	14.08		
27	09.15	07.31	05.51	05.02	03.15	02.30	03.53	05.34	07.06			07.39	09.22	10.17		
	15.35	17.20	18.46	15 06.38 (T19)	21.24	23.05	00.00	22.41	20.51	18.58		16.12	14.36	14.09		
28	09.12	07.28	05.47	05.01	03.12	02.31	03.56	05.37	07.09			07.42	09.25	10.16		
	15.39	17.23	18.49	19 06.40 (T19)	21.27	23.09	23.59	20.48	18.55			16.09	14.34	14.10		
29	09.09	07.25	05.44	05.00	03.09	02.33	04.00	05.40	07.12			07.45	09.28	10.16		
	15.42	17.26	18.50	20 07.20 (T19)	21.30	23.12	23.58	20.44	18.51			16.05	14.31	14.12		
30	09.06	07.22	05.40	05.00	03.06	02.35	04.03	05.43	07.15			07.48	09.31	10.15		
	15.46	17.29	18.53	22 07.40 (T19)	21.33	23.15	23.56	22.31	20.40	18.48		16.02	14.29	14.13		
31	09.03	07.18	05.36	05.00	03.03	02.37	04.07	05.46				07.52		10.14		
	15.49	17.32	18.58	23 07.41 (T19)	21.37	23.18	22.28	20.37				15.58		14.15		
Potential sun hours	164	235	363	453	576	638	618	512	394			303	193	127		
Total, worst case				109	163				277							
Sun reduction				0.36	0.43				0.32							
Oper. time red.				0.98	0.98				0.98							
Wind dir. red.				0.62	0.62				0.62							
Total reduction				0.22	0.26				0.20							
Total, real				24	43				55							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkisellä + TakiankangasShadow receptor: C - Lomarakennus C (Mutahti)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619

Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1 to 31). It contains numerical data for sun hours and reduction percentages, along with a summary section at the bottom.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)



SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: D - Lomarakennus D (Mutaniemi)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	08.59	07.24	06.33	04.44	03.00	02.37	04.10	05.49	07.18	07.55	09.34
	14.17	15.52	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	02.54	02.39	04.13	05.52	07.21	07.58	09.37
	14.19	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.41	04.17	05.55	07.24	08.02	09.40
	14.22	15.59	17.32	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.49	02.44	04.20	05.58	07.27	08.05	09.43
	14.24	16.03	17.35	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	02.46	02.46	04.23	06.01	07.30	08.08	09.46
	14.26	16.06	17.39	20.14	21.50	23.34	23.47	22.10	20.18	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	07.33	08.12	09.49
	14.29	16.10	17.42	20.17	21.54	23.37	23.45	22.07	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	07.36	08.15	09.51
	14.31	16.13	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	04.19	02.39	02.55	04.33	06.10	07.39	08.19	09.54
	14.34	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.13
9	10.01	08.33	06.56	06.03	04.16	02.37	02.57	04.37	06.13	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	22.04	23.45	23.37	21.56	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	02.35	03.00	04.40	06.16	07.45	08.25	09.58
	14.40	16.23	17.54	20.29	22.07	23.47	23.34	21.53	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.09	02.33	03.00	04.43	06.19	07.48	08.29	10.01
	14.43	16.27	17.57	20.32	22.11	23.49	23.32	21.49	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.32	03.03	04.46	06.22	07.51	08.32	10.03
	14.46	16.30	18.00	20.36	22.14	23.52	23.29	21.45	19.53	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.55	08.35	10.05
	14.49	16.34	18.03	20.39	22.18	23.54	23.26	21.42	19.49	18.01	15.16	14.07
14	09.50	08.17	06.38	05.45	03.58	02.29	03.10	04.53	06.28	07.58	08.39	10.07
	14.52	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.27	03.13	04.56	06.31	08.01	08.42	10.08
	14.55	16.40	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.05
16	09.45	08.10	06.31	05.38	03.51	02.26	03.16	04.59	06.34	08.04	08.46	10.10
	14.58	16.44	18.13	20.48	22.28	23.59	23.17	21.31	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	02.26	03.19	05.03	06.37	08.07	08.49	10.11
	15.01	16.47	18.16	20.51	22.31	00.00	23.14	21.27	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	02.25	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.50	18.19	20.54	22.35	00.01	23.11	21.24	19.31	17.43	15.01	14.04
19	09.38	07.59	06.20	05.27	03.41	02.24	03.26	05.09	06.43	08.13	08.56	10.14
	15.08	16.54	18.22	20.58	22.38	00.02	23.08	21.20	19.27	17.40	14.58	14.04
20	09.35	07.56	06.16	05.23	03.38	02.24	03.29	05.12	06.46	08.16	08.59	10.15
	15.11	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	02.24	03.33	05.15	06.49	08.19	09.02	10.15
	15.15	17.00	18.28	21.04	22.45	00.03	23.01	21.13	19.20	17.33	14.52	14.04
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.18	06.52	08.23	09.06	10.16
	15.18	17.03	18.31	21.07	22.49	00.03	22.58	21.09	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	02.25	03.39	05.22	06.55	08.26	09.09	10.16
	15.21	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.03	22.51	21.02	19.09	17.22	14.44	14.06
25	09.21	07.39	05.58	05.05	03.21	02.27	03.46	05.28	07.01	07.32	09.16	10.17
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03	07.35	09.19	10.17
	15.32	17.16	18.43	21.20	23.02	00.01	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.29	03.53	05.34	07.06	07.39	09.22	10.17
	15.35	17.20	18.46	21.24	23.06	00.01	22.41	20.51	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.16
	15.39	17.23	18.49	21.27	23.09	23.59	22.38	20.48	18.55	16.08	14.33	14.10
29	09.09		06.44	04.51	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16
	15.42		19.52	21.30	23.12	23.58	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.06	02.35	04.03	05.43	07.15	07.49	09.31	10.15
	15.46		19.55	21.34	23.15	23.57	22.31	20.40	18.48	16.02	14.29	14.13
31	09.03		06.36		03.03		04.06	05.46		07.52		10.14
	15.49		19.58		23.19		22.28	20.37		15.58		14.15
Potential sun hours	164	235	363	454	577	639	618	513	394	303	193	127
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Mikka Saranpää / mikka.saranpaa@fcg.fi
 Calculated:
 9.5.2023 19.20/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkiselkä + TakiankangasShadow receptor: E - Asuinrakennus E (Alanko)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	08.59	07.24	06.33	04.44	05.28 (T9)	03.00	02.37	04.10	05.41 (T9)	05.49	07.18	07.55	09.35	
	14.17	15.52	17.26	20.02	21.37	05.50 (T9)	23.22	23.55	22.24	16	05.57 (T9)	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	05.28 (T9)	02.54	02.39	04.13	05.39 (T9)	05.52	07.21	07.58	09.37	
	14.19	15.56	17.29	20.05	21.40	05.51 (T9)	23.25	23.53	22.21	19	05.58 (T9)	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	05.27 (T9)	02.52	02.41	04.17	05.38 (T9)	05.55	07.24	08.02	09.40	
	14.22	15.59	17.32	20.08	21.44	05.51 (T9)	23.28	23.51	22.17	21	05.59 (T9)	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	05.27 (T9)	02.49	02.44	04.20	05.38 (T9)	05.58	07.27	08.05	09.43	
	14.24	16.03	17.35	20.11	21.47	05.51 (T9)	23.31	23.49	22.14	21	05.59 (T9)	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	05.27 (T9)	02.46	02.46	04.23	05.38 (T9)	06.01	07.30	08.08	09.46	
	14.26	16.06	17.39	20.14	21.50	05.51 (T9)	23.34	23.47	22.10	22	06.00 (T9)	20.18	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	05.27 (T9)	02.44	02.49	04.27	05.36 (T9)	06.04	07.33	08.12	09.49	
	14.29	16.10	17.42	20.17	21.54	05.48 (T9)	23.37	23.45	22.07	24	06.00 (T9)	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	05.28 (T9)	02.42	02.52	04.30	05.36 (T9)	06.07	07.36	08.15	09.51	
	14.31	16.13	17.45	20.20	21.57	05.49 (T9)	23.40	23.42	22.03	24	06.00 (T9)	20.11	18.22	15.35	14.14
8	10.03	08.37	07.00	06.07	04.19	05.28 (T9)	02.39	02.54	04.33	05.36 (T9)	06.10	07.39	08.19	09.54	
	14.34	16.17	17.48	20.23	22.01	05.48 (T9)	23.42	23.40	22.00	24	06.00 (T9)	20.08	18.19	15.32	14.13
9	10.01	08.34	06.56	06.03	04.15	05.28 (T9)	02.37	02.57	04.37	05.36 (T9)	06.13	07.42	08.22	09.56	
	14.37	16.20	17.51	20.26	22.04	05.49 (T9)	23.45	23.37	21.56	24	06.00 (T9)	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	05.29 (T9)	02.35	03.00	04.40	05.36 (T9)	06.16	07.45	08.25	09.59	
	14.40	16.23	17.54	20.29	22.07	05.48 (T9)	23.47	23.35	21.53	24	06.00 (T9)	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.08	05.29 (T9)	02.33	03.00	04.43	05.36 (T9)	06.19	07.48	08.29	10.01	
	14.43	16.27	17.57	20.32	22.11	05.49 (T9)	23.50	23.32	21.49	23	05.59 (T9)	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	05.30 (T9)	02.31	03.03	04.46	05.36 (T9)	06.22	07.51	08.32	10.03	
	14.46	16.30	18.00	20.36	22.14	05.46 (T9)	23.52	23.29	21.45	22	05.58 (T9)	19.53	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	05.31 (T9)	02.30	03.07	04.50	05.37 (T9)	06.25	07.55	08.36	10.05	
	14.49	16.34	18.03	20.39	22.18	05.44 (T9)	23.54	23.26	21.42	21	05.58 (T9)	19.49	18.01	15.16	14.06
14	09.50	08.17	06.38	05.45	03.58	05.33 (T9)	02.29	03.10	04.53	05.38 (T9)	06.28	07.58	08.39	10.07	
	14.52	16.37	18.07	20.42	22.21	05.42 (T9)	23.56	23.23	21.38	19	05.57 (T9)	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	05.40 (T9)	02.27	03.13	04.56	05.41 (T9)	06.31	08.01	08.42	10.08	
	14.55	16.40	18.10	20.45	22.25	05.49 (T9)	23.57	23.20	21.35	15	05.56 (T9)	19.42	17.54	15.10	14.05
16	09.46	08.10	06.31	05.38	03.51	05.42 (T9)	02.26	03.16	04.59	05.44 (T9)	06.34	08.04	08.46	10.10	
	14.58	16.44	18.13	20.48	22.28	05.49 (T9)	23.59	23.17	21.31	11	05.55 (T9)	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	05.42 (T9)	02.25	03.19	05.03	05.46 (T9)	06.37	08.07	08.49	10.11	
	15.01	16.47	18.16	20.51	22.31	05.49 (T9)	00.00	23.14	21.27	6	05.52 (T9)	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	05.42 (T9)	02.25	03.23	05.06	05.46 (T9)	06.40	08.10	08.52	10.13	
	15.05	16.50	18.19	20.55	22.35	05.42 (T9)	00.01	23.11	21.24	19	05.58 (T9)	19.31	17.43	15.01	14.04
19	09.38	08.00	06.20	05.27	03.41	05.42 (T9)	02.24	03.26	05.09	05.46 (T9)	06.43	08.13	08.56	10.14	
	15.08	16.54	18.22	20.58	22.38	05.42 (T9)	00.02	23.08	21.20	19	05.58 (T9)	19.27	17.40	14.58	14.04
20	09.35	07.56	06.16	05.23	03.38	05.42 (T9)	02.24	03.29	05.12	05.46 (T9)	06.46	08.16	08.59	10.15	
	15.11	16.57	18.25	21.01	22.42	05.42 (T9)	00.03	23.05	21.17	19	05.58 (T9)	19.24	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	05.42 (T9)	02.24	03.33	05.15	05.46 (T9)	06.49	08.19	09.03	10.15	
	15.15	17.00	18.28	21.04	22.45	05.42 (T9)	00.03	23.01	21.13	19	05.58 (T9)	19.20	17.33	14.52	14.04
22	09.30	07.49	06.09	05.16	03.31	05.42 (T9)	02.25	03.36	05.18	05.46 (T9)	06.52	08.23	09.06	10.16	
	15.18	17.03	18.31	21.07	22.49	05.42 (T9)	00.03	23.05	21.09	19	05.58 (T9)	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	05.42 (T9)	02.25	03.39	05.22	05.46 (T9)	06.55	08.26	09.09	10.17	
	15.21	17.07	18.34	21.11	22.52	05.42 (T9)	00.03	23.05	21.06	19	05.58 (T9)	19.13	17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	05.42 (T9)	02.26	03.43	05.25	05.46 (T9)	06.58	08.29	09.12	10.17	
	15.25	17.10	18.37	21.14	22.55	05.42 (T9)	00.03	23.05	21.02	19	05.58 (T9)	19.09	17.22	14.44	14.05
25	09.21	07.39	05.58	05.05	03.21	05.42 (T9)	02.27	03.46	05.28	05.46 (T9)	07.01	07.32	09.16	10.17	
	15.28	17.13	18.40	21.17	22.59	05.42 (T9)	00.02	23.05	20.59	19	05.58 (T9)	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	05.39 (T9)	03.18	02.28	03.49	05.31	07.03	07.36	09.19	10.17	10.17	
	15.32	17.16	18.43	21.20	7	05.46 (T9)	23.02	22.45	20.55	19	05.58 (T9)	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	05.36 (T9)	03.15	02.29	03.53	05.34	07.06	07.39	09.22	10.17	10.17	
	15.35	17.20	18.46	21.24	12	05.48 (T9)	23.06	22.41	20.51	18	05.58 (T9)	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	05.33 (T9)	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.16	10.16	
	15.39	17.23	18.49	21.27	16	05.49 (T9)	23.09	22.38	20.48	18	05.58 (T9)	18.55	16.08	14.33	14.10
29	09.09	06.44	04.51	05.29 (T9)	03.09	03.09	02.33	04.00	05.45 (T9)	07.12	07.45	09.28	10.16	10.16	
	15.42	17.27	18.52	21.30	20	05.49 (T9)	23.12	22.58	20.44	18	05.58 (T9)	18.51	16.05	14.31	14.11
30	09.06	06.40	04.47	05.28 (T9)	03.06	03.06	02.34	04.03	05.43 (T9)	07.15	07.49	09.31	10.15	10.15	
	15.46	17.31	18.95	21.34	22	05.50 (T9)	23.15	23.57	20.40	18	05.58 (T9)	18.48	16.02	14.29	14.13
31	09.03	06.36	04.43	05.25 (T9)	03.03	03.03	02.35	04.06	05.42 (T9)	07.15	07.52	09.35	10.15	10.15	
	15.49	17.34	19.08	21.37	23.19	05.50 (T9)	23.19	23.99	20.37	14	05.56 (T9)	18.44	15.58	14.15	14.15
Potential sun hours	164	235	363	454	577	639	618	513	394	303	193	127			
Total, worst case				77	281		31	336							
Sun reduction				0.43	0.47		0.48	0.42							
Oper. time red.				0.98	0.98		0.98	0.98							
Wind dir. red.				0.62	0.62		0.62	0.62							
Total reduction				0.26	0.29		0.29	0.26							
Total, real				20	82		9	86							

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 19.20/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiankangas Shadow receptor: F - Asuinrakennus F (Joensuu)
 Sunshine probability S (Average daily sunshine hours) [LULEÅ]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.24	06.33	04.44	03.00	02.36	04.10	05.49	07.18	07.55	09.35
	14.17	15.52	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	02.54	02.39	04.13	05.52	07.21	07.59	09.38
	14.19	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.41	04.17	05.55	07.24	08.02	09.40
	14.22	15.59	17.32	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.49	02.44	04.20	05.58	07.27	08.05	09.43
	14.24	16.03	17.35	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	02.46	02.46	04.23	06.01	07.30	08.09	09.46
	14.26	16.06	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	07.33	08.12	09.49
	14.29	16.10	17.42	20.17	21.54	23.37	23.45	22.07	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	07.36	08.15	09.51
	14.31	16.13	17.45	20.20	21.57	23.40	23.42	22.03	20.11	18.22	15.35	14.14
8	10.03	08.37	07.00	06.07	04.19	02.39	02.54	04.33	06.10	07.39	08.19	09.54
	14.34	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.13
9	10.01	08.34	06.56	06.03	04.15	02.37	02.57	04.37	06.13	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	22.04	23.45	23.37	21.56	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	02.35	03.00	04.40	06.16	07.45	08.25	09.59
	14.40	16.23	17.54	20.29	22.07	23.47	23.35	21.53	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.08	02.33	03.00	04.43	06.19	07.48	08.29	10.01
	14.43	16.27	17.57	20.32	22.11	23.50	23.32	21.49	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.31	03.03	04.46	06.22	07.51	08.32	10.03
	14.46	16.30	18.00	20.36	22.14	23.52	23.29	21.45	19.53	18.04	15.19	14.07
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.54	23.26	21.42	19.49	18.01	15.16	14.06
14	09.50	08.17	06.38	05.45	03.58	02.28	03.10	04.53	06.28	07.58	08.39	10.07
	14.52	16.37	18.07	20.42	22.21	23.56	23.23	21.38	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.27	03.13	04.56	06.31	08.01	08.42	10.08
	14.55	16.40	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.05
16	09.46	08.10	06.31	05.38	03.51	02.26	03.16	04.59	06.34	08.04	08.46	10.10
	14.58	16.44	18.13	20.48	22.28	23.59	23.17	21.31	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	02.25	03.19	05.03	06.37	08.07	08.49	10.11
	15.01	16.47	18.16	20.51	22.32	00.00	23.14	21.27	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	02.25	03.23	05.06	06.40	08.10	08.52	10.13
	15.05	16.50	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.43	15.01	14.04
19	09.38	08.00	06.20	05.27	03.41	02.24	03.26	05.09	06.43	08.13	08.56	10.14
	15.08	16.54	18.22	20.58	22.38	00.02	23.08	21.20	19.27	17.40	14.58	14.03
20	09.35	07.56	06.16	05.23	03.38	02.24	03.29	05.12	06.46	08.16	08.59	10.15
	15.11	16.57	18.25	21.01	22.42	00.03	23.05	21.17	19.24	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	02.24	03.33	05.15	06.49	08.20	09.03	10.15
	15.15	17.00	18.28	21.04	22.45	00.03	23.01	21.13	19.20	17.33	14.52	14.04
22	09.30	07.49	06.09	05.16	03.31	02.24	03.36	05.18	06.52	08.23	09.06	10.16
	15.18	17.03	18.31	21.07	22.49	00.03	22.58	21.09	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	02.25	03.39	05.22	06.55	08.26	09.09	10.17
	15.21	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.56	00.03	22.51	21.02	19.09	17.22	14.44	14.05
25	09.21	07.39	05.58	05.05	03.21	02.27	03.46	05.28	07.01	07.32	09.16	10.17
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.28	03.49	05.31	07.03	07.36	09.19	10.17
	15.32	17.16	18.43	21.20	23.02	00.02	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.29	03.53	05.34	07.06	07.39	09.22	10.17
	15.35	17.20	18.46	21.24	23.06	00.01	22.41	20.51	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.17
	15.39	17.23	18.49	21.27	23.09	00.00	22.38	20.48	18.55	16.08	14.33	14.10
29	09.09		06.44	04.51	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16
	15.42		19.52	21.30	23.12	23.58	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.06	02.34	04.03	05.43	07.15	07.49	09.32	10.15
	15.46		19.55	21.34	23.15	23.57	22.31	20.40	18.48	16.02	14.29	14.13
31	09.03		06.36		03.03		04.06	05.46		07.52		10.15
	15.49		19.58		23.19		22.28	20.37		15.58		14.15
Potential sun hours	164	235	363	454	577	639	618	513	394	303	193	127
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: G - Asuinrakennus G (Heiniaho)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		
1	10.14	09.00	07.25	06.33	07.49 (T3)	04.44	05.23 (T1)	03.00
	14.17	15.52	17.26	20.02	6 07.55 (T3)	21.37	8 05.31 (T1)	23.22
2	10.13	08.57	07.21	06.29		04.40	05.20 (T1)	02.54
	14.19	15.56	17.29	20.05		21.40	13 05.33 (T1)	23.25
3	10.12	08.53	07.17	06.25		04.37	05.18 (T1)	02.51
	14.21	15.59	17.32	20.08		21.44	16 05.34 (T1)	23.29
4	10.10	08.50	07.14	06.22		04.33	05.17 (T1)	02.48
	14.23	16.03	17.35	20.11		21.47	18 05.35 (T1)	23.32
5	10.09	08.47	07.10	06.18		04.29	05.15 (T1)	02.46
	14.26	16.06	17.39	20.14		21.51	20 05.35 (T1)	23.35
6	10.07	08.44	07.07	06.14		04.26	05.14 (T1)	02.43
	14.28	16.10	17.42	20.17		21.54	22 05.36 (T1)	23.37
7	10.05	08.40	07.03	06.11		04.22	05.14 (T1)	02.41
	14.31	16.13	17.45	20.20		21.57	22 05.36 (T1)	23.40
8	10.04	08.37	07.00	06.07		04.19	05.13 (T1)	02.39
	14.34	16.16	17.48	20.23		22.01	23 05.36 (T1)	23.43
9	10.02	08.34	06.56	06.03		04.15	05.14 (T1)	02.37
	14.37	16.20	17.51	20.26		22.04	24 05.38 (T1)	23.45
10	10.00	08.30	06.52	06.00		04.12	05.14 (T1)	02.34
	14.39	16.23	17.54	20.29		22.08	24 05.38 (T1)	23.48
11	09.58	08.27	06.49	05.56		04.08	05.13 (T1)	02.33
	14.42	16.27	17.57	20.33		22.11	24 05.37 (T1)	23.50
12	09.55	08.24	06.45	05.52		04.05	05.13 (T1)	02.31
	14.45	16.30	18.00	20.36		22.15	24 05.37 (T1)	23.52
13	09.53	08.20	06.42	05.49		04.01	05.13 (T1)	02.29
	14.48	16.33	18.04	20.39		22.18	24 05.37 (T1)	23.54
14	09.51	08.17	06.38	05.45		03.58	05.13 (T1)	02.28
	14.52	16.37	18.07	20.42		22.21	23 05.36 (T1)	23.56
15	09.48	08.13	06.34	05.42		03.54	05.15 (T1)	02.27
	14.55	16.40	18.10	20.45		22.25	22 05.37 (T1)	23.58
16	09.46	08.10	06.31	05.38		03.51	05.15 (T1)	02.26
	14.58	16.44	18.13	20.48		22.28	21 05.36 (T1)	23.59
17	09.43	08.07	06.27	05.34		03.48	05.15 (T1)	02.25
	15.01	16.47	18.16	20.51		22.32	20 05.35 (T1)	00.01
18	09.41	08.03	06.24	05.31	06.56 (T3)	03.44	05.16 (T1)	02.24
	15.04	16.50	18.19	3 06.59 (T3)	20.55	22.35	19 05.35 (T1)	00.02
19	09.38	08.00	06.20	05.27	06.52 (T3)	03.41	05.17 (T1)	02.24
	15.08	16.54	18.22	10 07.02 (T3)	20.58	22.39	16 05.33 (T1)	00.03
20	09.35	07.56	06.16	05.23	06.49 (T3)	03.37	05.18 (T1)	02.23
	15.11	16.57	18.25	15 07.04 (T3)	21.01	22.42	15 05.33 (T1)	00.03
21	09.33	07.53	06.13	05.20	06.46 (T3)	03.34	05.19 (T1)	02.24
	15.14	17.00	18.28	19 07.05 (T3)	21.04	22.46	12 05.31 (T1)	00.04
22	09.30	07.49	06.09	05.16	06.44 (T3)	03.31	05.21 (T1)	02.24
	15.18	17.03	18.31	21 07.05 (T3)	21.08	22.49	8 05.29 (T1)	00.04
23	09.27	07.46	06.05	05.12	06.44 (T3)	03.27		02.24
	15.21	17.07	18.34	22 07.06 (T3)	21.11	22.52		00.04
24	09.24	07.42	06.02	05.09	06.43 (T3)	03.24		02.25
	15.25	17.10	18.37	23 07.06 (T3)	21.14	22.56		00.04
25	09.21	07.39	05.58	05.05	06.42 (T3)	03.21		02.26
	15.28	17.13	18.40	23 07.05 (T3)	21.17	22.59		00.03
26	09.18	07.35	05.54	05.02	06.43 (T3)	03.18		02.27
	15.31	17.16	18.43	22 07.05 (T3)	21.21	23.03		00.02
27	09.15	07.32	05.51	04.58	06.42 (T3)	03.15		02.29
	15.35	17.20	18.46	22 07.04 (T3)	21.24	23.06		00.01
28	09.12	07.28	05.47	04.54	06.43 (T3)	03.12		02.30
	15.38	17.23	18.49	21 07.04 (T3)	21.27	23.09		00.00
29	09.09		06.44	04.51	07.44 (T3)	03.08		02.32
	15.42		19.52	18 08.02 (T3)	21.30	23.13		23.59
30	09.06		06.40	04.47	07.44 (T3)	03.05		02.34
	15.45		19.55	16 08.00 (T3)	21.34	23.16		23.57
31	09.03		06.36	04.46	07.46 (T3)	03.02		
	15.49		19.59	13 07.59 (T3)		23.19		
Potential sun hours	163	235	363	454		577		639
Total, worst case			248		6		418	
Sun reduction			0,36		0,43		0,47	
Oper. time red.			0,98		0,98		0,98	
Wind dir. red.			0,62		0,62		0,63	
Total reduction			0,22		0,26		0,29	
Total, real			54		2		122	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: G - Asuinrakennus G (Heiniaho)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.36	04.10	05.23 (T1)	05.49	07.18	07.55	09.35	
	23.56	22.25	24 05.47 (T1)	20.33	18.44	15.55	14.26	
2	02.38	04.13	05.23 (T1)	05.52	07.21	07.59	09.38	
	23.54	22.21	24 05.47 (T1)	20.30	18.40	15.51	14.24	
3	02.40	04.16	05.24 (T1)	05.55	07.24	08.02	09.41	
	23.52	22.18	23 05.47 (T1)	20.26	18.37	15.48	14.22	
4	02.43	04.20	05.24 (T1)	05.58	07.27	08.05	09.44	
	23.50	22.14	23 05.47 (T1)	20.22	18.33	15.45	14.20	
5	02.46	04.23	05.23 (T1)	06.01	07.30	08.09	09.46	
	23.48	22.11	23 05.46 (T1)	20.19	18.30	15.41	14.18	
6	02.48	04.26	05.24 (T1)	06.04	07.33	08.12	09.49	
	23.45	22.07	22 05.46 (T1)	20.15	18.26	15.38	14.16	
7	02.51	04.30	05.24 (T1)	06.07	07.36	08.15	09.52	
	23.43	22.03	22 05.46 (T1)	20.11	18.22	15.35	14.14	
8	02.54	04.33	05.25 (T1)	06.10	07.39	08.19	09.54	
	23.40	22.00	20 05.45 (T1)	20.08	18.19	15.32	14.12	
9	02.57	04.36	05.26 (T1)	06.13	07.42	08.22	09.57	
	23.38	21.56	18 05.44 (T1)	20.04	18.15	15.28	14.11	
10	03.00	04.40	05.27 (T1)	06.16	07.45	08.26	09.59	
	23.35	21.53	16 05.43 (T1)	20.00	18.12	15.25	14.10	
11	03.00	04.43	05.29 (T1)	06.19	07.48	08.29	10.01	
	23.32	21.49	12 05.41 (T1)	19.57	4 07.46 (T3)	18.08	15.22	14.08
12	03.03	04.46	05.32 (T1)	06.22	07.38 (T3)	07.52	08.32	10.03
	23.29	21.46	6 05.38 (T1)	19.53	12 07.50 (T3)	18.04	15.19	14.07
13	03.06	04.49	06.25	07.36 (T3)	07.55	08.36	10.05	
	23.27	21.42	19.49	16 07.52 (T3)	18.01	15.16	14.06	
14	03.09	04.53	06.28	07.34 (T3)	07.58	08.39	10.07	
	23.24	21.38	19.46	19 07.53 (T3)	17.57	15.13	14.05	
15	03.12	04.56	06.31	07.33 (T3)	08.01	08.43	10.09	
	23.21	21.35	19.42	21 07.54 (T3)	17.54	15.09	14.04	
16	03.16	04.59	06.34	07.32 (T3)	08.04	08.46	10.10	
	23.18	21.31	19.38	22 07.54 (T3)	17.50	15.06	14.04	
17	03.19	05.02	06.37	07.31 (T3)	08.07	08.49	10.12	
	23.14	21.28	19.35	22 07.53 (T3)	17.47	15.03	14.03	
18	03.22	05.06	06.40	07.30 (T3)	08.10	08.53	10.13	
	23.11	21.24	19.31	23 07.53 (T3)	17.43	15.00	14.03	
19	03.26	05.09	06.43	07.30 (T3)	08.13	08.56	10.14	
	23.08	21.20	19.28	23 07.53 (T3)	17.40	14.58	14.03	
20	03.29	05.12	06.46	07.30 (T3)	08.16	08.59	10.15	
	23.05	21.17	19.24	22 07.52 (T3)	17.36	14.55	14.03	
21	03.32	05.32 (T1)	05.15	06.49	07.30 (T3)	08.20	09.03	10.16
	23.02	5 05.37 (T1)	21.13	19.20	21 07.51 (T3)	17.33	14.52	14.03
22	03.36	05.30 (T1)	05.18	06.52	07.31 (T3)	08.23	09.06	10.17
	22.58	10 05.40 (T1)	21.10	19.17	19 07.50 (T3)	17.29	14.49	14.04
23	03.39	05.28 (T1)	05.21	06.55	07.32 (T3)	08.26	09.09	10.17
	22.55	13 05.41 (T1)	21.06	19.13	17 07.49 (T3)	17.26	14.46	14.04
24	03.42	05.28 (T1)	05.25	06.58	07.35 (T3)	08.29	09.13	10.17
	22.52	15 05.43 (T1)	21.02	19.09	12 07.47 (T3)	17.22	14.43	14.05
25	03.46	05.27 (T1)	05.28	07.01	07.38 (T3)	07.32	09.16	10.17
	22.48	18 05.45 (T1)	20.59	19.06	6 07.44 (T3)	16.19	14.41	14.06
26	03.49	05.26 (T1)	05.31	07.04	07.36	09.19	10.17	
	22.45	19 05.45 (T1)	20.55	19.02	16.15	14.38	14.07	
27	03.53	05.26 (T1)	05.34	07.06	07.39	09.22	10.17	
	22.42	20 05.46 (T1)	20.51	18.58	16.12	14.36	14.08	
28	03.56	05.25 (T1)	05.37	07.09	07.42	09.26	10.17	
	22.38	22 05.47 (T1)	20.48	18.55	16.08	14.33	14.09	
29	03.59	05.24 (T1)	05.40	07.12	07.45	09.29	10.16	
	22.35	23 05.47 (T1)	20.44	18.51	16.05	14.31	14.11	
30	04.03	05.24 (T1)	05.43	07.15	07.49	09.32	10.16	
	22.31	23 05.47 (T1)	20.40	18.48	16.02	14.28	14.13	
31	04.06	05.24 (T1)	05.46		07.52		10.15	
	22.28	24 05.48 (T1)	20.37		15.58		14.14	
Potential sun hours	619	513	394	303	193	127		
Total, worst case	192	233	259					
Sun reduction	0,48	0,42	0,32					
Oper. time red.	0,98	0,98	0,98					
Wind dir. red.	0,63	0,63	0,62					
Total reduction	0,29	0,26	0,20					
Total, real	56	60	51					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: H - Asuinrakennus H (Mäkelä)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.14	09.00	07.25	06.33	04.44	02.56	02.36	04.09	05.49	07.18	07.55	09.35
	14.17	15.52	17.26	20.02	21.37	23.23	23.56	22.25	20.33	18.44	15.55	14.26
2	10.13	08.57	07.21	06.29	04.40	02.54	02.38	04.13	05.52	07.21	07.59	09.38
	14.19	15.56	17.29	20.05	21.41	23.26	23.54	22.21	20.30	18.40	15.51	14.24
3	10.12	08.53	07.18	06.25	04.36	02.51	02.40	04.16	05.55	07.24	08.02	09.41
	14.21	15.59	17.32	20.08	21.44	23.29	23.52	22.18	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.48	02.43	04.20	05.58	07.27	08.05	09.44
	14.23	16.03	17.35	20.11	21.47	23.32	23.50	22.14	20.22	18.33	15.45	14.20
5	10.09	08.47	07.10	06.18	04.29	02.46	02.45	04.23	06.01	07.30	08.09	09.47
	14.26	16.06	17.39	20.14	21.51	23.35	23.48	22.11	20.19	18.30	15.41	14.18
6	10.07	08.44	07.07	06.14	04.26	02.43	02.48	04.26	06.04	07.33	08.12	09.49
	14.28	16.10	17.42	20.17	21.54	23.38	23.46	22.07	20.15	18.26	15.38	14.16
7	10.06	08.40	07.03	06.11	04.22	02.41	02.51	04.30	06.07	07.36	08.16	09.52
	14.31	16.13	17.45	20.20	21.58	23.40	23.43	22.04	20.11	18.22	15.35	14.14
8	10.04	08.37	07.00	06.07	04.19	02.38	02.54	04.33	06.10	07.39	08.19	09.54
	14.34	16.16	17.48	20.23	22.01	23.43	23.41	22.00	20.08	18.19	15.32	14.12
9	10.02	08.34	06.56	06.03	04.15	02.36	02.57	04.36	06.13	07.42	08.22	09.57
	14.36	16.20	17.51	20.26	22.04	23.46	23.38	21.56	20.04	18.15	15.28	14.11
10	10.00	08.30	06.52	06.00	04.12	02.34	03.00	04.40	06.16	07.45	08.26	09.59
	14.39	16.23	17.54	20.29	22.08	23.48	23.35	21.53	20.00	18.12	15.25	14.09
11	09.58	08.27	06.49	05.56	04.08	02.32	03.00	04.43	06.19	07.49	08.29	10.01
	14.42	16.27	17.57	20.33	22.11	23.51	23.33	21.49	19.57	18.08	15.22	14.08
12	09.56	08.24	06.45	05.52	04.05	02.31	03.03	04.46	06.22	07.52	08.32	10.03
	14.45	16.30	18.00	20.36	22.15	23.53	23.30	21.46	19.53	18.04	15.19	14.07
13	09.53	08.20	06.42	05.49	04.01	02.29	03.06	04.49	06.25	07.55	08.36	10.05
	14.48	16.33	18.04	20.39	22.18	23.55	23.27	21.42	19.49	18.01	15.16	14.06
14	09.51	08.17	06.38	05.45	03.58	02.28	03.09	04.53	06.28	07.58	08.39	10.07
	14.51	16.37	18.07	20.42	22.22	23.57	23.24	21.39	19.46	17.57	15.13	14.05
15	09.49	08.14	06.34	05.42	03.54	02.26	03.12	04.56	06.31	08.01	08.43	10.09
	14.55	16.40	18.10	20.45	22.25	23.58	23.21	21.35	19.42	17.54	15.09	14.04
16	09.46	08.10	06.31	05.38	03.51	02.25	03.16	04.59	06.34	08.04	08.46	10.11
	14.58	16.44	18.13	20.48	22.29	00.00	23.18	21.31	19.38	17.50	15.06	14.04
17	09.43	08.07	06.27	05.34	03.47	02.24	03.19	05.02	06.37	08.07	08.49	10.12
	15.01	16.47	18.16	20.52	22.32	00.01	23.15	21.28	19.35	17.47	15.03	14.03
18	09.41	08.03	06.24	05.31	03.44	02.24	03.22	05.06	06.40	08.10	08.53	10.13
	15.04	16.50	18.19	20.55	22.35	00.02	23.11	21.24	19.31	17.43	15.00	14.03
19	09.38	08.00	06.20	05.27	03.41	02.23	03.25	05.09	06.43	08.13	08.56	10.14
	15.08	16.53	18.22	20.58	22.39	00.03	23.08	21.21	19.28	17.40	14.57	14.03
20	09.36	07.56	06.16	05.23	03.37	02.23	03.29	05.12	06.46	08.17	09.00	10.15
	15.11	16.57	18.25	21.01	22.42	00.04	23.05	21.17	19.24	17.36	14.55	14.03
21	09.33	07.53	06.13	05.20	03.34	02.23	03.32	05.15	06.49	08.20	09.03	10.16
	15.14	17.00	18.28	21.04	22.46	00.04	23.02	21.13	19.20	17.33	14.52	14.03
22	09.30	07.49	06.09	05.16	03.31	02.23	03.36	05.18	06.52	08.23	09.06	10.17
	15.18	17.03	18.31	21.08	22.49	00.04	22.59	21.10	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.12	03.27	02.24	03.39	05.21	06.55	08.26	09.10	10.17
	15.21	17.07	18.34	21.11	22.53	00.04	22.55	21.06	19.13	17.26	14.46	14.04
24	09.24	07.42	06.02	05.09	03.24	02.25	03.42	05.25	06.58	08.29	09.13	10.18
	15.25	17.10	18.37	21.14	22.56	00.04	22.52	21.02	19.09	17.22	14.43	14.05
25	09.21	07.39	05.58	05.05	03.21	02.26	03.46	05.28	07.01	07.33	09.16	10.18
	15.28	17.13	18.40	21.17	22.59	00.03	22.49	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.27	03.49	05.31	07.04	07.36	09.19	10.18
	15.31	17.16	18.43	21.21	23.03	00.03	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.28	03.52	05.34	07.06	07.39	09.23	10.18
	15.35	17.20	18.46	21.24	23.06	00.02	22.42	20.51	18.58	16.12	14.36	14.08
28	09.12	07.28	05.47	04.54	03.11	02.30	03.56	05.37	07.09	07.42	09.26	10.17
	15.38	17.23	18.49	21.27	23.10	00.01	22.38	20.48	18.55	16.08	14.33	14.09
29	09.09		06.44	04.51	03.08	02.32	03.59	05.40	07.12	07.46	09.29	10.17
	15.42		19.52	21.31	23.13	23.59	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.05	02.34	04.03	05.43	07.15	07.49	09.32	10.16
	15.45		19.56	21.34	23.16	23.58	22.32	20.41	18.48	16.02	14.28	14.12
31	09.03		06.36		03.02		04.06	05.46		07.52		10.15
	15.49		19.59		23.19		22.28	20.37		15.58		14.14
Potential sun hours	163	235	363	454	577	640	619	513	394	303	192	126
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiakangasShadow receptor: I - Lomarakennus I
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.14	08.59	12.37 (T7)	07.24	06.32	04.43
	14.16	15.52	9 12.46 (T7)	17.26	20.01	21.37
2	10.13	08.56	07.21	17.26	06.29	04.40
	14.18	15.55	17.29	17.29	20.04	21.40
3	10.11	08.53	07.17	17.29	06.25	04.36
	14.21	15.59	17.32	17.32	20.07	21.44
4	10.10	08.50	07.14	17.32	06.21	04.33
	14.23	16.02	17.35	17.35	20.10	21.47
5	10.09	08.47	07.10	17.35	06.18	04.29
	14.25	16.06	17.38	6 17.01 (T2)	20.14	21.50
6	10.07	08.43	07.06	17.38	06.14	04.25
	14.28	16.09	17.41	6 17.01 (T2)	20.14	21.50
7	10.05	08.40	07.03	17.41	06.10	04.22
	14.30	16.13	17.44	12 17.04 (T2)	20.17	21.54
8	10.03	12.27 (T7)	08.37	17.44	06.10	04.22
	14.33	5 12.32 (T7)	16.16	17.44	06.10	04.22
9	10.01	12.26 (T7)	08.33	17.44	06.10	04.22
	14.36	16 12.42 (T7)	16.19	17.44	06.10	04.22
10	09.59	12.26 (T7)	08.30	17.44	06.10	04.22
	14.39	18 12.44 (T7)	16.23	17.44	06.10	04.22
11	09.57	12.26 (T7)	08.27	17.44	06.10	04.22
	14.42	19 12.45 (T7)	16.26	17.44	06.10	04.22
12	09.55	12.25 (T7)	08.23	17.44	06.10	04.22
	14.45	20 12.45 (T7)	16.30	17.44	06.10	04.22
13	09.53	12.26 (T7)	08.20	17.44	06.10	04.22
	14.48	20 12.46 (T7)	16.33	17.44	06.10	04.22
14	09.51	12.25 (T7)	08.17	17.44	06.10	04.22
	14.51	22 12.47 (T7)	16.36	17.44	06.10	04.22
15	09.48	12.26 (T7)	08.13	17.44	06.10	04.22
	14.54	22 12.48 (T7)	16.40	17.44	06.10	04.22
16	09.46	12.25 (T7)	08.10	17.44	06.10	04.22
	14.57	23 12.48 (T7)	16.43	17.44	06.10	04.22
17	09.43	12.25 (T7)	08.06	17.44	06.10	04.22
	15.01	24 12.49 (T7)	16.46	17.44	06.10	04.22
18	09.41	12.25 (T7)	08.03	17.44	06.10	04.22
	15.04	25 12.50 (T7)	16.50	17.44	06.10	04.22
19	09.38	12.25 (T7)	07.59	17.44	06.10	04.22
	15.07	25 12.50 (T7)	16.53	17.44	06.10	04.22
20	09.35	12.26 (T7)	07.56	17.44	06.10	04.22
	15.11	25 12.51 (T7)	16.56	17.44	06.10	04.22
21	09.32	12.26 (T7)	07.52	17.44	06.10	04.22
	15.14	25 12.51 (T7)	17.00	17.44	06.10	04.22
22	09.30	12.26 (T7)	07.49	17.44	06.10	04.22
	15.17	25 12.51 (T7)	17.03	17.44	06.10	04.22
23	09.27	12.27 (T7)	07.45	17.44	06.10	04.22
	15.21	25 12.52 (T7)	17.06	17.44	06.10	04.22
24	09.24	12.27 (T7)	07.42	17.44	06.10	04.22
	15.24	24 12.51 (T7)	17.09	17.44	06.10	04.22
25	09.21	12.28 (T7)	07.38	17.44	06.10	04.22
	15.28	24 12.52 (T7)	17.13	17.44	06.10	04.22
26	09.18	12.29 (T7)	07.35	17.44	06.10	04.22
	15.31	23 12.52 (T7)	17.16	17.44	06.10	04.22
27	09.15	12.29 (T7)	07.31	17.44	06.10	04.22
	15.34	22 12.51 (T7)	17.19	17.44	06.10	04.22
28	09.12	12.30 (T7)	07.28	17.44	06.10	04.22
	15.38	21 12.51 (T7)	17.22	17.44	06.10	04.22
29	09.09	12.31 (T7)	07.25	17.44	06.10	04.22
	15.41	19 12.50 (T7)	17.25	17.44	06.10	04.22
30	09.06	12.33 (T7)	07.21	17.44	06.10	04.22
	15.45	17 12.50 (T7)	17.28	17.44	06.10	04.22
31	09.03	12.34 (T7)	07.18	17.44	06.10	04.22
	15.48	14 12.48 (T7)	17.31	17.44	06.10	04.22
Potential sun hours	163	235	363	454	577	640
Total, worst case	503	9	250			
Sun reduction	0,11	0,31	0,36			
Oper. time red.	0,98	0,98	0,98			
Wind dir. red.	0,66	0,66	0,61			
Total reduction	0,08	0,21	0,22			
Total, real	38	2	55			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiakangasShadow receptor: I - Lomarakenus I
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
531	418	482	543	576	834	1 108	1 065	893	815	711	642	8 619

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December				
1	02.35	04.09	05.49	07.18	17.27 (T2)	07.55	09.35	12.08 (T7)		
	23.56	22.24	20.33	18.44	22	17.49 (T2)	15.54	14.25	19	12.27 (T7)
2	02.37	04.12	05.52	07.21	17.26 (T2)	07.58	09.38	12.09 (T7)		
	23.54	22.21	20.29	18.40	23	17.49 (T2)	15.51	14.23	18	12.27 (T7)
3	02.40	04.16	05.55	07.24	17.26 (T2)	08.02	09.41	12.10 (T7)		
	23.52	22.17	20.26	18.36	22	17.48 (T2)	15.48	14.21	16	12.26 (T7)
4	02.42	04.19	05.58	07.27	17.26 (T2)	08.05	09.43	12.11 (T7)		
	23.50	22.14	20.22	18.33	22	17.48 (T2)	15.44	14.19	6	12.17 (T7)
5	02.45	04.23	06.01	07.30	17.26 (T2)	08.08	09.46	12.12 (T7)		
	23.48	22.10	20.18	18.29	21	17.47 (T2)	15.41	14.17		
6	02.48	04.26	06.04	07.33	17.27 (T2)	08.12	09.49	12.13 (T7)		
	23.45	22.07	20.15	18.26	18	17.45 (T2)	15.38	14.15		
7	02.50	04.29	06.07	07.36	17.27 (T2)	08.15	09.52	12.14 (T7)		
	23.43	22.03	20.11	18.22	14	17.41 (T2)	15.34	14.14		
8	02.53	04.33	06.10	07.39	17.30 (T2)	08.19	09.54	12.15 (T7)		
	23.40	22.00	20.07	18.18	8	17.38 (T2)	15.31	14.12		
9	02.56	04.36	06.13	07.42	17.33 (T2)	08.22	09.56	12.16 (T7)		
	23.38	21.56	20.04	18.15	1	17.34 (T2)	15.28	14.10		
10	02.59	04.39	06.16	07.45	17.36 (T2)	08.25	09.59	12.17 (T7)		
	23.35	21.53	20.00	18.11		15.25	10	12.17 (T7)	14.09	
11	03.02	04.42	06.19	07.48	17.39 (T2)	08.29	10.01	12.05 (T7)	14.01	
	23.32	21.49	19.56	18.08		15.22	14	12.19 (T7)	14.08	
12	03.02	04.46	06.22	07.51	17.42 (T2)	08.32	10.03	12.04 (T7)	14.03	
	23.29	21.45	19.53	18.04		15.18	17	12.21 (T7)	14.07	
13	03.05	04.49	06.25	07.54	17.45 (T2)	08.35	10.05	12.03 (T7)	14.05	
	23.26	21.42	19.49	18.00		15.15	19	12.22 (T7)	14.06	
14	03.09	04.52	06.28	07.57	17.48 (T2)	08.39	10.07	12.03 (T7)	14.07	
	23.23	21.38	19.45	17.57		15.12	21	12.24 (T7)	14.05	
15	03.12	04.56	06.31	08.00	17.51 (T2)	08.42	10.09	12.02 (T7)	14.09	
	23.20	21.35	19.42	17.53		15.09	22	12.24 (T7)	14.04	
16	03.15	04.59	06.34	08.04	17.54 (T2)	08.46	10.10	12.02 (T7)	14.10	
	23.17	21.31	19.38	17.50		15.06	23	12.25 (T7)	14.03	
17	03.18	05.02	06.37	08.07	17.57 (T2)	08.49	10.12	12.02 (T7)	14.12	
	23.14	21.27	19.34	17.46		15.03	24	12.26 (T7)	14.03	
18	03.22	05.05	06.40	08.10	17.60 (T2)	08.52	10.13	12.01 (T7)	14.13	
	23.11	21.24	19.31	17.43		15.00	24	12.25 (T7)	14.03	
19	03.25	05.08	06.42	08.13	17.63 (T2)	08.56	10.14	12.01 (T7)	14.14	
	23.08	21.20	19.27	17.39		14.57	25	12.26 (T7)	14.02	
20	03.28	05.12	06.45	08.16	17.66 (T2)	08.59	10.15	12.01 (T7)	14.15	
	23.05	21.17	19.24	17.36		14.54	25	12.26 (T7)	14.03	
21	03.32	05.15	06.48	08.19	17.69 (T2)	09.03	10.16	12.01 (T7)	14.16	
	23.01	21.13	19.20	17.32		14.51	25	12.26 (T7)	14.03	
22	03.35	05.18	06.51	08.22	17.72 (T2)	09.06	10.16	12.02 (T7)	14.16	
	22.58	21.09	19.16	17.29		14.48	25	12.27 (T7)	14.03	
23	03.38	05.21	06.54	08.26	17.75 (T2)	09.09	10.17	12.03 (T7)	14.17	
	22.55	21.06	19.13	17.25		14.46	24	12.27 (T7)	14.04	
24	03.42	05.24	06.57	08.29	17.78 (T2)	09.13	10.17	12.03 (T7)	14.17	
	22.52	21.02	19.09	17.22		14.43	24	12.27 (T7)	14.04	
25	03.45	05.27	07.00	17.36 (T2)	17.81 (T2)	09.16	10.17	12.04 (T7)	14.17	
	22.48	20.58	19.05	17.45 (T2)	16.18	14.40	23	12.27 (T7)	14.05	
26	03.49	05.30	07.03	17.33 (T2)	17.84 (T2)	09.19	10.17	12.04 (T7)	14.17	
	22.45	20.55	19.02	17.47 (T2)	16.15	14.38	24	12.28 (T7)	14.06	
27	03.52	05.33	07.06	17.31 (T2)	17.87 (T2)	09.22	10.17	12.04 (T7)	14.17	
	22.41	20.51	18.58	17.48 (T2)	16.11	14.35	23	12.27 (T7)	14.08	
28	03.55	05.37	07.09	17.29 (T2)	17.90 (T2)	09.25	10.17	12.06 (T7)	14.17	
	22.38	20.47	18.54	17.49 (T2)	16.08	14.33	22	12.28 (T7)	14.09	
29	03.59	05.40	07.12	17.28 (T2)	17.93 (T2)	09.29	10.16	12.06 (T7)	14.16	
	22.35	20.44	18.51	17.49 (T2)	16.05	14.30	21	12.27 (T7)	14.10	
30	04.02	05.43	07.15	17.27 (T2)	17.96 (T2)	09.32	10.16	12.07 (T7)	14.16	
	22.31	20.40	18.47	17.49 (T2)	16.01	14.28	20	12.27 (T7)	14.12	
31	04.06	05.46		07.52			10.15			
	22.28	20.37		15.58			14.14			
Potential sun hours	619	513	394	303	192		126			
Total, worst case			103	151	455		59			
Sun reduction			0,32	0,28	0,19		0,04			
Oper. time red.			0,98	0,98	0,98		0,98			
Wind dir. red.			0,61	0,61	0,66		0,66			
Total reduction			0,20	0,17	0,13		0,03			
Total, real			20	26	57		2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: J - Lomarakenus J (Hautakaarto)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1108 1065 893 815 711 642 8619
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12 14.18	08.59 15.53	07.24 17.26	06.33 20.01	04.44 21.36	03.01 23.20	02.38 23.53	04.10 22.23	05.49 20.33	07.18 18.44	07.55 15.55	09.34 14.27
2	10.11 14.20	08.56 15.56	07.21 17.29	06.29 20.04	04.41 21.40	02.55 23.24	02.40 23.52	04.14 22.20	05.52 20.29	07.21 18.40	07.58 15.52	09.36 14.25
3	10.10 14.22	08.53 16.00	07.17 17.32	06.25 20.07	04.37 21.43	02.53 23.27	02.42 23.50	04.17 22.16	05.55 20.25	07.24 18.37	08.01 15.48	09.39 14.23
4	10.09 14.25	08.49 16.03	07.14 17.35	06.22 20.10	04.33 21.46	02.50 23.30	02.45 23.48	04.20 22.13	05.58 20.22	07.27 18.33	08.05 15.45	09.42 14.21
5	10.07 14.27	08.46 16.07	07.10 17.39	06.18 20.13	04.30 21.50	02.48 23.32	02.47 23.45	04.24 22.10	06.01 20.18	07.30 18.29	08.08 15.42	09.45 14.19
6	10.06 14.30	08.43 16.10	07.06 17.42	06.14 20.17	04.26 21.53	02.45 23.35	02.50 23.43	04.27 22.06	06.04 20.15	07.33 18.26	08.11 15.39	09.48 14.17
7	10.04 14.32	08.40 16.13	07.03 17.45	06.11 20.20	04.23 21.56	02.43 23.38	02.53 23.41	04.30 22.03	06.07 20.11	07.36 18.22	08.15 15.35	09.50 14.15
8	10.02 14.35	08.36 16.17	06.59 17.48	06.07 20.23	04.19 22.00	02.41 23.41	02.56 23.38	04.34 21.59	06.10 20.07	07.39 18.19	08.18 15.32	09.53 14.14
9	10.00 14.38	08.33 16.20	06.56 17.51	06.03 20.26	04.16 22.03	02.39 23.43	02.59 23.36	04.37 21.55	06.13 20.04	07.42 18.15	08.21 15.29	09.55 14.12
10	09.58 14.40	08.30 16.24	06.52 17.54	06.00 20.29	04.12 22.07	02.37 23.46	03.01 23.33	04.40 21.52	06.16 20.00	07.45 18.12	08.25 15.26	09.57 14.11
11	09.56 14.43	08.26 16.27	06.49 17.57	05.56 20.32	04.09 22.10	02.35 23.48	03.01 23.30	04.43 21.48	06.19 19.56	07.48 18.08	08.28 15.22	10.00 14.10
12	09.54 14.46	08.23 16.30	06.45 18.00	05.53 20.35	04.05 22.13	02.33 23.50	03.04 23.28	04.47 21.45	06.22 19.53	07.51 18.04	08.31 15.19	10.02 14.08
13	09.52 14.49	08.20 16.34	06.41 18.03	05.49 20.38	04.02 22.17	02.31 23.52	03.08 23.25	04.50 21.41	06.25 19.49	07.54 18.01	08.35 15.16	10.04 14.07
14	09.49 14.52	08.16 16.37	06.38 18.06	05.45 20.41	03.59 22.20	02.30 23.54	03.11 23.22	04.53 21.38	06.28 19.45	07.57 17.57	08.38 15.13	10.05 14.07
15	09.47 14.56	08.13 16.40	06.34 18.10	05.42 20.45	03.55 22.24	02.29 23.55	03.14 23.19	04.56 21.34	06.31 19.42	08.00 17.54	08.42 15.10	10.07 14.06
16	09.45 14.59	08.09 16.44	06.31 18.13	05.38 20.48	03.52 22.27	02.28 23.57	03.17 23.16	05.00 21.31	06.34 19.38	08.03 17.50	08.45 15.07	10.09 14.05
17	09.42 15.02	08.06 16.47	06.27 18.16	05.34 20.51	03.48 22.31	02.27 23.58	03.20 23.13	05.03 21.27	06.37 19.35	08.07 17.47	08.48 15.04	10.10 14.05
18	09.40 15.05	08.03 16.50	06.23 18.19	05.31 20.54	03.45 22.34	02.26 23.59	03.23 23.10	05.06 21.23	06.40 19.31	08.10 17.43	08.52 15.01	10.11 14.05
19	09.37 15.09	07.59 16.54	06.20 18.22	05.27 20.57	03.42 22.37	02.26 23.00	03.27 23.07	05.09 21.20	06.43 19.27	08.13 17.40	08.55 14.58	10.12 14.04
20	09.34 15.12	07.56 16.57	06.16 18.25	05.24 21.00	03.38 22.41	02.26 23.01	03.30 23.03	05.12 21.16	06.46 19.24	08.16 17.36	08.58 14.55	10.13 14.05
21	09.32 15.15	07.52 17.00	06.12 18.28	05.20 21.04	03.35 22.44	02.26 23.00	03.33 23.00	05.15 21.13	06.49 19.20	08.19 17.33	09.02 14.52	10.14 14.05
22	09.29 15.19	07.49 17.04	06.09 18.31	05.16 21.07	03.32 22.48	02.26 23.01	03.37 22.57	05.19 21.09	06.52 19.16	08.22 17.29	09.05 14.50	10.15 14.05
23	09.26 15.22	07.45 17.07	06.05 18.34	05.13 21.10	03.29 22.51	02.27 23.00	03.40 22.54	05.22 21.05	06.54 19.13	08.25 17.26	09.08 14.47	10.15 14.06
24	09.23 15.25	07.42 17.10	06.02 18.37	05.09 21.13	03.25 22.54	02.27 23.00	03.43 22.50	05.25 21.02	06.57 19.09	08.29 17.22	09.12 14.44	10.16 14.06
25	09.20 15.29	07.38 17.13	05.58 18.40	05.06 21.17	03.22 22.58	02.28 23.00	03.47 22.47	05.28 20.58	07.00 19.05	07.32 16.19	09.15 14.42	10.16 14.07
26	09.17 15.32	07.35 17.16	05.54 18.43	05.02 21.20	03.19 23.01	02.30 23.00	03.50 22.44	05.31 20.54	07.03 19.02	07.35 16.15	09.18 14.39	10.16 14.08
27	09.14 15.36	07.31 17.20	05.51 18.46	04.58 21.23	03.16 23.04	02.31 23.59	03.53 22.40	05.34 20.51	07.06 18.58	07.38 16.12	09.21 14.36	10.16 14.10
28	09.11 15.39	07.28 17.23	05.47 18.49	04.55 21.26	03.13 23.08	02.32 23.58	03.57 22.37	05.37 20.47	07.09 18.55	07.42 16.09	09.24 14.34	10.15 14.11
29	09.08 15.42		06.43 19.52	04.51 21.30	03.10 23.11	02.34 23.56	04.00 22.34	05.40 20.44	07.12 18.51	07.45 16.05	09.27 14.32	10.15 14.12
30	09.05 15.46		06.40 19.55	04.48 21.33	03.07 23.14	02.36 23.55	04.04 22.30	05.43 20.40	07.15 18.47	07.48 16.02	09.31 14.29	10.14 14.14
31	09.02 15.49		06.36 19.58		03.04 23.17		04.07 22.27	05.46 20.36		07.51 15.58		10.13 14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkielkä + Takiankangas Shadow receptor: K - Asuinrakennus K (Takalo)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1-31). Each cell contains two values representing sun rise and set times. Summary rows at the bottom include: Potential sun hours, Total, worst case, Sun reduction, Oper. time red., Wind dir. red., Total reduction, Total, real.

Table layout: For each day in each month the following matrix apply

Day in month | Sun rise (hh:mm) | Sun set (hh:mm) | Minutes with flicker | First time (hh:mm) with flicker | Last time (hh:mm) with flicker | (WTG causing flicker first time) | (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkisellä + Takiankangas Shadow receptor: L - Lomarakennus L (Haukijärvi)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

531 418 482 543 576 834 1108 1065 893 815 711 642 8619

Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1-31), showing sun rise, sun set, and operational time. Summary rows include Total sun hours, Sun reduction, Oper. time red., Wind dir. red., Total reduction, and Total, real.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)



Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Mikka Saranpää / mikka.saranpaa@fcg.fi
Calculated:
9.5.2023 19.20/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas Shadow receptor: M - Lomarakenus M (Haukihahti)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for each day of the month, showing sun rise, sun set, and shadow reduction data.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: N - Lomarakennus N (Kuusela)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

531 418 482 543 576 834 1108 1065 893 815 711 642 8619

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.31	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.08	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.52	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.41	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.05
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.26	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.52	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiankangas Shadow receptor: O - Lomarakennus O (Kuusela)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 418 482 543 576 834 1 108 1 065 893 815 711 642 8 619

Idle start wind speed: Cut in wind speed from power curve

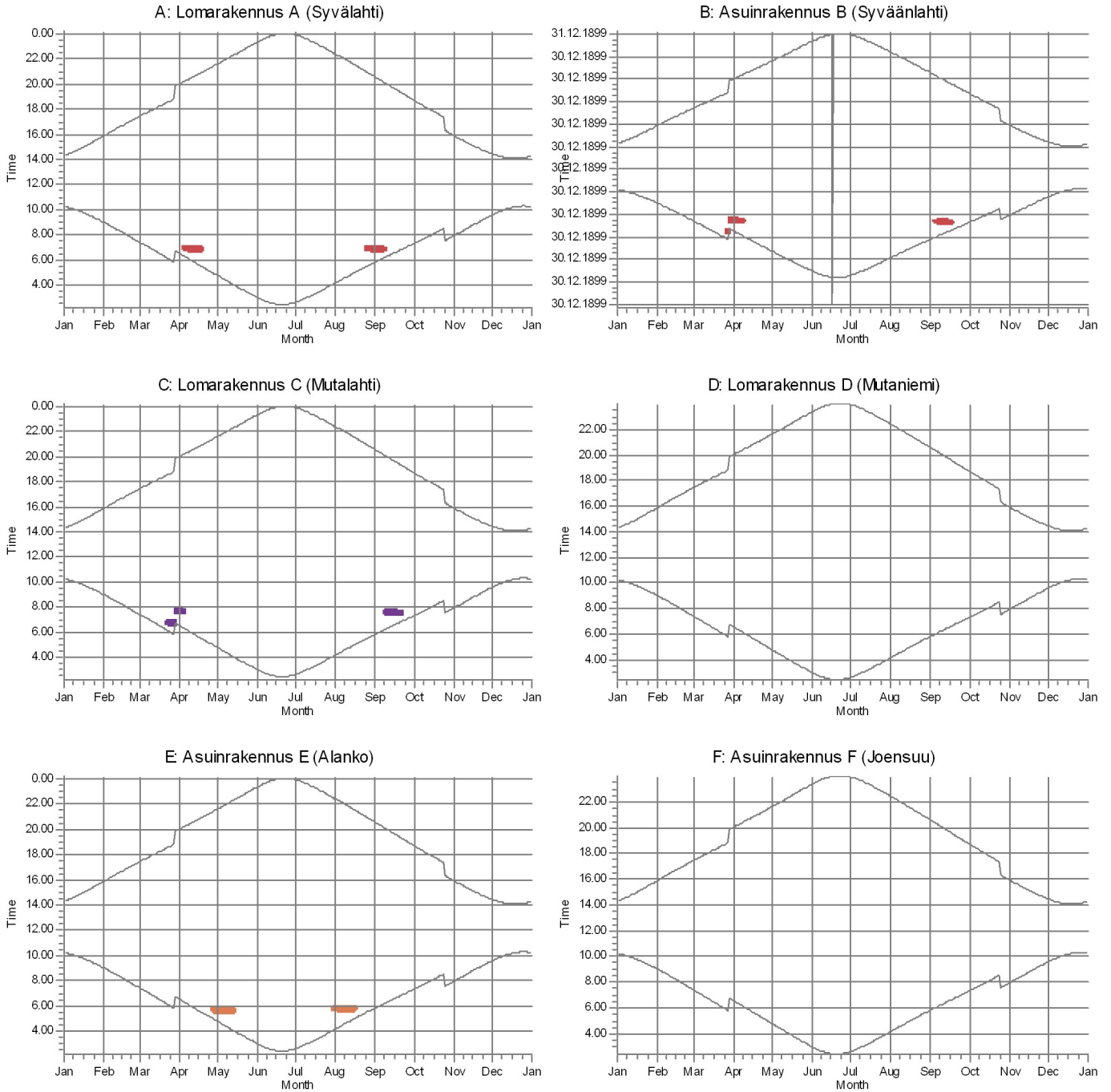
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.30	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.07	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.51	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.40	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.04
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.51	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas



WTG:

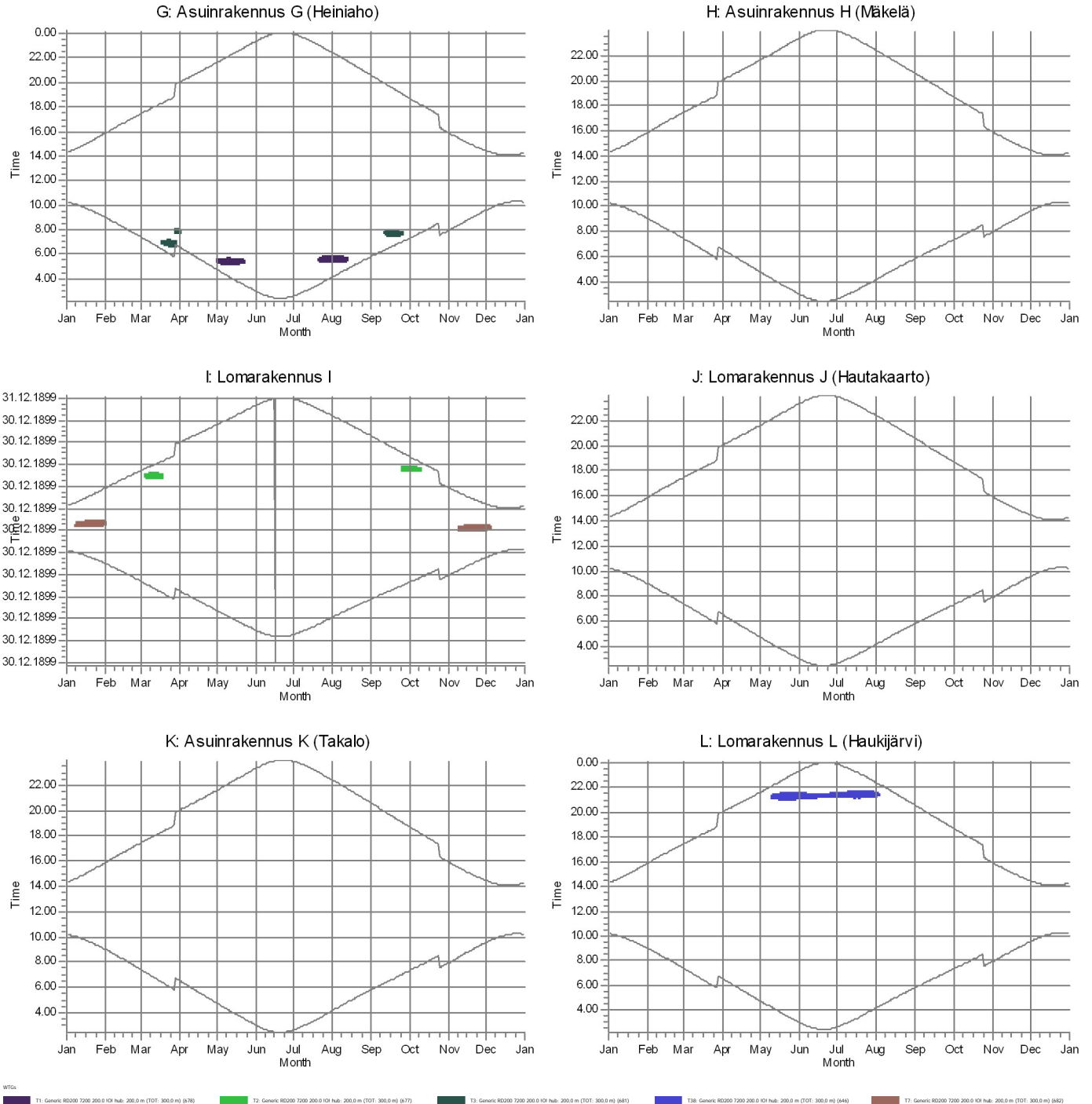
T16: Generic RD200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (643)

T19: Generic RD200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (645)

T9: Generic RD200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (670)

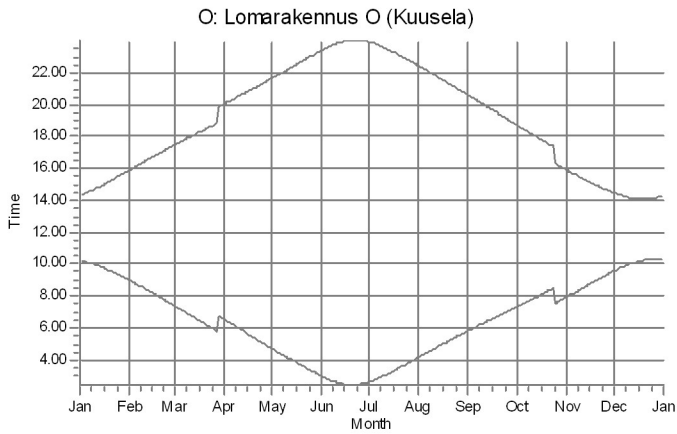
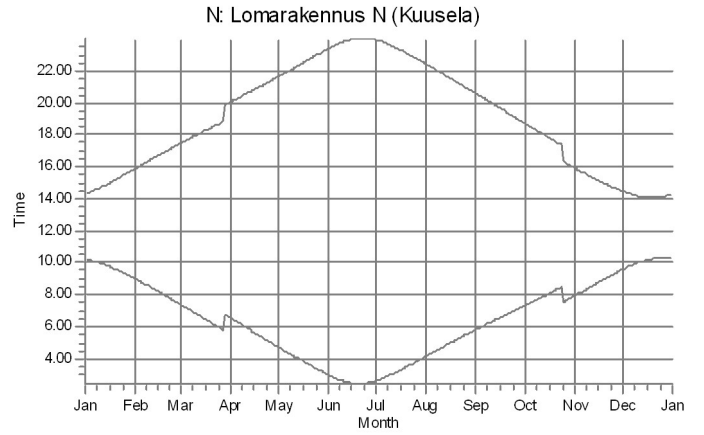
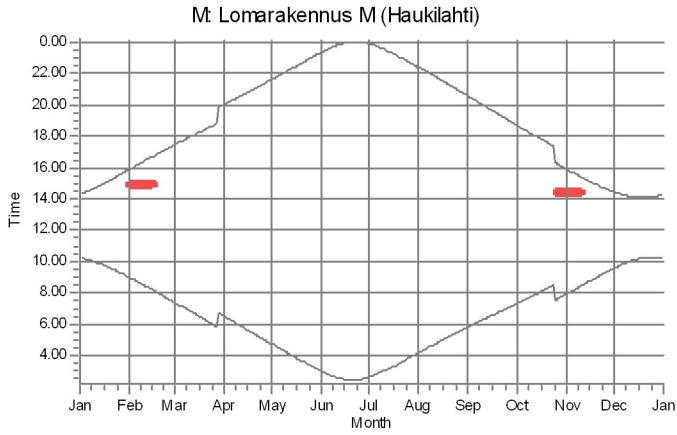
SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas



SHADOW - Calendar, graphical

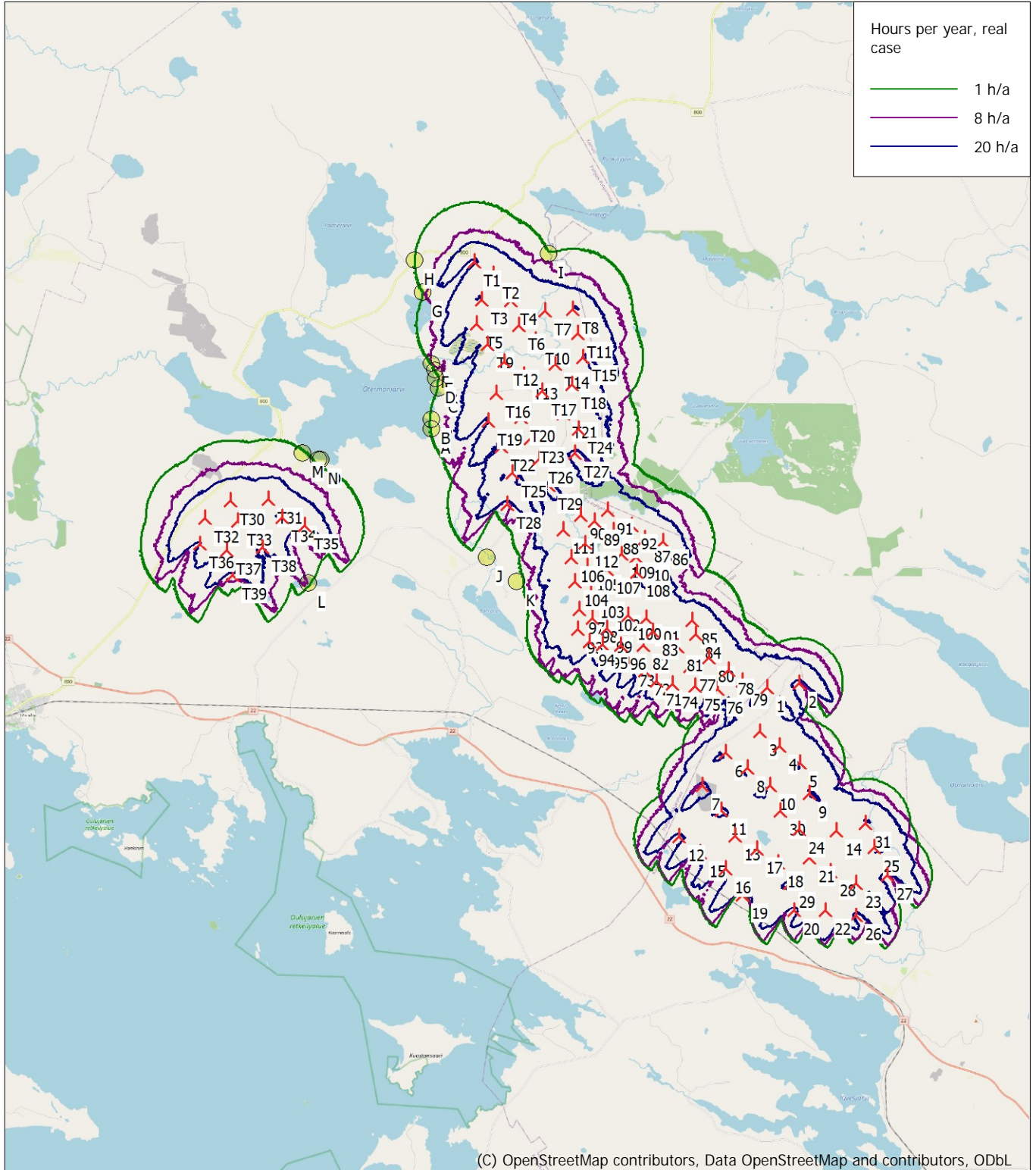
Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas



WTS
T31: Generic RD200 7200 200.0 ICH Hub: 200.0 m (TOT: 300.0 m) (652)

SHADOW - Map

Calculation: Haarasuonkangas_VE1_RD200x39xHH200_2023058 + Turkkiselkä + Takiangkangas



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

0 2,5 5 7,5 10km

Map: EMD OpenStreetMap , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 509 790 North: 7 163 490

🚧 New WTG 🟡 Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas_0.wpo (2)

Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m

Liite 12. Yhteisvaikutus varjostusmallinnuksen tulokset "Real Case, No Forest" - VE2

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

Assumptions for shadow calculations

Maximum distance for influence
Calculate only when more than 20 % of sun is covered by the blade
Please look in WTG table

Minimum sun height over horizon for influence 3 °
Day step for calculation 1 days
Time step for calculation 1 minutes

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational hours are calculated from WTGs in calculation and wind distribution:
MERRA_N64,50_E027,335 (12)

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

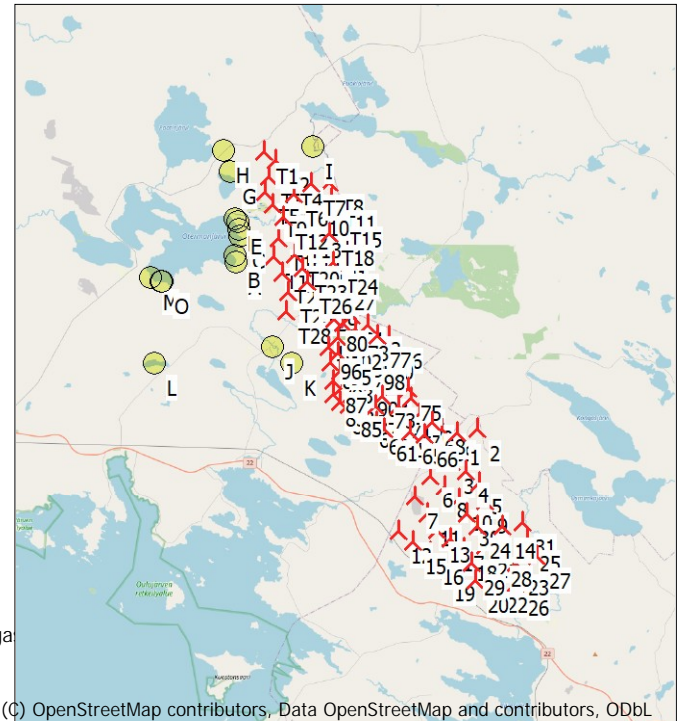
A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas
Obstacles used in calculation
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTGs

	East	North	Z	Row data/Description	WTG type			Shadow data					
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]	
	[m]												
1	518 603	7 160 024	164,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
10	518 711	7 156 574	157,6	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
100	513 976	7 164 554	141,5	NORDEX N149/4.0-4.5-4 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
101	511 430	7 165 541	140,0	NORDEX N149/4.0-4.5-4 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
102	512 201	7 165 062	137,5	NORDEX N149/4.0-4.5-4 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7	
11	517 010	7 155 708	145,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
12	515 527	7 154 776	152,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
13	517 530	7 154 832	146,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
14	521 058	7 155 020	164,8	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
15	516 293	7 154 229	165,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
16	517 207	7 153 659	146,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
17	518 286	7 154 356	145,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
18	519 036	7 153 873	147,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
19	517 798	7 152 768	147,2	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
2	519 707	7 160 212	181,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
20	519 595	7 152 194	138,1	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
21	520 112	7 154 049	153,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
22	520 685	7 152 221	143,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
23	521 787	7 153 171	156,9	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
24	519 754	7 155 057	147,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
25	522 393	7 154 422	158,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
26	521 798	7 152 019	160,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
27	522 872	7 153 480	157,2	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
28	520 875	7 153 602	157,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
29	519 434	7 153 144	142,6	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
3	518 335	7 158 482	177,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
30	519 097	7 155 706	152,4	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
31	522 104	7 155 279	160,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
4	519 041	7 157 963	170,0	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
5	519 788	7 157 386	171,2	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	
6	517 177	7 157 725	162,5	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4	

To be continued on next page...



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Scale 1:400 000

New WTG

Shadow receptor

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
			[m]									
61	514 713	7 160 221	138,9	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
62	514 322	7 160 594	136,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
63	513 760	7 160 896	134,6	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
64	515 280	7 160 145	142,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
65	516 065	7 160 095	148,9	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
66	516 865	7 159 975	150,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
67	515 893	7 160 771	145,1	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
68	517 250	7 160 639	147,2	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
69	517 760	7 160 250	152,8	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
7	516 365	7 156 572	143,6	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4
70	516 561	7 161 067	145,1	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
71	515 455	7 161 460	140,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
72	514 251	7 161 482	138,1	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
73	514 587	7 161 973	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
74	516 095	7 161 880	142,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
75	515 968	7 162 365	143,8	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
76	514 920	7 165 135	143,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
77	514 309	7 165 216	143,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
78	513 180	7 165 515	143,2	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
79	512 525	7 165 835	140,7	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
8	517 940	7 157 182	154,8	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4
80	512 030	7 166 046	139,7	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
81	512 970	7 166 250	144,6	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
82	513 824	7 165 685	143,8	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
83	511 955	7 162 030	134,6	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
84	512 368	7 161 612	135,2	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
85	512 831	7 161 519	136,4	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
86	513 463	7 161 490	137,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
87	512 000	7 162 735	139,8	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
88	512 460	7 162 435	142,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
89	512 970	7 162 065	141,5	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
9	520 096	7 156 333	164,3	VESTAS V172-7.2 7200 250.0...	Yes	VESTAS	V172-7.2-7 200	7 200	250,0	225,0	1 541	10,4
90	513 720	7 162 538	142,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
91	514 360	7 162 448	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
92	512 957	7 162 816	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
93	512 396	7 163 292	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
94	511 847	7 163 708	136,2	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
95	512 266	7 164 240	144,4	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
96	511 697	7 164 525	140,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
97	512 955	7 164 121	140,7	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
98	514 006	7 164 037	145,0	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
99	513 472	7 164 666	141,3	NORDEX N149/4.0-4.5 4500 ...	Yes	NORDEX	N149/4.0-4.5-4 500	4 500	180,0	190,0	1 802	10,7
T1	508 282	7 174 861	157,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T10	510 426	7 172 148	146,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T11	511 902	7 172 395	147,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T12	509 346	7 171 412	143,2	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T13	510 056	7 170 927	146,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T14	511 130	7 171 298	148,8	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T15	512 122	7 171 560	159,0	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T16	509 073	7 170 275	147,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T17	510 668	7 170 368	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T18	511 731	7 170 576	165,0	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T19	508 820	7 169 317	148,1	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T2	508 948	7 174 439	157,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T20	509 941	7 169 425	149,8	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T21	511 434	7 169 585	157,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T22	509 256	7 168 427	147,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T23	510 283	7 168 708	149,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T24	511 959	7 169 067	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T25	509 625	7 167 494	142,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T26	510 589	7 167 991	147,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T27	511 839	7 168 207	148,1	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T28	509 456	7 166 427	142,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T29	510 920	7 167 074	142,1	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

	East	North	Z	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM
			[m]									
T3	508 557	7 173 555	151,9	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T4	509 564	7 173 532	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T5	508 354	7 172 700	144,8	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T6	509 849	7 172 666	152,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T7	510 753	7 173 171	147,6	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T8	511 738	7 173 247	154,9	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4
T9	508 756	7 172 027	142,5	Generic RD200 7200 200.0 !...	Yes	Generic	RD200-7 200	7 200	200,0	200,0	2 075	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Lomarakennus A (Syvälahti)	506 817	7 169 043	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Asuinrakennus B (Syväänlahti)	506 799	7 169 349	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Lomarakennus C (Mutalahti)	507 047	7 170 436	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Lomarakennus D (Mutaniemi)	506 972	7 170 765	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Asuinrakennus E (Alanko)	506 919	7 171 101	145,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Asuinrakennus F (Joensuu)	506 790	7 171 328	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Asuinrakennus G (Heiniäho)	506 504	7 173 821	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Asuinrakennus H (Mäkelä)	506 192	7 174 913	150,9	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Lomarakennus I	510 890	7 175 161	155,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Lomarakennus J (Hautakaarto)	508 768	7 164 525	132,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Asuinrakennus K (Takalo)	509 809	7 163 697	133,1	5,0	5,0	1,0	90,0	"Green house mode"	6,0
L	Lomarakennus L (Haukijärvi)	502 501	7 163 625	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
M	Lomarakennus M (Haukilahti)	502 306	7 168 185	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
N	Lomarakennus N (Kuusela)	502 860	7 167 956	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
O	Lomarakennus O (Kuusela)	502 930	7 167 959	142,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values per year [h/year]
A	Lomarakennus A (Syvälahti)	2:21
B	Asuinrakennus B (Syväänlahti)	2:01
C	Lomarakennus C (Mutalahti)	1:54
D	Lomarakennus D (Mutaniemi)	0:00
E	Asuinrakennus E (Alanko)	3:17
F	Asuinrakennus F (Joensuu)	0:00
G	Asuinrakennus G (Heiniäho)	5:45
H	Asuinrakennus H (Mäkelä)	0:00
I	Lomarakennus I	3:19
J	Lomarakennus J (Hautakaarto)	0:00
K	Asuinrakennus K (Takalo)	0:00
L	Lomarakennus L (Haukijärvi)	0:00
M	Lomarakennus M (Haukilahti)	0:00
N	Lomarakennus N (Kuusela)	0:00
O	Lomarakennus O (Kuusela)	0:00

Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Expected [h/year]
1	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (217)	0:00
10	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (226)	0:00
100	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (927)	0:00
101	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (928)	0:00
102	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (929)	0:00
11	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (227)	0:00
12	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (228)	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

No.	Name	Expected [h/year]
13	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (229)	0:00
14	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (230)	0:00
15	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (232)	0:00
16	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (233)	0:00
17	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (234)	0:00
18	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (235)	0:00
19	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (236)	0:00
2	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (218)	0:00
20	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (237)	0:00
21	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (238)	0:00
22	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (239)	0:00
23	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (240)	0:00
24	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (241)	0:00
25	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (242)	0:00
26	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (243)	0:00
27	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (244)	0:00
28	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (245)	0:00
29	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (247)	0:00
3	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (219)	0:00
30	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (246)	0:00
31	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (231)	0:00
4	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (220)	0:00
5	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (221)	0:00
6	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (222)	0:00
61	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (888)	0:00
62	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (889)	0:00
63	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (890)	0:00
64	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (891)	0:00
65	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (892)	0:00
66	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (893)	0:00
67	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (894)	0:00
68	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (895)	0:00
69	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (896)	0:00
7	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (223)	0:00
70	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (897)	0:00
71	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (898)	0:00
72	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (899)	0:00
73	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (900)	0:00
74	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (901)	0:00
75	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (902)	0:00
76	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (903)	0:00
77	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (904)	0:00
78	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (905)	0:00
79	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (906)	0:00
8	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (224)	0:00
80	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (907)	0:00
81	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (908)	0:00
82	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (909)	0:00
83	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (910)	0:00
84	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (911)	0:00
85	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (912)	0:00
86	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (913)	0:00
87	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (914)	0:00
88	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (915)	0:00
89	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (916)	0:00
9	VESTAS V172-7.2 7200 250.0 !O! hub: 225,0 m (TOT: 350,0 m) (225)	0:00
90	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (917)	0:00
91	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (918)	0:00
92	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (919)	0:00
93	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (920)	0:00
94	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (921)	0:00
95	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (922)	0:00
96	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (923)	0:00
97	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (924)	0:00
98	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (925)	0:00

To be continued on next page...

SHADOW - Main Result

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

...continued from previous page

No.	Name	Expected [h/year]
99	NORDEX N149/4.0-4.5 4500 180.0 !O! hub: 190,0 m (TOT: 280,0 m) (926)	0:00
T1	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (709)	3:58
T10	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (702)	0:00
T11	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (704)	0:00
T12	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (699)	0:00
T13	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (697)	0:00
T14	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (698)	0:00
T15	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (700)	0:00
T16	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (694)	1:54
T17	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (695)	0:00
T18	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (696)	0:00
T19	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (691)	4:23
T2	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (708)	1:39
T20	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (693)	0:00
T21	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (692)	0:00
T22	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (688)	0:00
T23	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (689)	0:00
T24	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (690)	0:00
T25	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (685)	0:00
T26	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (686)	0:00
T27	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (687)	0:00
T28	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (683)	0:00
T29	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (684)	0:00
T3	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (710)	1:46
T4	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (707)	0:00
T5	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (705)	0:00
T6	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (703)	0:00
T7	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (711)	1:37
T8	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (706)	0:00
T9	Generic RD200 7200 200.0 !O! hub: 200,0 m (TOT: 300,0 m) (701)	3:17

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Miikka Saranpää / miikka.saranpaa@fcg.fi
Calculated:
9.5.2023 19.45/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: A - Lomarakennus A (Syyvähti)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1 to 31). It contains numerical data for sun hours and reduction percentages, along with a summary row at the bottom.

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas Shadow receptor: B - Asuinrakennus B (Syväänlahti)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December		
1	10.13	08.59	07.24	06.33	07.17 (T19)	04.44	03.00	02.37	04.10	05.49	07.18	07.55	09.34	
	14.18	15.53	17.26	20.01	23	07.40 (T19)	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	07.17 (T19)	04.40	02.55	02.39	04.13	05.52	07.21	07.58	09.37	
	14.20	15.56	17.29	20.05	24	07.41 (T19)	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	07.17 (T19)	04.37	02.52	02.42	04.17	05.55	07.23 (T19)	07.24	08.02	09.40
	14.22	16.00	17.32	20.08	23	07.40 (T19)	21.43	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.09	08.50	07.14	06.22	07.17 (T19)	04.33	02.49	02.44	04.20	05.58	07.17 (T19)	07.27	08.05	09.43
	14.24	16.03	17.36	20.11	22	07.39 (T19)	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	07.17 (T19)	04.30	02.47	02.47	04.23	06.01	07.15 (T19)	07.30	08.08	09.46
	14.27	16.06	17.39	20.14	21	07.38 (T19)	21.50	23.34	23.47	22.10	20.18	18.30	15.42	14.18
6	10.06	08.43	07.07	06.14	07.18 (T19)	04.26	02.44	02.49	04.27	06.04	07.14 (T19)	07.33	08.12	09.48
	14.29	16.10	17.42	20.17	18	07.36 (T19)	21.54	23.36	23.44	22.07	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	07.19 (T19)	04.23	02.42	02.52	04.30	06.07	07.13 (T19)	07.36	08.15	09.51
	14.32	16.13	17.45	20.20	16	07.35 (T19)	21.57	23.39	23.42	22.03	20.11	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	07.20 (T19)	04.19	02.40	02.55	04.33	06.10	07.12 (T19)	07.39	08.18	09.54
	14.34	16.17	17.58	20.23	12	07.32 (T19)	22.00	23.42	23.39	22.00	20.08	18.19	15.32	14.13
9	10.01	08.33	06.56	06.03	07.24 (T19)	04.16	02.38	02.58	04.37	06.13	07.11 (T19)	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	4	07.28 (T19)	22.04	23.44	23.37	21.56	20.04	18.15	15.29	14.12
10	09.59	08.30	06.52	06.00	04.12	02.36	03.01	04.40	06.16	07.10 (T19)	07.45	08.25	09.58	
	14.40	16.24	17.54	20.29	22.07	23.47	23.34	21.52	20.00	23	07.33 (T19)	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.09	02.34	03.01	04.43	06.19	07.09 (T19)	07.48	08.29	10.00	
	14.43	16.27	17.57	20.32	22.11	23.49	23.31	21.49	19.57	24	07.33 (T19)	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.32	03.04	04.47	06.22	07.09 (T19)	07.51	08.32	10.03	
	14.46	16.30	18.00	20.36	22.14	23.51	23.29	21.45	19.53	23	07.32 (T19)	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.10 (T19)	07.55	08.35	10.04	
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.49	22	07.32 (T19)	18.01	15.16	14.07
14	09.50	08.17	06.38	05.45	03.58	02.29	03.10	04.53	06.28	07.10 (T19)	07.58	08.39	10.06	
	14.52	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	21	07.31 (T19)	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.28	03.13	04.56	06.31	07.11 (T19)	08.01	08.42	10.08	
	14.55	16.40	18.10	20.45	22.24	23.57	23.20	21.35	19.42	19	07.30 (T19)	17.54	15.10	14.05
16	09.45	08.10	06.31	05.38	03.51	02.27	03.16	04.59	06.34	07.12 (T19)	08.04	08.46	10.10	
	14.58	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.38	16	07.28 (T19)	17.50	15.07	14.05
17	09.43	08.06	06.27	05.34	03.48	02.26	03.20	05.03	06.37	07.14 (T19)	08.07	08.49	10.11	
	15.02	16.47	18.16	20.51	22.31	00.00	23.14	21.27	19.35	11	07.25 (T19)	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.45	02.25	03.23	05.06	06.40	07.17 (T19)	08.10	08.52	10.12	
	15.05	16.50	18.19	20.54	22.35	00.01	23.11	21.24	19.31	4	07.21 (T19)	17.43	15.01	14.04
19	09.38	07.59	06.20	05.27	03.41	02.25	03.26	05.09	06.43	08.13	08.56	10.13		
	15.08	16.54	18.22	20.58	22.38	00.01	23.07	21.20	19.27	17.40	14.58	14.04		
20	09.35	07.56	06.16	05.24	03.38	02.25	03.30	05.12	06.46	08.16	08.59	10.14		
	15.11	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.36	14.55	14.04		
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.15	06.49	08.19	09.02	10.15		
	15.15	17.00	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.52	14.04		
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.18	06.52	08.23	09.06	10.16		
	15.18	17.03	18.31	21.07	22.48	00.03	22.58	21.09	19.17	17.29	14.49	14.04		
23	09.27	07.46	06.05	05.13	03.28	02.26	03.40	05.22	06.55	08.26	09.09	10.16		
	15.22	17.07	18.34	21.10	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.05		
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17		
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.09	17.22	14.44	14.06		
25	09.21	07.39	05.58	05.05	03.22	02.27	03.46	05.28	07.01	07.32	09.16	10.17		
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.58	19.06	16.19	14.41	14.07		
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03	07.35	09.19	10.17		
	15.32	17.16	18.43	10	06.37 (T19)	21.20	23.02	00.01	22.45	20.55	19.02	16.15	14.39	14.08
27	09.15	07.31	05.51	05.02	03.15	02.30	03.53	05.34	07.06	07.39	09.22	10.17		
	15.35	17.20	18.46	15	06.38 (T19)	21.24	23.05	00.00	22.41	20.51	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	05.00	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.16		
	15.39	17.23	18.49	19	06.40 (T19)	21.27	23.09	23.59	20.48	18.55	16.09	14.34	14.10	
29	09.09	07.25	05.44	05.00	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16		
	15.42	17.26	18.50	20	07.40 (T19)	21.30	23.12	23.58	20.44	18.51	16.05	14.31	14.12	
30	09.06	07.22	05.40	05.00	03.06	02.35	04.03	05.43	07.15	07.48	09.31	10.15		
	15.46	17.27	18.55	22	07.40 (T19)	21.33	23.15	23.56	22.31	20.40	18.48	16.02	14.29	14.13
31	09.03	07.18	05.36	05.00	03.03	02.34	04.07	05.46	07.18	07.52	09.34	10.14		
	15.49	17.30	18.58	23	07.41 (T19)	21.36	23.18	22.28	20.37	15.58	14.29	14.15		
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	127		
Total, worst case			109	163					277					
Sun reduction			0.36	0.43					0.32					
Oper. time red.			0.99	0.99					0.99					
Wind dir. red.			0.62	0.62					0.62					
Total reduction			0.22	0.26					0.20					
Total, real			24	43					55					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy

Osmontie 34, PO Box 950

FI-00601 Helsinki

+358104095666

Mikka Saranpää / mikka.saranpaa@fcg.fi

Calculated:

9.5.2023 19.45/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: C - Lomarakennus C (Mutalahti)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December	
1	10.13	08.59	07.24	06.33	07.32 (T16)	04.44	03.00	02.37	04.10	05.49	07.18	07.55	09.34
	14.17	15.52	17.26	20.01	20.01	20.01	23.22	23.55	22.24	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	07.33 (T16)	04.40	02.54	02.39	04.13	05.52	07.21	07.58	09.37
	14.19	15.56	17.29	20.05	18 07.51 (T16)	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	07.34 (T16)	04.37	02.52	02.41	04.17	05.55	07.24	08.02	09.40
	14.22	15.59	17.32	20.08	15 07.49 (T16)	21.44	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	07.35 (T16)	04.33	02.49	02.44	04.20	05.58	07.27	08.05	09.43
	14.24	16.03	17.35	20.11	11 07.46 (T16)	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	06.18	04.30	02.47	02.46	04.23	06.01	07.30	08.08	09.46
	14.26	16.06	17.39	20.14	21.50	23.34	23.47	22.10	20.18	18.30	15.42	14.18	
6	10.07	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	07.33	08.12	09.49	
	14.29	16.10	17.42	20.17	21.54	23.37	23.45	22.07	20.15	18.26	15.38	14.16	
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	07.36	08.15	09.51	
	14.31	16.13	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.22	15.35	14.15	
8	10.03	08.37	06.59	06.07	04.19	02.39	02.55	04.33	06.10	07.31 (T16)	07.39	08.19	09.54
	14.34	16.17	17.48	20.23	22.00	23.42	23.40	22.00	20.08	10 07.41 (T16)	18.19	15.32	14.13
9	10.01	08.33	06.56	06.03	04.16	02.37	02.58	04.37	06.13	07.28 (T16)	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	22.04	23.45	23.37	21.56	20.04	15 07.43 (T16)	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	02.35	03.00	04.40	06.16	07.25 (T16)	07.45	08.25	09.58
	14.40	16.23	17.54	20.29	22.07	23.47	23.34	21.52	20.00	18 07.43 (T16)	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.09	02.33	03.00	04.43	06.19	07.24 (T16)	07.48	08.29	10.01
	14.43	16.27	17.57	20.32	22.11	23.49	23.32	21.49	19.57	20 07.44 (T16)	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.32	03.04	04.46	06.22	07.23 (T16)	07.51	08.32	10.03
	14.46	16.30	18.00	20.36	22.14	23.52	23.29	21.45	19.53	22 07.45 (T16)	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.23 (T16)	07.55	08.35	10.05
	14.49	16.34	18.03	20.39	22.18	23.54	23.26	21.42	19.49	22 07.45 (T16)	18.01	15.16	14.07
14	09.50	08.17	06.38	05.45	03.58	02.29	03.10	04.53	06.28	07.22 (T16)	07.58	08.39	10.06
	14.52	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	23 07.45 (T16)	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.27	03.13	04.56	06.31	07.22 (T16)	08.01	08.42	10.08
	14.55	16.40	18.10	20.45	22.24	23.57	23.20	21.35	19.42	23 07.45 (T16)	17.54	15.10	14.05
16	09.45	08.10	06.31	05.38	03.51	02.26	03.16	04.59	06.34	07.22 (T16)	08.04	08.46	10.10
	14.58	16.44	18.13	20.48	22.28	23.59	23.17	21.31	19.38	22 07.44 (T16)	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	02.26	03.19	05.03	06.37	07.21 (T16)	08.07	08.49	10.11
	15.01	16.47	18.16	20.51	22.31	00.00	23.14	21.27	19.35	22 07.43 (T16)	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	02.25	03.23	05.06	06.40	07.21 (T16)	08.10	08.52	10.12
	15.05	16.50	18.19	20.54	22.35	00.01	23.11	21.24	19.31	21 07.42 (T16)	17.43	15.01	14.04
19	09.38	07.59	06.20	05.27	03.41	02.25	03.26	05.09	06.43	07.22 (T16)	08.13	08.56	10.14
	15.08	16.54	18.22	20.58	22.38	00.02	23.08	21.20	19.27	19 07.41 (T16)	17.40	14.58	14.04
20	09.35	07.56	06.16	05.23	03.38	02.24	03.29	05.12	06.46	07.23 (T16)	08.16	08.59	10.14
	15.11	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	16 07.39 (T16)	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	02.24	03.33	05.15	06.49	07.26 (T16)	08.19	09.02	10.15
	15.15	17.00	18.28	21.04	22.45	00.03	23.01	21.13	19.20	11 07.37 (T16)	17.33	14.52	14.04
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.18	06.52	07.29 (T16)	08.23	09.06	10.16
	15.18	17.03	18.31	21.07	22.49	00.03	22.58	21.09	19.17	5 07.34 (T16)	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	02.25	03.39	05.22	06.55		08.26	09.09	10.16
	15.21	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13		17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58		08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.03	22.51	21.02	19.09		17.22	14.44	14.06
25	09.21	07.39	05.58	05.05	03.21	02.27	03.46	05.28	07.01		07.32	09.16	10.17
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.58	19.06		16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03		07.35	09.19	10.17
	15.32	17.16	18.43	21.20	23.02	00.01	22.45	20.55	19.02		16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.29	03.53	05.34	07.06		07.39	09.22	10.17
	15.35	17.20	18.46	21.24	23.05	00.00	22.41	20.51	18.58		16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09		07.42	09.25	10.16
	15.39	17.23	18.49	21.27	23.09	23.59	22.38	20.48	18.55		16.08	14.33	14.10
29	09.09	07.24	05.43	04.51	03.09	02.33	04.00	05.40	07.12		07.45	09.28	10.16
	15.42	17.27	18.52	21.30	23.12	23.58	22.34	20.44	18.51		16.05	14.31	14.11
30	09.06	07.20	05.39	04.47	03.06	02.35	04.03	05.43	07.15		07.49	09.31	10.15
	15.46	17.30	18.57	21.34	23.15	23.57	22.31	20.40	18.48		16.02	14.29	14.13
31	09.03	07.16	05.36	04.44	03.03	02.37	04.06	05.46			07.52	09.34	10.14
	15.49	17.33	18.58	21.37	23.19	23.58	22.28	20.37			15.58	14.27	14.15
Potential sun hours	164	235	363	454	577	638	618	512	394		303	193	127
Total, worst case										269			
Sun reduction			0.36							0.32			
Oper. time red.			0.99							0.99			
Wind dir. red.			0.62							0.62			
Total reduction			0.22							0.20			
Total, real			44							53			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: D - Lomarakenus D (Mutaniemi)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	08.59	07.24	06.33	04.44	03.00	02.37	04.10	05.49	07.18	07.55	09.34
	14.17	15.52	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	02.54	02.39	04.13	05.52	07.21	07.58	09.37
	14.19	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.41	04.17	05.55	07.24	08.02	09.40
	14.22	15.59	17.32	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.49	02.44	04.20	05.58	07.27	08.05	09.43
	14.24	16.03	17.35	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	02.46	02.46	04.23	06.01	07.30	08.08	09.46
	14.26	16.06	17.39	20.14	21.50	23.34	23.47	22.10	20.18	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	07.33	08.12	09.49
	14.29	16.10	17.42	20.17	21.54	23.37	23.45	22.07	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	07.36	08.15	09.51
	14.31	16.13	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.22	15.35	14.15
8	10.03	08.37	06.59	06.07	04.19	02.39	02.55	04.33	06.10	07.39	08.19	09.54
	14.34	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.13
9	10.01	08.33	06.56	06.03	04.16	02.37	02.57	04.37	06.13	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	22.04	23.45	23.37	21.56	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	02.35	03.00	04.40	06.16	07.45	08.25	09.58
	14.40	16.23	17.54	20.29	22.07	23.47	23.34	21.53	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.09	02.33	03.00	04.43	06.19	07.48	08.29	10.01
	14.43	16.27	17.57	20.32	22.11	23.49	23.32	21.49	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.32	03.03	04.46	06.22	07.51	08.32	10.03
	14.46	16.30	18.00	20.36	22.14	23.52	23.29	21.45	19.53	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.55	08.35	10.05
	14.49	16.34	18.03	20.39	22.18	23.54	23.26	21.42	19.49	18.01	15.16	14.07
14	09.50	08.17	06.38	05.45	03.58	02.29	03.10	04.53	06.28	07.58	08.39	10.07
	14.52	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.27	03.13	04.56	06.31	08.01	08.42	10.08
	14.55	16.40	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.05
16	09.45	08.10	06.31	05.38	03.51	02.26	03.16	04.59	06.34	08.04	08.46	10.10
	14.58	16.44	18.13	20.48	22.28	23.59	23.17	21.31	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	02.26	03.19	05.03	06.37	08.07	08.49	10.11
	15.01	16.47	18.16	20.51	22.31	00.00	23.14	21.27	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	02.25	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.50	18.19	20.54	22.35	00.01	23.11	21.24	19.31	17.43	15.01	14.04
19	09.38	07.59	06.20	05.27	03.41	02.24	03.26	05.09	06.43	08.13	08.56	10.14
	15.08	16.54	18.22	20.58	22.38	00.02	23.08	21.20	19.27	17.40	14.58	14.04
20	09.35	07.56	06.16	05.23	03.38	02.24	03.29	05.12	06.46	08.16	08.59	10.15
	15.11	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	02.24	03.33	05.15	06.49	08.19	09.02	10.15
	15.15	17.00	18.28	21.04	22.45	00.03	23.01	21.13	19.20	17.33	14.52	14.04
22	09.29	07.49	06.09	05.16	03.31	02.25	03.36	05.18	06.52	08.23	09.06	10.16
	15.18	17.03	18.31	21.07	22.49	00.03	22.58	21.09	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	02.25	03.39	05.22	06.55	08.26	09.09	10.16
	15.21	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.03	22.51	21.02	19.09	17.22	14.44	14.06
25	09.21	07.39	05.58	05.05	03.21	02.27	03.46	05.28	07.01	07.32	09.16	10.17
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.28	03.50	05.31	07.03	07.35	09.19	10.17
	15.32	17.16	18.43	21.20	23.02	00.01	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.29	03.53	05.34	07.06	07.39	09.22	10.17
	15.35	17.20	18.46	21.24	23.06	00.01	22.41	20.51	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.16
	15.39	17.23	18.49	21.27	23.09	23.59	22.38	20.48	18.55	16.08	14.33	14.10
29	09.09		06.44	04.51	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16
	15.42		19.52	21.30	23.12	23.58	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.06	02.35	04.03	05.43	07.15	07.49	09.31	10.15
	15.46		19.55	21.34	23.15	23.57	22.31	20.40	18.48	16.02	14.29	14.13
31	09.03		06.36		03.03		04.06	05.46		07.52		10.14
	15.49		19.58		23.19		22.28	20.37		15.58		14.15
Potential sun hours	164	235	363	454	577	639	618	513	394	303	193	127
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Miikka Saranpää / miikka.saranpaa@fcg.fi
 Calculated:
 9.5.2023 19.45/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkielkä + TakiankangasShadow receptor: E - Asuinrakennus E (Alanko)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December			
1	10.13	08.59	07.24	06.33	04.44	05.28 (T9)	03.00	02.37	04.10	05.41 (T9)	05.49	07.18	07.55	09.35	
	14.17	15.52	17.26	20.02	21.37	05.50 (T9)	23.22	23.55	22.24	16	05.57 (T9)	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	05.28 (T9)	02.54	02.39	04.13	05.39 (T9)	05.52	07.21	07.58	09.37	
	14.19	15.56	17.29	20.05	21.40	05.51 (T9)	23.25	23.53	22.21	19	05.58 (T9)	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	05.27 (T9)	02.52	02.41	04.17	05.38 (T9)	05.55	07.24	08.02	09.40	
	14.22	15.59	17.32	20.08	21.44	05.51 (T9)	23.28	23.51	22.17	21	05.59 (T9)	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	05.27 (T9)	02.49	02.44	04.20	05.38 (T9)	05.58	07.27	08.05	09.43	
	14.24	16.03	17.35	20.11	21.47	05.51 (T9)	23.31	23.49	22.14	21	05.59 (T9)	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	05.27 (T9)	02.46	02.46	04.23	05.38 (T9)	06.01	07.30	08.08	09.46	
	14.26	16.06	17.39	20.14	21.50	05.51 (T9)	23.34	23.47	22.10	22	06.00 (T9)	20.18	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	05.27 (T9)	02.44	02.49	04.27	05.36 (T9)	06.04	07.33	08.12	09.49	
	14.29	16.10	17.42	20.17	21.54	05.51 (T9)	23.37	23.45	22.07	24	06.00 (T9)	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	05.28 (T9)	02.42	02.52	04.30	05.36 (T9)	06.07	07.36	08.15	09.51	
	14.31	16.13	17.45	20.20	21.57	05.51 (T9)	23.40	23.42	22.03	24	06.00 (T9)	20.11	18.22	15.35	14.14
8	10.03	08.37	07.00	06.07	04.19	05.28 (T9)	02.39	02.54	04.33	05.36 (T9)	06.10	07.39	08.19	09.54	
	14.34	16.17	17.48	20.23	22.01	05.50 (T9)	23.42	23.40	22.00	24	06.00 (T9)	20.08	18.19	15.32	14.13
9	10.01	08.34	06.56	06.03	04.15	05.28 (T9)	02.37	02.57	04.37	05.36 (T9)	06.13	07.42	08.22	09.56	
	14.37	16.20	17.51	20.26	22.04	05.49 (T9)	23.45	23.37	21.56	24	06.00 (T9)	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	05.29 (T9)	02.35	03.00	04.40	05.36 (T9)	06.16	07.45	08.25	09.59	
	14.40	16.23	17.54	20.29	22.07	05.48 (T9)	23.47	23.35	21.53	24	06.00 (T9)	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.08	05.29 (T9)	02.33	03.00	04.43	05.36 (T9)	06.19	07.48	08.29	10.01	
	14.43	16.27	17.57	20.32	22.11	05.47 (T9)	23.50	23.32	21.49	23	05.59 (T9)	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	05.30 (T9)	02.31	03.03	04.46	05.36 (T9)	06.22	07.51	08.32	10.03	
	14.46	16.30	18.00	20.36	22.14	05.46 (T9)	23.52	23.29	21.45	22	05.58 (T9)	19.53	18.04	15.19	14.08
13	09.53	08.20	06.42	05.49	04.02	05.31 (T9)	02.30	03.07	04.50	05.37 (T9)	06.25	07.55	08.36	10.05	
	14.49	16.34	18.03	20.39	22.18	05.44 (T9)	23.54	23.26	21.42	21	05.58 (T9)	19.49	18.01	15.16	14.06
14	09.50	08.17	06.38	05.45	03.58	05.33 (T9)	02.29	03.10	04.53	05.38 (T9)	06.28	07.58	08.39	10.07	
	14.52	16.37	18.07	20.42	22.21	05.42 (T9)	23.56	23.23	21.38	19	05.57 (T9)	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55		02.27	03.13	04.56	05.41 (T9)	06.31	08.01	08.42	10.08	
	14.55	16.40	18.10	20.45	22.25		23.57	23.20	21.35	15	05.56 (T9)	19.42	17.54	15.10	14.05
16	09.46	08.10	06.31	05.38	03.51		02.26	03.16	04.59	05.44 (T9)	06.34	08.04	08.46	10.10	
	14.58	16.44	18.13	20.48	22.28		23.59	23.17	21.31	11	05.55 (T9)	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48		02.25	03.19	05.03	05.46 (T9)	06.37	08.07	08.49	10.11	
	15.01	16.47	18.16	20.51	22.31		00.00	23.14	21.27	6	05.52 (T9)	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44		02.25	03.23	05.06		06.40	08.10	08.52	10.13	
	15.05	16.50	18.19	20.55	22.35		00.01	23.11	21.24		19.31	17.43	15.01	14.04	
19	09.38	08.00	06.20	05.27	03.41		02.24	03.26	05.09		06.43	08.13	08.56	10.14	
	15.08	16.54	18.22	20.58	22.38		00.02	23.08	21.20		19.27	17.40	14.58	14.04	
20	09.35	07.56	06.16	05.23	03.38		02.24	03.29	05.12		06.46	08.16	08.59	10.15	
	15.11	16.57	18.25	21.01	22.42		00.03	23.05	21.17		19.24	17.36	14.55	14.04	
21	09.32	07.53	06.13	05.20	03.34		02.24	03.33	05.15		06.49	08.19	09.03	10.15	
	15.15	17.00	18.28	21.04	22.45		00.03	23.01	21.13		19.20	17.33	14.52	14.04	
22	09.30	07.49	06.09	05.16	03.31		02.25	03.36	05.18		06.52	08.23	09.06	10.16	
	15.18	17.03	18.31	21.07	22.49		00.03	22.58	21.09		19.17	17.29	14.49	14.04	
23	09.27	07.46	06.05	05.13	03.28		02.25	03.39	05.22		06.55	08.26	09.09	10.17	
	15.21	17.07	18.34	21.11	22.52		00.03	22.55	21.06		19.13	17.26	14.46	14.05	
24	09.24	07.42	06.02	05.09	03.25		02.26	03.43	05.25		06.58	08.29	09.12	10.17	
	15.25	17.10	18.37	21.14	22.55		00.03	22.51	21.02		19.09	17.22	14.44	14.05	
25	09.21	07.39	05.58	05.05	03.21		02.27	03.46	05.28		07.01	07.32	09.16	10.17	
	15.28	17.13	18.40	21.17	22.59		00.02	22.48	20.59		19.06	16.19	14.41	14.06	
26	09.18	07.35	05.54	05.02	05.39 (T9)	03.18	02.28	03.49	05.31		07.03	07.36	09.19	10.17	
	15.32	17.16	18.43	21.20	7	05.46 (T9)	23.02	22.45	20.55		19.02	16.15	14.38	14.07	
27	09.15	07.32	05.51	04.58	05.36 (T9)	03.15	02.29	03.53	05.34		07.06	07.39	09.22	10.17	
	15.35	17.20	18.46	21.24	12	05.48 (T9)	23.06	22.41	20.51		18.58	16.12	14.36	14.09	
28	09.12	07.28	05.47	04.55	05.33 (T9)	03.12	02.31	03.56	05.37		07.09	07.42	09.25	10.16	
	15.39	17.23	18.49	21.27	16	05.49 (T9)	23.09	22.38	20.48		18.55	16.08	14.33	14.10	
29	09.09	07.24	05.44	04.51	05.29 (T9)	03.09	02.33	04.00	05.45 (T9)	05.40	07.12	07.45	09.28	10.16	
	15.42	17.28	18.54	21.30	20	05.49 (T9)	23.12	22.58	6	05.51 (T9)	20.44	18.51	16.05	14.31	14.11
30	09.06	07.20	05.40	04.47	05.28 (T9)	03.06	02.34	04.03	05.43 (T9)	05.43	07.15	07.49	09.31	10.15	
	15.46	17.32	18.58	21.34	22	05.50 (T9)	23.15	22.57	11	05.54 (T9)	20.40	18.48	16.02	14.29	14.13
31	09.03	07.16	05.36	04.44	03.03		02.35	04.06	05.42 (T9)	05.46		07.52	08.52	10.15	
	15.49	17.36	19.02	21.38	23.19		22.28	22.48	14	05.56 (T9)	20.37		15.58	14.15	
Potential sun hours	164	235	363	454	577	639	618	513		394		303	193	127	
Total, worst case				77	281		31	336							
Sun reduction				0.43	0.47		0.48	0.42							
Oper. time red.				0.99	0.99		0.99	0.99							
Wind dir. red.				0.62	0.62		0.62	0.62							
Total reduction				0.26	0.29		0.29	0.26							
Total, real				20	82		9	86							

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: F - Asuinrakennus F (Joensuu)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.24	06.33	04.44	03.00	02.36	04.10	05.49	07.18	07.55	09.35
	14.17	15.52	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.26
2	10.12	08.56	07.21	06.29	04.40	02.54	02.39	04.13	05.52	07.21	07.59	09.38
	14.19	15.56	17.29	20.05	21.40	23.25	23.53	22.21	20.29	18.40	15.52	14.24
3	10.11	08.53	07.17	06.25	04.37	02.52	02.41	04.17	05.55	07.24	08.02	09.40
	14.22	15.59	17.32	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.49	02.44	04.20	05.58	07.27	08.05	09.43
	14.24	16.03	17.35	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.20
5	10.08	08.47	07.10	06.18	04.30	02.46	02.46	04.23	06.01	07.30	08.09	09.46
	14.26	16.06	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.18
6	10.07	08.43	07.07	06.14	04.26	02.44	02.49	04.27	06.04	07.33	08.12	09.49
	14.29	16.10	17.42	20.17	21.54	23.37	23.45	22.07	20.15	18.26	15.38	14.16
7	10.05	08.40	07.03	06.11	04.23	02.42	02.52	04.30	06.07	07.36	08.15	09.51
	14.31	16.13	17.45	20.20	21.57	23.40	23.42	22.03	20.11	18.22	15.35	14.14
8	10.03	08.37	07.00	06.07	04.19	02.39	02.54	04.33	06.10	07.39	08.19	09.54
	14.34	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.13
9	10.01	08.34	06.56	06.03	04.15	02.37	02.57	04.37	06.13	07.42	08.22	09.56
	14.37	16.20	17.51	20.26	22.04	23.45	23.37	21.56	20.04	18.15	15.29	14.11
10	09.59	08.30	06.52	06.00	04.12	02.35	03.00	04.40	06.16	07.45	08.25	09.59
	14.40	16.23	17.54	20.29	22.07	23.47	23.35	21.53	20.00	18.12	15.25	14.10
11	09.57	08.27	06.49	05.56	04.08	02.33	03.00	04.43	06.19	07.48	08.29	10.01
	14.43	16.27	17.57	20.32	22.11	23.50	23.32	21.49	19.57	18.08	15.22	14.09
12	09.55	08.23	06.45	05.53	04.05	02.31	03.03	04.46	06.22	07.51	08.32	10.03
	14.46	16.30	18.00	20.36	22.14	23.52	23.29	21.45	19.53	18.04	15.19	14.07
13	09.53	08.20	06.42	05.49	04.02	02.30	03.07	04.50	06.25	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.54	23.26	21.42	19.49	18.01	15.16	14.06
14	09.50	08.17	06.38	05.45	03.58	02.28	03.10	04.53	06.28	07.58	08.39	10.07
	14.52	16.37	18.07	20.42	22.21	23.56	23.23	21.38	19.46	17.57	15.13	14.06
15	09.48	08.13	06.34	05.42	03.55	02.27	03.13	04.56	06.31	08.01	08.42	10.08
	14.55	16.40	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.05
16	09.46	08.10	06.31	05.38	03.51	02.26	03.16	04.59	06.34	08.04	08.46	10.10
	14.58	16.44	18.13	20.48	22.28	23.59	23.17	21.31	19.38	17.50	15.07	14.04
17	09.43	08.06	06.27	05.34	03.48	02.25	03.19	05.03	06.37	08.07	08.49	10.11
	15.01	16.47	18.16	20.51	22.32	00.00	23.14	21.27	19.35	17.47	15.04	14.04
18	09.40	08.03	06.23	05.31	03.44	02.25	03.23	05.06	06.40	08.10	08.52	10.13
	15.05	16.50	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.43	15.01	14.04
19	09.38	08.00	06.20	05.27	03.41	02.24	03.26	05.09	06.43	08.13	08.56	10.14
	15.08	16.54	18.22	20.58	22.38	00.02	23.08	21.20	19.27	17.40	14.58	14.03
20	09.35	07.56	06.16	05.23	03.38	02.24	03.29	05.12	06.46	08.16	08.59	10.15
	15.11	16.57	18.25	21.01	22.42	00.03	23.05	21.17	19.24	17.36	14.55	14.04
21	09.32	07.53	06.13	05.20	03.34	02.24	03.33	05.15	06.49	08.20	09.03	10.15
	15.15	17.00	18.28	21.04	22.45	00.03	23.01	21.13	19.20	17.33	14.52	14.04
22	09.30	07.49	06.09	05.16	03.31	02.24	03.36	05.18	06.52	08.23	09.06	10.16
	15.18	17.03	18.31	21.07	22.49	00.03	22.58	21.09	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.13	03.28	02.25	03.39	05.22	06.55	08.26	09.09	10.17
	15.21	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.46	14.05
24	09.24	07.42	06.02	05.09	03.25	02.26	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.56	00.03	22.51	21.02	19.09	17.22	14.44	14.05
25	09.21	07.39	05.58	05.05	03.21	02.27	03.46	05.28	07.01	07.32	09.16	10.17
	15.28	17.13	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.28	03.49	05.31	07.03	07.36	09.19	10.17
	15.32	17.16	18.43	21.20	23.02	00.02	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.29	03.53	05.34	07.06	07.39	09.22	10.17
	15.35	17.20	18.46	21.24	23.06	00.01	22.41	20.51	18.58	16.12	14.36	14.09
28	09.12	07.28	05.47	04.55	03.12	02.31	03.56	05.37	07.09	07.42	09.25	10.17
	15.39	17.23	18.49	21.27	23.09	00.00	22.38	20.48	18.55	16.08	14.33	14.10
29	09.09		06.44	04.51	03.09	02.33	04.00	05.40	07.12	07.45	09.28	10.16
	15.42		19.52	21.30	23.12	23.58	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.06	02.34	04.03	05.43	07.15	07.49	09.32	10.15
	15.46		19.55	21.34	23.15	23.57	22.31	20.40	18.48	16.02	14.29	14.13
31	09.03		06.36		03.03		04.06	05.46		07.52		10.15
	15.49		19.58		23.19		22.28	20.37		15.58		14.15
Potential sun hours	164	235	363	454	577	639	618	513	394	303	193	127
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

Project:

Haarasuonkangas

Licensed user:

FCG Finnish Consulting Group Oy
 Osmontie 34, PO Box 950
 FI-00601 Helsinki
 +358104095666
 Miikka Saranpää / miikka.saranpaa@fcg.fi
 Calculated:
 9.5.2023 19.45/3.5.584

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: G - Asuinrakennus G (Heiniaho)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June		
1	10.14 14.17	09.00 15.52	07.25 17.26	06.33 20.02	07.49 (T3) 07.55 (T3)	04.44 21.37	05.23 (T1) 05.31 (T1)	03.00 23.22
2	10.13 14.19	08.57 15.56	07.21 17.29	06.29 20.05	04.40 21.40	05.20 (T1) 05.33 (T1)	02.54 23.25	
3	10.12 14.21	08.53 15.59	07.17 17.32	06.25 20.08	04.37 21.44	05.18 (T1) 05.34 (T1)	02.51 23.29	
4	10.10 14.23	08.50 16.03	07.14 17.35	06.22 20.11	04.33 21.47	05.17 (T1) 05.35 (T1)	02.48 23.32	
5	10.09 14.26	08.47 16.06	07.10 17.39	06.18 20.14	04.29 21.51	05.15 (T1) 05.35 (T1)	02.46 23.35	
6	10.07 14.28	08.44 16.10	07.07 17.42	06.14 20.17	04.26 21.54	05.14 (T1) 05.36 (T1)	02.43 23.37	
7	10.05 14.31	08.40 16.13	07.03 17.45	06.11 20.20	04.22 21.57	05.14 (T1) 05.36 (T1)	02.41 23.40	
8	10.04 14.34	08.37 16.16	07.00 17.48	06.07 20.23	04.19 22.01	05.13 (T1) 05.36 (T1)	02.39 23.43	
9	10.02 14.37	08.34 16.20	06.56 17.51	06.03 20.26	04.15 22.04	05.14 (T1) 05.38 (T1)	02.37 23.45	
10	10.00 14.39	08.30 16.23	06.52 17.54	06.00 20.29	04.12 22.08	05.14 (T1) 05.38 (T1)	02.34 23.48	
11	09.58 14.42	08.27 16.27	06.49 17.57	05.56 20.33	04.08 22.11	05.13 (T1) 05.37 (T1)	02.33 23.50	
12	09.55 14.45	08.24 16.30	06.45 18.00	05.52 20.36	04.05 22.15	05.13 (T1) 05.37 (T1)	02.31 23.52	
13	09.53 14.48	08.20 16.33	06.42 18.04	05.49 20.39	04.01 22.18	05.13 (T1) 05.37 (T1)	02.29 23.54	
14	09.51 14.52	08.17 16.37	06.38 18.07	05.45 20.42	03.58 22.21	05.13 (T1) 05.36 (T1)	02.28 23.56	
15	09.48 14.55	08.13 16.40	06.34 18.10	05.42 20.45	03.54 22.25	05.15 (T1) 05.37 (T1)	02.27 23.58	
16	09.46 14.58	08.10 16.44	06.31 18.13	05.38 20.48	03.51 22.28	05.15 (T1) 05.36 (T1)	02.26 23.59	
17	09.43 15.01	08.07 16.47	06.27 18.16	05.34 20.51	03.48 22.32	05.15 (T1) 05.35 (T1)	02.25 00.01	
18	09.41 15.04	08.03 16.50	06.24 18.19	06.56 (T3) 06.59 (T3)	05.31 20.55	03.44 22.35	05.16 (T1) 05.35 (T1)	02.24 00.02
19	09.38 15.08	08.00 16.54	06.20 18.22	06.52 (T3) 07.02 (T3)	05.27 20.58	03.41 22.39	05.17 (T1) 05.33 (T1)	02.24 00.03
20	09.35 15.11	07.56 16.57	06.16 18.25	06.49 (T3) 07.04 (T3)	05.23 21.01	03.37 22.42	05.18 (T1) 05.33 (T1)	02.23 00.03
21	09.33 15.14	07.53 17.00	06.13 18.28	06.46 (T3) 07.05 (T3)	05.20 21.04	03.34 22.46	05.19 (T1) 05.31 (T1)	02.24 00.04
22	09.30 15.18	07.49 17.03	06.09 18.31	06.44 (T3) 07.05 (T3)	05.16 21.08	03.31 22.49	05.21 (T1) 05.29 (T1)	02.24 00.04
23	09.27 15.21	07.46 17.07	06.05 18.34	06.44 (T3) 07.06 (T3)	05.12 21.11	03.27 22.52	03.24 00.04	02.24 00.04
24	09.24 15.25	07.42 17.10	06.02 18.37	06.43 (T3) 07.06 (T3)	05.09 21.14	03.24 22.56	03.24 00.04	02.25 00.04
25	09.21 15.28	07.39 17.13	05.58 18.40	06.42 (T3) 07.05 (T3)	05.05 21.17	03.21 22.59	03.21 00.03	02.26 00.03
26	09.18 15.31	07.35 17.16	05.54 18.43	06.43 (T3) 07.05 (T3)	05.02 21.21	03.18 23.03	03.18 00.02	02.27 00.02
27	09.15 15.35	07.32 17.20	05.51 18.46	06.42 (T3) 07.04 (T3)	04.58 21.24	03.15 23.06	03.15 00.01	02.29 00.01
28	09.12 15.38	07.28 17.23	05.47 18.49	06.43 (T3) 07.04 (T3)	04.54 21.27	03.12 23.09	03.12 00.00	02.30 00.00
29	09.09 15.42	07.23 17.23	05.44 18.49	07.44 (T3) 08.02 (T3)	04.51 21.30	03.08 23.13	03.08 23.13	02.32 23.59
30	09.06 15.45	06.40 19.55	06.40 19.55	07.44 (T3) 08.00 (T3)	04.47 21.34	03.05 23.16	03.05 23.16	02.34 23.57
31	09.03 15.49	06.36 19.59	06.36 19.59	07.46 (T3) 07.59 (T3)	04.47 21.34	03.02 23.19	03.02 23.19	02.34 23.57
Potential sun hours	163	235	363	454	577	639		
Total, worst case			248		6	418		
Sun reduction			0,36		0,43	0,47		
Oper. time red.			0,99		0,99	0,99		
Wind dir. red.			0,62		0,62	0,63		
Total reduction			0,22		0,26	0,29		
Total, real			54		2	122		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: G - Asuinrakennus G (Heiniaho)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December		
1	02.36	04.10	05.23 (T1)	05.49	07.18	07.55	09.35	
	23.56	22.25	24 05.47 (T1)	20.33	18.44	15.55	14.26	
2	02.38	04.13	05.23 (T1)	05.52	07.21	07.59	09.38	
	23.54	22.21	24 05.47 (T1)	20.30	18.40	15.51	14.24	
3	02.40	04.16	05.24 (T1)	05.55	07.24	08.02	09.41	
	23.52	22.18	23 05.47 (T1)	20.26	18.37	15.48	14.22	
4	02.43	04.20	05.24 (T1)	05.58	07.27	08.05	09.44	
	23.50	22.14	23 05.47 (T1)	20.22	18.33	15.45	14.20	
5	02.46	04.23	05.23 (T1)	06.01	07.30	08.09	09.46	
	23.48	22.11	23 05.46 (T1)	20.19	18.30	15.41	14.18	
6	02.48	04.26	05.24 (T1)	06.04	07.33	08.12	09.49	
	23.45	22.07	22 05.46 (T1)	20.15	18.26	15.38	14.16	
7	02.51	04.30	05.24 (T1)	06.07	07.36	08.15	09.52	
	23.43	22.03	22 05.46 (T1)	20.11	18.22	15.35	14.14	
8	02.54	04.33	05.25 (T1)	06.10	07.39	08.19	09.54	
	23.40	22.00	20 05.45 (T1)	20.08	18.19	15.32	14.12	
9	02.57	04.36	05.26 (T1)	06.13	07.42	08.22	09.57	
	23.38	21.56	18 05.44 (T1)	20.04	18.15	15.28	14.11	
10	03.00	04.40	05.27 (T1)	06.16	07.45	08.26	09.59	
	23.35	21.53	16 05.43 (T1)	20.00	18.12	15.25	14.10	
11	03.00	04.43	05.29 (T1)	06.19	07.48	08.29	10.01	
	23.32	21.49	12 05.41 (T1)	19.57	4 07.46 (T3)	18.08	15.22	14.08
12	03.03	04.46	05.32 (T1)	06.22	07.38 (T3)	07.52	08.32	10.03
	23.29	21.46	6 05.38 (T1)	19.53	12 07.50 (T3)	18.04	15.19	14.07
13	03.06	04.49	06.25	07.36 (T3)	07.55	08.36	10.05	
	23.27	21.42	19.49	16 07.52 (T3)	18.01	15.16	14.06	
14	03.09	04.53	06.28	07.34 (T3)	07.58	08.39	10.07	
	23.24	21.38	19.46	19 07.53 (T3)	17.57	15.13	14.05	
15	03.12	04.56	06.31	07.33 (T3)	08.01	08.43	10.09	
	23.21	21.35	19.42	21 07.54 (T3)	17.54	15.09	14.04	
16	03.16	04.59	06.34	07.32 (T3)	08.04	08.46	10.10	
	23.18	21.31	19.38	22 07.54 (T3)	17.50	15.06	14.04	
17	03.19	05.02	06.37	07.31 (T3)	08.07	08.49	10.12	
	23.14	21.28	19.35	22 07.53 (T3)	17.47	15.03	14.03	
18	03.22	05.06	06.40	07.30 (T3)	08.10	08.53	10.13	
	23.11	21.24	19.31	23 07.53 (T3)	17.43	15.00	14.03	
19	03.26	05.09	06.43	07.30 (T3)	08.13	08.56	10.14	
	23.08	21.20	19.28	23 07.53 (T3)	17.40	14.58	14.03	
20	03.29	05.12	06.46	07.30 (T3)	08.16	08.59	10.15	
	23.05	21.17	19.24	22 07.52 (T3)	17.36	14.55	14.03	
21	03.32	05.32 (T1)	05.15	06.49	07.30 (T3)	08.20	09.03	10.16
	23.02	5 05.37 (T1)	21.13	19.20	21 07.51 (T3)	17.33	14.52	14.03
22	03.36	05.30 (T1)	05.18	06.52	07.31 (T3)	08.23	09.06	10.17
	22.58	10 05.40 (T1)	21.10	19.17	19 07.50 (T3)	17.29	14.49	14.04
23	03.39	05.28 (T1)	05.21	06.55	07.32 (T3)	08.26	09.09	10.17
	22.55	13 05.41 (T1)	21.06	19.13	17 07.49 (T3)	17.26	14.46	14.04
24	03.42	05.28 (T1)	05.25	06.58	07.35 (T3)	08.29	09.13	10.17
	22.52	15 05.43 (T1)	21.02	19.09	12 07.47 (T3)	17.22	14.43	14.05
25	03.46	05.27 (T1)	05.28	07.01	07.38 (T3)	07.32	09.16	10.17
	22.48	18 05.45 (T1)	20.59	19.06	6 07.44 (T3)	16.19	14.41	14.06
26	03.49	05.26 (T1)	05.31	07.04	07.36	09.19	10.17	
	22.45	19 05.45 (T1)	20.55	19.02	16.15	14.38	14.07	
27	03.53	05.26 (T1)	05.34	07.06	07.39	09.22	10.17	
	22.42	20 05.46 (T1)	20.51	18.58	16.12	14.36	14.08	
28	03.56	05.25 (T1)	05.37	07.09	07.42	09.26	10.17	
	22.38	22 05.47 (T1)	20.48	18.55	16.08	14.33	14.09	
29	03.59	05.24 (T1)	05.40	07.12	07.45	09.29	10.16	
	22.35	23 05.47 (T1)	20.44	18.51	16.05	14.31	14.11	
30	04.03	05.24 (T1)	05.43	07.15	07.49	09.32	10.16	
	22.31	23 05.47 (T1)	20.40	18.48	16.02	14.28	14.13	
31	04.06	05.24 (T1)	05.46	07.18	07.52	09.35	10.15	
	22.28	24 05.48 (T1)	20.37	18.45	15.58	14.25	14.14	
Potential sun hours	619	513	394	303	193	127		
Total, worst case	192	233	259					
Sun reduction	0,48	0,42	0,32					
Oper. time red.	0,99	0,99	0,99					
Wind dir. red.	0,63	0,63	0,62					
Total reduction	0,29	0,26	0,20					
Total, real	56	60	51					

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiangkangaShadow receptor: H - Asuinrakennus H (Mäkelä)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.14	09.00	07.25	06.33	04.44	02.56	02.36	04.09	05.49	07.18	07.55	09.35
	14.17	15.52	17.26	20.02	21.37	23.23	23.56	22.25	20.33	18.44	15.55	14.26
2	10.13	08.57	07.21	06.29	04.40	02.54	02.38	04.13	05.52	07.21	07.59	09.38
	14.19	15.56	17.29	20.05	21.41	23.26	23.54	22.21	20.30	18.40	15.51	14.24
3	10.12	08.53	07.18	06.25	04.36	02.51	02.40	04.16	05.55	07.24	08.02	09.41
	14.21	15.59	17.32	20.08	21.44	23.29	23.52	22.18	20.26	18.37	15.48	14.22
4	10.10	08.50	07.14	06.22	04.33	02.48	02.43	04.20	05.58	07.27	08.05	09.44
	14.23	16.03	17.35	20.11	21.47	23.32	23.50	22.14	20.22	18.33	15.45	14.20
5	10.09	08.47	07.10	06.18	04.29	02.46	02.45	04.23	06.01	07.30	08.09	09.47
	14.26	16.06	17.39	20.14	21.51	23.35	23.48	22.11	20.19	18.30	15.41	14.18
6	10.07	08.44	07.07	06.14	04.26	02.43	02.48	04.26	06.04	07.33	08.12	09.49
	14.28	16.10	17.42	20.17	21.54	23.38	23.46	22.07	20.15	18.26	15.38	14.16
7	10.06	08.40	07.03	06.11	04.22	02.41	02.51	04.30	06.07	07.36	08.16	09.52
	14.31	16.13	17.45	20.20	21.58	23.40	23.43	22.04	20.11	18.22	15.35	14.14
8	10.04	08.37	07.00	06.07	04.19	02.38	02.54	04.33	06.10	07.39	08.19	09.54
	14.34	16.16	17.48	20.23	22.01	23.43	23.41	22.00	20.08	18.19	15.32	14.12
9	10.02	08.34	06.56	06.03	04.15	02.36	02.57	04.36	06.13	07.42	08.22	09.57
	14.36	16.20	17.51	20.26	22.04	23.46	23.38	21.56	20.04	18.15	15.28	14.11
10	10.00	08.30	06.52	06.00	04.12	02.34	03.00	04.40	06.16	07.45	08.26	09.59
	14.39	16.23	17.54	20.29	22.08	23.48	23.35	21.53	20.00	18.12	15.25	14.09
11	09.58	08.27	06.49	05.56	04.08	02.32	03.00	04.43	06.19	07.49	08.29	10.01
	14.42	16.27	17.57	20.33	22.11	23.51	23.33	21.49	19.57	18.08	15.22	14.08
12	09.56	08.24	06.45	05.52	04.05	02.31	03.03	04.46	06.22	07.52	08.32	10.03
	14.45	16.30	18.00	20.36	22.15	23.53	23.30	21.46	19.53	18.04	15.19	14.07
13	09.53	08.20	06.42	05.49	04.01	02.29	03.06	04.49	06.25	07.55	08.36	10.05
	14.48	16.33	18.04	20.39	22.18	23.55	23.27	21.42	19.49	18.01	15.16	14.06
14	09.51	08.17	06.38	05.45	03.58	02.28	03.09	04.53	06.28	07.58	08.39	10.07
	14.51	16.37	18.07	20.42	22.22	23.57	23.24	21.39	19.46	17.57	15.13	14.05
15	09.49	08.14	06.34	05.42	03.54	02.26	03.12	04.56	06.31	08.01	08.43	10.09
	14.55	16.40	18.10	20.45	22.25	23.58	23.21	21.35	19.42	17.54	15.09	14.04
16	09.46	08.10	06.31	05.38	03.51	02.25	03.16	04.59	06.34	08.04	08.46	10.11
	14.58	16.44	18.13	20.48	22.29	03.00	23.18	21.31	19.38	17.50	15.06	14.04
17	09.43	08.07	06.27	05.34	03.47	02.24	03.19	05.02	06.37	08.07	08.49	10.12
	15.01	16.47	18.16	20.52	22.32	03.01	23.15	21.28	19.35	17.47	15.03	14.03
18	09.41	08.03	06.24	05.31	03.44	02.24	03.22	05.06	06.40	08.10	08.53	10.13
	15.04	16.50	18.19	20.55	22.35	03.02	23.11	21.24	19.31	17.43	15.00	14.03
19	09.38	08.00	06.20	05.27	03.41	02.23	03.25	05.09	06.43	08.13	08.56	10.14
	15.08	16.53	18.22	20.58	22.39	03.03	23.08	21.21	19.28	17.40	14.57	14.03
20	09.36	07.56	06.16	05.23	03.37	02.23	03.29	05.12	06.46	08.17	09.00	10.15
	15.11	16.57	18.25	21.01	22.42	03.04	23.05	21.17	19.24	17.36	14.55	14.03
21	09.33	07.53	06.13	05.20	03.34	02.23	03.32	05.15	06.49	08.20	09.03	10.16
	15.14	17.00	18.28	21.04	22.46	03.04	23.02	21.13	19.20	17.33	14.52	14.03
22	09.30	07.49	06.09	05.16	03.31	02.23	03.36	05.18	06.52	08.23	09.06	10.17
	15.18	17.03	18.31	21.08	22.49	03.04	22.59	21.10	19.17	17.29	14.49	14.04
23	09.27	07.46	06.05	05.12	03.27	02.24	03.39	05.21	06.55	08.26	09.10	10.17
	15.21	17.07	18.34	21.11	22.53	03.04	22.55	21.06	19.13	17.26	14.46	14.04
24	09.24	07.42	06.02	05.09	03.24	02.25	03.42	05.25	06.58	08.29	09.13	10.18
	15.25	17.10	18.37	21.14	22.56	03.04	22.52	21.02	19.09	17.22	14.43	14.05
25	09.21	07.39	05.58	05.05	03.21	02.26	03.46	05.28	07.01	07.33	09.16	10.18
	15.28	17.13	18.40	21.17	22.59	03.03	22.49	20.59	19.06	16.19	14.41	14.06
26	09.18	07.35	05.54	05.02	03.18	02.27	03.49	05.31	07.04	07.36	09.19	10.18
	15.31	17.16	18.43	21.21	23.03	03.03	22.45	20.55	19.02	16.15	14.38	14.07
27	09.15	07.32	05.51	04.58	03.15	02.28	03.52	05.34	07.06	07.39	09.23	10.18
	15.35	17.20	18.46	21.24	23.06	03.02	22.42	20.51	18.58	16.12	14.36	14.08
28	09.12	07.28	05.47	04.54	03.11	02.30	03.56	05.37	07.09	07.42	09.26	10.17
	15.38	17.23	18.49	21.27	23.10	03.01	22.38	20.48	18.55	16.08	14.33	14.09
29	09.09		06.44	04.51	03.08	02.32	03.59	05.40	07.12	07.46	09.29	10.17
	15.42		19.52	21.31	23.13	23.59	22.35	20.44	18.51	16.05	14.31	14.11
30	09.06		06.40	04.47	03.05	02.34	04.03	05.43	07.15	07.49	09.32	10.16
	15.45		19.56	21.34	23.16	23.58	22.32	20.41	18.48	16.02	14.28	14.12
31	09.03		06.36		03.02		04.06	05.46		07.52		10.15
	15.49		19.59		23.19		22.28	20.37		15.58		14.14
Potential sun hours	163	235	363	454	577	640	619	513	394	303	192	126
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiakangasShadow receptor: I - Lomarakennus I
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	10.14	08.59	12.37 (T7)	07.24	06.32	04.43
	14.16	15.52	9 12.46 (T7)	17.26	20.01	21.37
2	10.13	08.56	07.21	17.26	06.29	04.40
	14.18	15.55	17.29	17.29	20.04	21.40
3	10.11	08.53	07.17	17.29	06.25	04.36
	14.21	15.59	17.32	17.32	20.07	21.44
4	10.10	08.50	07.14	17.32	06.21	04.33
	14.23	16.02	17.35	17.35	20.10	21.47
5	10.09	08.47	07.10	17.35	06.18	04.29
	14.25	16.06	17.38	6 17.01 (T2)	20.14	21.50
6	10.07	08.43	07.06	17.38	06.14	04.25
	14.28	16.09	17.41	6 17.01 (T2)	20.14	21.50
7	10.05	08.40	07.03	17.41	06.10	04.22
	14.30	16.13	17.44	12 17.04 (T2)	20.17	21.54
8	10.03	12.27 (T7)	08.37	17.44	06.10	04.22
	14.33	5 12.32 (T7)	16.16	17.44	06.10	04.22
9	10.01	12.26 (T7)	08.33	17.44	06.10	04.22
	14.36	16 12.42 (T7)	16.19	17.44	06.10	04.22
10	09.59	12.26 (T7)	08.30	17.44	06.10	04.22
	14.39	18 12.44 (T7)	16.23	17.44	06.10	04.22
11	09.57	12.26 (T7)	08.27	17.44	06.10	04.22
	14.42	19 12.45 (T7)	16.26	17.44	06.10	04.22
12	09.55	12.25 (T7)	08.23	17.44	06.10	04.22
	14.45	20 12.45 (T7)	16.30	17.44	06.10	04.22
13	09.53	12.26 (T7)	08.20	17.44	06.10	04.22
	14.48	20 12.46 (T7)	16.33	17.44	06.10	04.22
14	09.51	12.25 (T7)	08.17	17.44	06.10	04.22
	14.51	22 12.47 (T7)	16.36	17.44	06.10	04.22
15	09.48	12.26 (T7)	08.13	17.44	06.10	04.22
	14.54	22 12.48 (T7)	16.40	17.44	06.10	04.22
16	09.46	12.25 (T7)	08.10	17.44	06.10	04.22
	14.57	23 12.48 (T7)	16.43	17.44	06.10	04.22
17	09.43	12.25 (T7)	08.06	17.44	06.10	04.22
	15.01	24 12.49 (T7)	16.46	17.44	06.10	04.22
18	09.41	12.25 (T7)	08.03	17.44	06.10	04.22
	15.04	25 12.50 (T7)	16.50	17.44	06.10	04.22
19	09.38	12.25 (T7)	07.59	17.44	06.10	04.22
	15.07	25 12.50 (T7)	16.53	17.44	06.10	04.22
20	09.35	12.26 (T7)	07.56	17.44	06.10	04.22
	15.11	25 12.51 (T7)	16.56	17.44	06.10	04.22
21	09.32	12.26 (T7)	07.52	17.44	06.10	04.22
	15.14	25 12.51 (T7)	17.00	17.44	06.10	04.22
22	09.30	12.26 (T7)	07.49	17.44	06.10	04.22
	15.17	25 12.51 (T7)	17.03	17.44	06.10	04.22
23	09.27	12.27 (T7)	07.45	17.44	06.10	04.22
	15.21	25 12.52 (T7)	17.06	17.44	06.10	04.22
24	09.24	12.27 (T7)	07.42	17.44	06.10	04.22
	15.24	24 12.51 (T7)	17.09	17.44	06.10	04.22
25	09.21	12.28 (T7)	07.38	17.44	06.10	04.22
	15.28	24 12.52 (T7)	17.13	17.44	06.10	04.22
26	09.18	12.29 (T7)	07.35	17.44	06.10	04.22
	15.31	23 12.52 (T7)	17.16	17.44	06.10	04.22
27	09.15	12.29 (T7)	07.31	17.44	06.10	04.22
	15.34	22 12.51 (T7)	17.19	17.44	06.10	04.22
28	09.12	12.30 (T7)	07.28	17.44	06.10	04.22
	15.38	21 12.51 (T7)	17.22	17.44	06.10	04.22
29	09.09	12.31 (T7)	07.25	17.44	06.10	04.22
	15.41	19 12.50 (T7)	17.25	17.44	06.10	04.22
30	09.06	12.33 (T7)	07.21	17.44	06.10	04.22
	15.45	17 12.50 (T7)	17.28	17.44	06.10	04.22
31	09.03	12.34 (T7)	07.18	17.44	06.10	04.22
	15.48	14 12.48 (T7)	17.31	17.44	06.10	04.22
Potential sun hours	163	235	363	454	577	640
Total, worst case	503	9	250			
Sun reduction	0,11	0,31	0,36			
Oper. time red.	0,99	0,99	0,99			
Wind dir. red.	0,66	0,66	0,61			
Total reduction	0,08	0,21	0,22			
Total, real	38	2	55			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiakangasShadow receptor: I - Lomarakennus I
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum

531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December				
1	02.35	04.09	05.49	07.18	17.27 (T2)	07.55	09.35	12.08 (T7)		
	23.56	22.24	20.33	18.44	22	17.49 (T2)	15.54	14.25	19	12.27 (T7)
2	02.37	04.12	05.52	07.21	17.26 (T2)	07.58	09.38	12.09 (T7)		
	23.54	22.21	20.29	18.40	23	17.49 (T2)	15.51	14.23	18	12.27 (T7)
3	02.40	04.16	05.55	07.24	17.26 (T2)	08.02	09.41	12.10 (T7)		
	23.52	22.17	20.26	18.36	22	17.48 (T2)	15.48	14.21	16	12.26 (T7)
4	02.42	04.19	05.58	07.27	17.26 (T2)	08.05	09.43	12.11 (T7)		
	23.50	22.14	20.22	18.33	22	17.48 (T2)	15.44	14.19	6	12.17 (T7)
5	02.45	04.23	06.01	07.30	17.26 (T2)	08.08	09.46	12.12 (T7)		
	23.48	22.10	20.18	18.29	21	17.47 (T2)	15.41	14.17		
6	02.48	04.26	06.04	07.33	17.27 (T2)	08.12	09.49	12.13 (T7)		
	23.45	22.07	20.15	18.26	18	17.45 (T2)	15.38	14.15		
7	02.50	04.29	06.07	07.36	17.27 (T2)	08.15	09.52	12.14 (T7)		
	23.43	22.03	20.11	18.22	14	17.41 (T2)	15.34	14.14		
8	02.53	04.33	06.10	07.39	17.30 (T2)	08.19	09.54	12.15 (T7)		
	23.40	22.00	20.07	18.18	8	17.38 (T2)	15.31	14.12		
9	02.56	04.36	06.13	07.42	17.33 (T2)	08.22	09.56	12.16 (T7)		
	23.38	21.56	20.04	18.15	1	17.34 (T2)	15.28	14.10		
10	02.59	04.39	06.16	07.45	17.36 (T2)	08.25	09.59	12.17 (T7)		
	23.35	21.53	20.00	18.11	10	12.17 (T7)	14.09			
11	03.02	04.42	06.19	07.48	17.39 (T2)	08.29	10.01	12.05 (T7)	10.01	
	23.32	21.49	19.56	18.08	14	12.19 (T7)	14.08			
12	03.02	04.46	06.22	07.51	17.42 (T2)	08.32	10.03	12.04 (T7)	10.03	
	23.29	21.45	19.53	18.04	17	12.21 (T7)	14.07			
13	03.05	04.49	06.25	07.54	17.45 (T2)	08.35	10.05	12.03 (T7)	10.05	
	23.26	21.42	19.49	18.00	19	12.22 (T7)	14.06			
14	03.09	04.52	06.28	07.57	17.48 (T2)	08.39	10.07	12.03 (T7)	10.07	
	23.23	21.38	19.45	17.57	21	12.24 (T7)	14.05			
15	03.12	04.56	06.31	08.00	17.51 (T2)	08.42	10.09	12.02 (T7)	10.09	
	23.20	21.35	19.42	17.53	22	12.24 (T7)	14.04			
16	03.15	04.59	06.34	08.04	17.54 (T2)	08.46	10.10	12.02 (T7)	10.10	
	23.17	21.31	19.38	17.50	23	12.25 (T7)	14.03			
17	03.18	05.02	06.37	08.07	17.57 (T2)	08.49	10.12	12.02 (T7)	10.12	
	23.14	21.27	19.34	17.46	24	12.26 (T7)	14.03			
18	03.22	05.05	06.40	08.10	17.60 (T2)	08.52	10.13	12.01 (T7)	10.13	
	23.11	21.24	19.31	17.43	24	12.25 (T7)	14.03			
19	03.25	05.08	06.42	08.13	17.63 (T2)	08.56	10.14	12.01 (T7)	10.14	
	23.08	21.20	19.27	17.39	25	12.26 (T7)	14.02			
20	03.28	05.12	06.45	08.16	17.66 (T2)	08.59	10.15	12.01 (T7)	10.15	
	23.05	21.17	19.24	17.36	25	12.26 (T7)	14.03			
21	03.32	05.15	06.48	08.19	17.69 (T2)	09.03	10.16	12.01 (T7)	10.16	
	23.01	21.13	19.20	17.32	25	12.26 (T7)	14.03			
22	03.35	05.18	06.51	08.22	17.72 (T2)	09.06	10.16	12.02 (T7)	10.16	
	22.58	21.09	19.16	17.29	25	12.27 (T7)	14.03			
23	03.38	05.21	06.54	08.26	17.75 (T2)	09.09	10.17	12.03 (T7)	10.17	
	22.55	21.06	19.13	17.25	24	12.27 (T7)	14.04			
24	03.42	05.24	06.57	08.29	17.78 (T2)	09.13	10.17	12.03 (T7)	10.17	
	22.52	21.02	19.09	17.22	24	12.27 (T7)	14.04			
25	03.45	05.27	07.00	17.36 (T2)	17.81 (T2)	09.16	10.17	12.04 (T7)	10.17	
	22.48	20.58	19.05	9	17.45 (T2)	16.18	14.40	23	12.27 (T7)	14.05
26	03.49	05.30	07.03	17.33 (T2)	17.84 (T2)	09.19	10.17	12.04 (T7)	10.17	
	22.45	20.55	19.02	14	17.47 (T2)	16.15	14.38	24	12.28 (T7)	14.06
27	03.52	05.33	07.06	17.31 (T2)	17.87 (T2)	09.22	10.17	12.04 (T7)	10.17	
	22.41	20.51	18.58	17	17.48 (T2)	16.11	14.35	23	12.27 (T7)	14.08
28	03.55	05.37	07.09	17.29 (T2)	17.90 (T2)	09.25	10.17	12.06 (T7)	10.17	
	22.38	20.47	18.54	20	17.49 (T2)	16.08	14.33	22	12.28 (T7)	14.09
29	03.59	05.40	07.12	17.28 (T2)	17.91 (T2)	09.29	10.16	12.06 (T7)	10.16	
	22.35	20.44	18.51	21	17.49 (T2)	16.05	14.30	21	12.27 (T7)	14.10
30	04.02	05.43	07.15	17.27 (T2)	17.92 (T2)	09.32	10.16	12.07 (T7)	10.16	
	22.31	20.40	18.47	22	17.49 (T2)	16.01	14.28	20	12.27 (T7)	14.12
31	04.06	05.46		07.52			10.15			
	22.28	20.37		15.58			14.14			
Potential sun hours	619	513	394	303	192		126			
Total, worst case			103	151	455		59			
Sun reduction			0,32	0,28	0,19		0,04			
Oper. time red.			0,99	0,99	0,99		0,99			
Wind dir. red.			0,61	0,61	0,66		0,66			
Total reduction			0,20	0,17	0,13		0,03			
Total, real			20	26	57		2			

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: J - Lomarakenus J (Hautakaarto)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	08.59	07.24	06.33	04.44	03.01	02.38	04.10	05.49	07.18	07.55	09.34
	14.18	15.53	17.26	20.01	21.36	23.20	23.53	22.23	20.33	18.44	15.55	14.27
2	10.11	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.52	07.21	07.58	09.36
	14.20	15.56	17.29	20.04	21.40	23.24	23.52	22.20	20.29	18.40	15.52	14.25
3	10.10	08.53	07.17	06.25	04.37	02.53	02.42	04.17	05.55	07.24	08.01	09.39
	14.22	16.00	17.32	20.07	21.43	23.27	23.50	22.16	20.25	18.37	15.48	14.23
4	10.09	08.49	07.14	06.22	04.33	02.50	02.45	04.20	05.58	07.27	08.05	09.42
	14.25	16.03	17.35	20.10	21.46	23.30	23.48	22.13	20.22	18.33	15.45	14.21
5	10.07	08.46	07.10	06.18	04.30	02.48	02.47	04.24	06.01	07.30	08.08	09.45
	14.27	16.07	17.39	20.13	21.50	23.32	23.45	22.10	20.18	18.29	15.42	14.19
6	10.06	08.43	07.06	06.14	04.26	02.45	02.50	04.27	06.04	07.33	08.11	09.48
	14.30	16.10	17.42	20.17	21.53	23.35	23.43	22.06	20.15	18.26	15.39	14.17
7	10.04	08.40	07.03	06.11	04.23	02.43	02.53	04.30	06.07	07.36	08.15	09.50
	14.32	16.13	17.45	20.20	21.56	23.38	23.41	22.03	20.11	18.22	15.35	14.15
8	10.02	08.36	06.59	06.07	04.19	02.41	02.56	04.34	06.10	07.39	08.18	09.53
	14.35	16.17	17.48	20.23	22.00	23.41	23.38	21.59	20.07	18.19	15.32	14.14
9	10.00	08.33	06.56	06.03	04.16	02.39	02.59	04.37	06.13	07.42	08.21	09.55
	14.38	16.20	17.51	20.26	22.03	23.43	23.36	21.55	20.04	18.15	15.29	14.12
10	09.58	08.30	06.52	06.00	04.12	02.37	03.01	04.40	06.16	07.45	08.25	09.57
	14.40	16.24	17.54	20.29	22.07	23.46	23.33	21.52	20.00	18.12	15.26	14.11
11	09.56	08.26	06.49	05.56	04.09	02.35	03.01	04.43	06.19	07.48	08.28	10.00
	14.43	16.27	17.57	20.32	22.10	23.48	23.30	21.48	19.56	18.08	15.22	14.10
12	09.54	08.23	06.45	05.53	04.05	02.33	03.04	04.47	06.22	07.51	08.31	10.02
	14.46	16.30	18.00	20.35	22.13	23.50	23.28	21.45	19.53	18.04	15.19	14.08
13	09.52	08.20	06.41	05.49	04.02	02.31	03.08	04.50	06.25	07.54	08.35	10.04
	14.49	16.34	18.03	20.38	22.17	23.52	23.25	21.41	19.49	18.01	15.16	14.07
14	09.49	08.16	06.38	05.45	03.59	02.30	03.11	04.53	06.28	07.57	08.38	10.05
	14.52	16.37	18.06	20.41	22.20	23.54	23.22	21.38	19.45	17.57	15.13	14.07
15	09.47	08.13	06.34	05.42	03.55	02.29	03.14	04.56	06.31	08.00	08.42	10.07
	14.56	16.40	18.10	20.45	22.24	23.55	23.19	21.34	19.42	17.54	15.10	14.06
16	09.45	08.09	06.31	05.38	03.52	02.28	03.17	05.00	06.34	08.03	08.45	10.09
	14.59	16.44	18.13	20.48	22.27	23.57	23.16	21.31	19.38	17.50	15.07	14.05
17	09.42	08.06	06.27	05.34	03.48	02.27	03.20	05.03	06.37	08.07	08.48	10.10
	15.02	16.47	18.16	20.51	22.31	23.58	23.13	21.27	19.35	17.47	15.04	14.05
18	09.40	08.03	06.23	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.11
	15.05	16.50	18.19	20.54	22.34	23.59	23.10	21.23	19.31	17.43	15.01	14.05
19	09.37	07.59	06.20	05.27	03.42	02.26	03.27	05.09	06.43	08.13	08.55	10.12
	15.09	16.54	18.22	20.57	22.37	00.00	23.07	21.20	19.27	17.40	14.58	14.04
20	09.34	07.56	06.16	05.24	03.38	02.26	03.30	05.12	06.46	08.16	08.58	10.13
	15.12	16.57	18.25	21.00	22.41	00.01	23.03	21.16	19.24	17.36	14.55	14.05
21	09.32	07.52	06.12	05.20	03.35	02.26	03.33	05.15	06.49	08.19	09.02	10.14
	15.15	17.00	18.28	21.04	22.44	00.01	23.00	21.13	19.20	17.33	14.52	14.05
22	09.29	07.49	06.09	05.16	03.32	02.26	03.37	05.19	06.52	08.22	09.05	10.15
	15.19	17.04	18.31	21.07	22.48	00.01	22.57	21.09	19.16	17.29	14.50	14.05
23	09.26	07.45	06.05	05.13	03.29	02.27	03.40	05.22	06.54	08.25	09.08	10.15
	15.22	17.07	18.34	21.10	22.51	00.01	22.54	21.05	19.13	17.26	14.47	14.06
24	09.23	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.57	08.29	09.12	10.16
	15.25	17.10	18.37	21.13	22.54	00.01	22.50	21.02	19.09	17.22	14.44	14.06
25	09.20	07.38	05.58	05.06	03.22	02.28	03.47	05.28	07.00	07.32	09.15	10.16
	15.29	17.13	18.40	21.17	22.58	00.00	22.47	20.58	19.05	16.19	14.42	14.07
26	09.17	07.35	05.54	05.02	03.19	02.30	03.50	05.31	07.03	07.35	09.18	10.16
	15.32	17.16	18.43	21.20	23.01	00.00	22.44	20.54	19.02	16.15	14.39	14.08
27	09.14	07.31	05.51	04.58	03.16	02.31	03.53	05.34	07.06	07.38	09.21	10.16
	15.36	17.20	18.46	21.23	23.04	23.59	22.40	20.51	18.58	16.12	14.36	14.10
28	09.11	07.28	05.47	04.55	03.13	02.32	03.57	05.37	07.09	07.42	09.24	10.15
	15.39	17.23	18.49	21.26	23.08	23.58	22.37	20.47	18.55	16.09	14.34	14.11
29	09.08		06.43	04.51	03.10	02.34	04.00	05.40	07.12	07.45	09.27	10.15
	15.42		19.52	21.30	23.11	23.56	22.34	20.44	18.51	16.05	14.32	14.12
30	09.05		06.40	04.48	03.07	02.36	04.04	05.43	07.15	07.48	09.31	10.14
	15.46		19.55	21.33	23.14	23.55	22.30	20.40	18.47	16.02	14.29	14.14
31	09.02		06.36		03.04		04.07	05.46		07.51		10.13
	15.49		19.58		23.17		22.27	20.36		15.58		14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)		Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: K - Asuinrakennus K (Takalo)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.12	08.59	07.24	06.32	04.44	03.01	02.38	04.10	05.49	07.18	07.55	09.33
	14.18	15.53	17.26	20.01	21.36	23.20	23.53	22.23	20.33	18.44	15.55	14.27
2	10.11	08.56	07.20	06.29	04.41	02.55	02.40	04.14	05.52	07.21	07.58	09.36
	14.20	15.56	17.29	20.04	21.39	23.23	23.51	22.20	20.29	18.40	15.52	14.25
3	10.10	08.52	07.17	06.25	04.37	02.53	02.43	04.17	05.55	07.24	08.01	09.39
	14.22	16.00	17.32	20.07	21.43	23.26	23.49	22.16	20.25	18.37	15.48	14.23
4	10.08	08.49	07.13	06.22	04.33	02.50	02.45	04.20	05.58	07.27	08.04	09.42
	14.25	16.03	17.35	20.10	21.46	23.29	23.47	22.13	20.22	18.33	15.45	14.21
5	10.07	08.46	07.10	06.18	04.30	02.48	02.48	04.24	06.01	07.30	08.08	09.45
	14.27	16.07	17.39	20.13	21.50	23.32	23.45	22.09	20.18	18.29	15.42	14.19
6	10.05	08.43	07.06	06.14	04.26	02.45	02.50	04.27	06.04	07.33	08.11	09.47
	14.30	16.10	17.42	20.16	21.53	23.35	23.43	22.06	20.14	18.26	15.39	14.17
7	10.04	08.39	07.03	06.11	04.23	02.43	02.53	04.30	06.07	07.36	08.14	09.50
	14.32	16.13	17.45	20.20	21.56	23.38	23.41	22.02	20.11	18.22	15.35	14.15
8	10.02	08.36	06.59	06.07	04.19	02.41	02.56	04.34	06.10	07.39	08.18	09.52
	14.35	16.17	17.48	20.23	22.00	23.40	23.38	21.59	20.07	18.19	15.32	14.14
9	10.00	08.33	06.56	06.03	04.16	02.39	02.59	04.37	06.13	07.42	08.21	09.55
	14.38	16.20	17.51	20.26	22.03	23.43	23.36	21.55	20.04	18.15	15.29	14.12
10	09.58	08.30	06.52	06.00	04.12	02.37	03.02	04.40	06.16	07.45	08.25	09.57
	14.40	16.24	17.54	20.29	22.06	23.45	23.33	21.52	20.00	18.11	15.26	14.11
11	09.56	08.26	06.48	05.56	04.09	02.35	03.02	04.43	06.19	07.48	08.28	09.59
	14.43	16.27	17.57	20.32	22.10	23.47	23.30	21.48	19.56	18.08	15.22	14.10
12	09.54	08.23	06.45	05.53	04.05	02.33	03.05	04.47	06.22	07.51	08.31	10.01
	14.46	16.30	18.00	20.35	22.13	23.50	23.27	21.45	19.53	18.04	15.19	14.08
13	09.52	08.19	06.41	05.49	04.02	02.32	03.08	04.50	06.25	07.54	08.35	10.03
	14.49	16.34	18.03	20.38	22.17	23.52	23.25	21.41	19.49	18.01	15.16	14.07
14	09.49	08.16	06.38	05.45	03.59	02.30	03.11	04.53	06.28	07.57	08.38	10.05
	14.52	16.37	18.06	20.41	22.20	23.53	23.22	21.38	19.45	17.57	15.13	14.07
15	09.47	08.13	06.34	05.42	03.55	02.29	03.14	04.56	06.31	08.00	08.41	10.07
	14.56	16.40	18.09	20.44	22.24	23.55	23.19	21.34	19.42	17.54	15.10	14.06
16	09.44	08.09	06.30	05.38	03.52	02.28	03.17	05.00	06.34	08.03	08.45	10.08
	14.59	16.44	18.13	20.48	22.27	23.56	23.16	21.30	19.38	17.50	15.07	14.05
17	09.42	08.06	06.27	05.34	03.48	02.27	03.20	05.03	06.37	08.06	08.48	10.10
	15.02	16.47	18.16	20.51	22.30	23.58	23.13	21.27	19.34	17.47	15.04	14.05
18	09.39	08.02	06.23	05.31	03.45	02.27	03.24	05.06	06.40	08.10	08.52	10.11
	15.05	16.50	18.19	20.54	22.34	23.59	23.10	21.23	19.31	17.43	15.01	14.05
19	09.37	07.59	06.20	05.27	03.42	02.26	03.27	05.09	06.43	08.13	08.55	10.12
	15.09	16.54	18.22	20.57	22.37	00.00	23.06	21.20	19.27	17.40	14.58	14.05
20	09.34	07.56	06.16	05.24	03.38	02.26	03.30	05.12	06.46	08.16	08.58	10.13
	15.12	16.57	18.25	21.00	22.41	00.00	23.03	21.16	19.24	17.36	14.55	14.05
21	09.31	07.52	06.12	05.20	03.35	02.26	03.33	05.15	06.49	08.19	09.02	10.14
	15.15	17.00	18.28	21.04	22.44	00.01	23.00	21.12	19.20	17.33	14.52	14.05
22	09.29	07.49	06.09	05.16	03.32	02.26	03.37	05.19	06.51	08.22	09.05	10.15
	15.19	17.03	18.31	21.07	22.47	00.01	22.57	21.09	19.16	17.29	14.50	14.05
23	09.26	07.45	06.05	05.13	03.29	02.27	03.40	05.22	06.54	08.25	09.08	10.15
	15.22	17.07	18.34	21.10	22.51	00.01	22.54	21.05	19.13	17.26	14.47	14.06
24	09.23	07.42	06.02	05.09	03.25	02.28	03.43	05.25	06.57	08.29	09.11	10.15
	15.25	17.10	18.37	21.13	22.54	00.00	22.50	21.02	19.09	17.22	14.44	14.06
25	09.20	07.38	05.58	05.06	03.22	02.29	03.47	05.28	07.00	07.32	09.15	10.15
	15.29	17.13	18.40	21.16	22.58	00.00	22.47	20.58	19.05	16.19	14.42	14.07
26	09.17	07.35	05.54	05.02	03.19	02.30	03.50	05.31	07.03	07.35	09.18	10.15
	15.32	17.16	18.43	21.20	23.01	23.59	22.44	20.54	19.02	16.15	14.39	14.08
27	09.14	07.31	05.51	04.58	03.16	02.31	03.53	05.34	07.06	07.38	09.21	10.15
	15.36	17.20	18.46	21.23	23.04	23.58	22.40	20.51	18.58	16.12	14.36	14.10
28	09.11	07.28	05.47	04.55	03.13	02.33	03.57	05.37	07.09	07.41	09.24	10.15
	15.39	17.23	18.49	21.26	23.07	23.57	22.37	20.47	18.55	16.09	14.34	14.11
29	09.08		06.43	04.51	03.10	02.34	04.00	05.40	07.12	07.45	09.27	10.15
	15.42		19.52	21.30	23.11	23.56	22.34	20.43	18.51	16.05	14.32	14.12
30	09.05		06.40	04.48	03.07	02.36	04.04	05.43	07.15	07.48	09.30	10.14
	15.46		19.55	21.33	23.14	23.55	22.30	20.40	18.47	16.02	14.29	14.14
31	09.02		06.36		03.04		04.07	05.46		07.51		10.13
	15.49		19.58		23.17		22.27	20.36		15.58		14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiangkangasShadow receptor: L - Lomarakennus L (Haukijärvi)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	08.59	07.25	06.33	04.45	03.02	02.39	04.11	05.50	07.19	07.55	09.34
	14.19	15.53	17.27	20.02	21.37	23.21	23.54	22.24	20.33	18.44	15.56	14.28
2	10.12	08.56	07.21	06.29	04.41	02.56	02.41	04.14	05.53	07.22	07.58	09.37
	14.21	15.57	17.30	20.05	21.40	23.24	23.52	22.20	20.30	18.41	15.52	14.25
3	10.10	08.53	07.18	06.26	04.38	02.53	02.43	04.18	05.56	07.25	08.02	09.40
	14.23	16.00	17.33	20.08	21.43	23.27	23.50	22.17	20.26	18.37	15.49	14.23
4	10.09	08.50	07.14	06.22	04.34	02.51	02.46	04.21	05.59	07.28	08.05	09.43
	14.25	16.04	17.36	20.11	21.47	23.30	23.48	22.13	20.22	18.34	15.46	14.21
5	10.08	08.47	07.10	06.19	04.31	02.48	02.48	04.24	06.02	07.31	08.08	09.45
	14.28	16.07	17.39	20.14	21.50	23.33	23.46	22.10	20.19	18.30	15.42	14.19
6	10.06	08.43	07.07	06.15	04.27	02.46	02.51	04.28	06.05	07.34	08.12	09.48
	14.30	16.11	17.42	20.17	21.54	23.36	23.44	22.06	20.15	18.26	15.39	14.18
7	10.04	08.40	07.03	06.11	04.23	02.44	02.54	04.31	06.08	07.37	08.15	09.51
	14.33	16.14	17.45	20.20	21.57	23.38	23.41	22.03	20.11	18.23	15.36	14.16
8	10.02	08.37	07.00	06.08	04.20	02.41	02.56	04.34	06.11	07.40	08.18	09.53
	14.36	16.17	17.48	20.23	22.00	23.41	23.39	21.59	20.08	18.19	15.33	14.14
9	10.01	08.33	06.56	06.04	04.16	02.39	02.59	04.37	06.14	07.43	08.22	09.55
	14.38	16.21	17.52	20.26	22.04	23.43	23.36	21.56	20.04	18.16	15.29	14.13
10	09.59	08.30	06.53	06.00	04.13	02.37	03.02	04.41	06.17	07.46	08.25	09.58
	14.41	16.24	17.55	20.29	22.07	23.46	23.33	21.52	20.00	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.10	02.35	03.02	04.44	06.20	07.49	08.29	10.00
	14.44	16.28	17.58	20.33	22.10	23.48	23.31	21.49	19.57	18.09	15.23	14.10
12	09.54	08.23	06.45	05.53	04.06	02.34	03.05	04.47	06.23	07.52	08.32	10.02
	14.47	16.31	18.01	20.36	22.14	23.50	23.28	21.45	19.53	18.05	15.20	14.09
13	09.52	08.20	06.42	05.50	04.03	02.32	03.08	04.51	06.26	07.55	08.35	10.04
	14.50	16.34	18.04	20.39	22.17	23.52	23.25	21.42	19.50	18.01	15.17	14.08
14	09.50	08.17	06.38	05.46	03.59	02.31	03.11	04.54	06.29	07.58	08.39	10.06
	14.53	16.38	18.07	20.42	22.21	23.54	23.22	21.38	19.46	17.58	15.14	14.07
15	09.47	08.13	06.35	05.42	03.56	02.30	03.14	04.57	06.32	08.01	08.42	10.07
	14.56	16.41	18.10	20.45	22.24	23.56	23.19	21.35	19.42	17.54	15.11	14.06
16	09.45	08.10	06.31	05.39	03.52	02.29	03.18	05.00	06.34	08.04	08.45	10.09
	14.59	16.44	18.13	20.48	22.28	23.57	23.16	21.31	19.39	17.51	15.08	14.06
17	09.43	08.06	06.27	05.35	03.49	02.28	03.21	05.03	06.37	08.07	08.49	10.10
	15.03	16.48	18.16	20.51	22.31	23.58	23.13	21.27	19.35	17.47	15.05	14.06
18	09.40	08.03	06.24	05.31	03.46	02.27	03.24	05.07	06.40	08.10	08.52	10.12
	15.06	16.51	18.19	20.55	22.34	23.59	23.10	21.24	19.31	17.44	15.02	14.05
19	09.37	08.00	06.20	05.28	03.42	02.27	03.27	05.10	06.43	08.13	08.55	10.13
	15.09	16.54	18.22	20.58	22.38	00.00	23.07	21.20	19.28	17.40	14.59	14.05
20	09.35	07.56	06.17	05.24	03.39	02.27	03.31	05.13	06.46	08.16	08.59	10.14
	15.12	16.58	18.25	21.01	22.41	00.01	23.04	21.17	19.24	17.37	14.56	14.05
21	09.32	07.53	06.13	05.21	03.36	02.27	03.34	05.16	06.49	08.20	09.02	10.15
	15.16	17.01	18.28	21.04	22.45	00.01	23.01	21.13	19.21	17.33	14.53	14.05
22	09.29	07.49	06.09	05.17	03.32	02.27	03.37	05.19	06.52	08.23	09.05	10.15
	15.19	17.04	18.31	21.07	22.48	00.01	22.57	21.09	19.17	17.30	14.50	14.06
23	09.26	07.46	06.06	05.13	03.29	02.28	03.41	05.22	06.55	08.26	09.09	10.16
	15.23	17.07	18.34	21.11	22.51	00.01	22.54	21.06	19.13	17.26	14.48	14.06
24	09.23	07.42	06.02	05.10	03.26	02.28	03.44	05.25	06.58	08.29	09.12	10.16
	15.26	17.11	18.37	21.14	22.55	00.01	22.51	21.02	19.10	17.23	14.45	14.07
25	09.21	07.39	05.58	05.06	03.23	02.29	03.47	05.28	07.01	07.32	09.15	10.16
	15.29	17.14	18.40	21.17	22.58	00.01	22.48	20.59	19.06	16.19	14.42	14.08
26	09.18	07.35	05.55	05.03	03.20	02.30	03.51	05.32	07.04	07.36	09.18	10.16
	15.33	17.17	18.44	21.20	23.01	00.00	22.44	20.55	19.02	16.16	14.40	14.09
27	09.15	07.32	05.51	04.59	03.17	02.32	03.54	05.35	07.07	07.39	09.22	10.16
	15.36	17.20	18.47	21.24	23.05	23.59	22.41	20.51	18.59	16.13	14.37	14.10
28	09.12	07.28	05.48	04.55	03.13	02.33	03.57	05.38	07.10	07.42	09.25	10.16
	15.40	17.23	18.50	21.27	23.08	23.58	22.38	20.48	18.55	16.09	14.35	14.12
29	09.09		06.44	04.52	03.10	02.35	04.01	05.41	07.13	07.45	09.28	10.15
	15.43		19.53	21.30	23.11	23.57	22.34	20.44	18.52	16.06	14.32	14.13
30	09.06		06.40	04.48	03.07	02.37	04.04	05.44	07.16	07.49	09.31	10.14
	15.46		19.56	21.33	23.15	23.55	22.31	20.40	18.48	16.02	14.30	14.15
31	09.02		06.37		03.05		04.08	05.47		07.52		10.14
	15.50		19.59		23.18		22.27	20.37		15.59		14.16
Potential sun hours	165	235	363	453	576	637	617	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiakangas Shadow receptor: M - Lomarakenus M (Haukilahti)
Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [LULEA]
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1-31) and summary rows (Potential sun hours, Total, worst case, Sun reduction, Oper. time red., Wind dir. red., Total reduction, Total, real).

Table layout: For each day in each month the following matrix apply

Day in month Sun rise (hh:mm) Sun set (hh:mm) Minutes with flicker First time (hh:mm) with flicker Last time (hh:mm) with flicker (WTG causing flicker first time) (WTG causing flicker last time)

SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiangkangaShadow receptor: N - Lomarakennus N (Kuusela)
Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.31	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.08	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.52	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.41	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.05
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.26	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.52	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + TakiankangasShadow receptor: O - Lomarakennus O (Kuusela)
 Sunshine probability S (Average daily sunshine hours) [LULEA]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0,60 2,61 4,18 6,47 8,80 10,60 9,50 6,88 4,22 2,77 1,22 0,17

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 531 419 483 544 577 835 1 110 1 067 895 816 712 643 8 632
 Idle start wind speed: Cut in wind speed from power curve

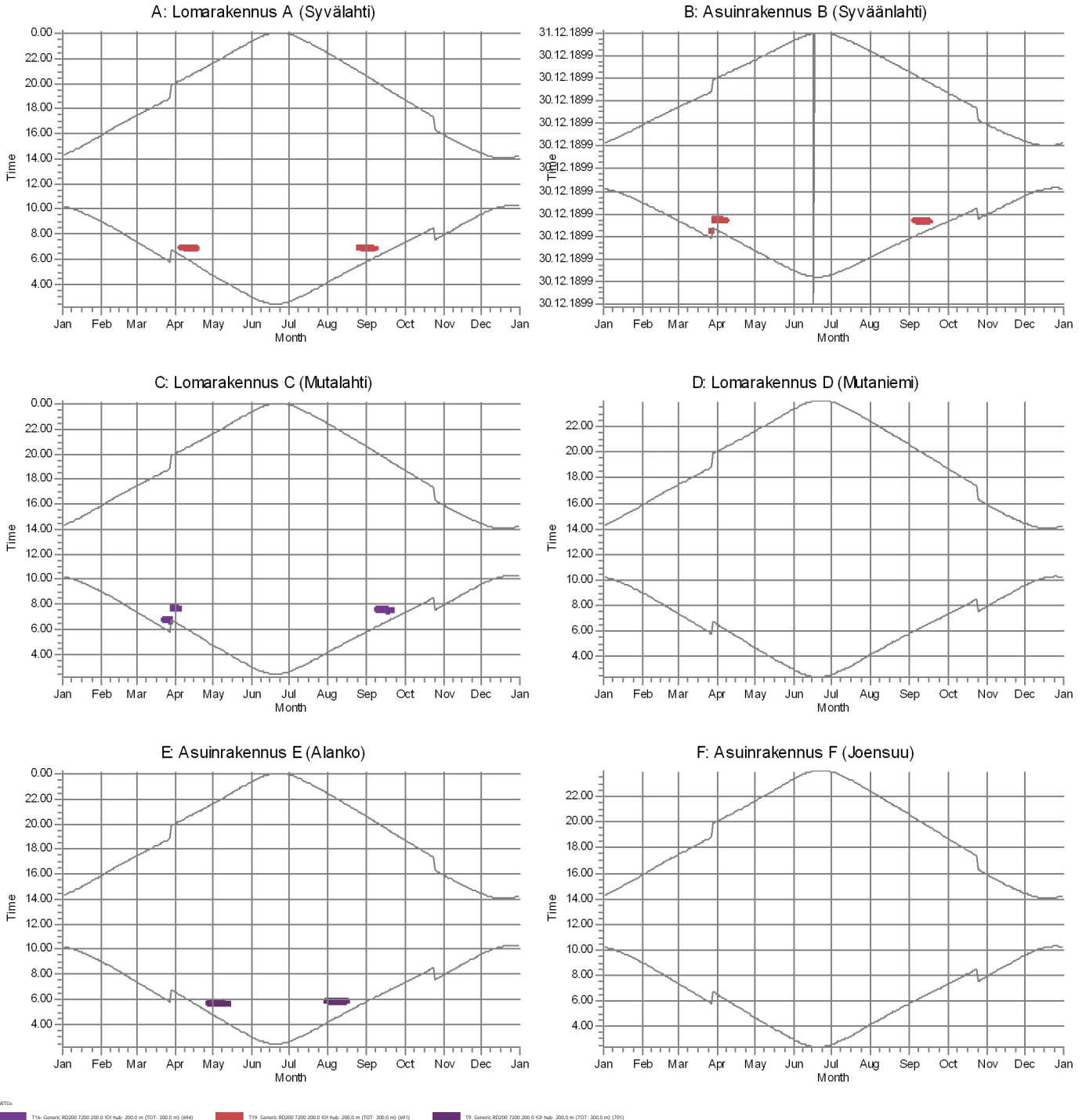
	January	February	March	April	May	June	July	August	September	October	November	December
1	10.13	09.00	07.25	06.33	04.44	03.01	02.38	04.10	05.50	07.19	07.55	09.34
	14.18	15.53	17.26	20.02	21.37	23.22	23.55	22.24	20.33	18.44	15.55	14.27
2	10.12	08.56	07.21	06.29	04.41	02.55	02.40	04.14	05.53	07.22	07.59	09.37
	14.20	15.56	17.30	20.05	21.40	23.25	23.53	22.21	20.30	18.41	15.52	14.25
3	10.11	08.53	07.18	06.26	04.37	02.53	02.42	04.17	05.56	07.25	08.02	09.40
	14.22	16.00	17.33	20.08	21.44	23.28	23.51	22.17	20.26	18.37	15.49	14.23
4	10.10	08.50	07.14	06.22	04.34	02.50	02.45	04.21	05.59	07.28	08.05	09.43
	14.25	16.03	17.36	20.11	21.47	23.31	23.49	22.14	20.22	18.33	15.45	14.21
5	10.08	08.47	07.11	06.18	04.30	02.47	02.47	04.24	06.02	07.31	08.09	09.46
	14.27	16.07	17.39	20.14	21.50	23.34	23.47	22.10	20.19	18.30	15.42	14.19
6	10.07	08.44	07.07	06.15	04.27	02.45	02.50	04.27	06.05	07.34	08.12	09.49
	14.30	16.10	17.42	20.17	21.54	23.36	23.44	22.07	20.15	18.26	15.39	14.17
7	10.05	08.40	07.03	06.11	04.23	02.43	02.53	04.30	06.08	07.37	08.15	09.51
	14.32	16.14	17.45	20.20	21.57	23.39	23.42	22.03	20.11	18.23	15.36	14.15
8	10.03	08.37	07.00	06.07	04.20	02.40	02.55	04.34	06.11	07.40	08.19	09.54
	14.35	16.17	17.48	20.23	22.01	23.42	23.40	22.00	20.08	18.19	15.32	14.14
9	10.01	08.34	06.56	06.04	04.16	02.38	02.58	04.37	06.14	07.43	08.22	09.56
	14.38	16.21	17.51	20.26	22.04	23.44	23.37	21.56	20.04	18.16	15.29	14.12
10	09.59	08.30	06.53	06.00	04.13	02.36	03.01	04.40	06.17	07.46	08.25	09.58
	14.40	16.24	17.55	20.30	22.07	23.47	23.34	21.53	20.01	18.12	15.26	14.11
11	09.57	08.27	06.49	05.57	04.09	02.34	03.01	04.44	06.20	07.49	08.29	10.01
	14.43	16.27	17.58	20.33	22.11	23.49	23.32	21.49	19.57	18.08	15.23	14.09
12	09.55	08.24	06.45	05.53	04.06	02.33	03.04	04.47	06.23	07.52	08.32	10.03
	14.46	16.31	18.01	20.36	22.14	23.51	23.29	21.46	19.53	18.05	15.20	14.08
13	09.53	08.20	06.42	05.49	04.02	02.31	03.07	04.50	06.26	07.55	08.36	10.05
	14.49	16.34	18.04	20.39	22.18	23.53	23.26	21.42	19.50	18.01	15.16	14.07
14	09.50	08.17	06.38	05.46	03.59	02.30	03.11	04.53	06.29	07.58	08.39	10.06
	14.53	16.37	18.07	20.42	22.21	23.55	23.23	21.38	19.46	17.58	15.13	14.06
15	09.48	08.13	06.35	05.42	03.55	02.28	03.14	04.57	06.31	08.01	08.42	10.08
	14.56	16.41	18.10	20.45	22.25	23.57	23.20	21.35	19.42	17.54	15.10	14.06
16	09.46	08.10	06.31	05.38	03.52	02.27	03.17	05.00	06.34	08.04	08.46	10.10
	14.59	16.44	18.13	20.48	22.28	23.58	23.17	21.31	19.39	17.51	15.07	14.05
17	09.43	08.07	06.27	05.35	03.48	02.27	03.20	05.03	06.37	08.07	08.49	10.11
	15.02	16.47	18.16	20.52	22.31	23.59	23.14	21.28	19.35	17.47	15.04	14.05
18	09.40	08.03	06.24	05.31	03.45	02.26	03.23	05.06	06.40	08.10	08.52	10.12
	15.05	16.51	18.19	20.55	22.35	00.01	23.11	21.24	19.31	17.44	15.01	14.04
19	09.38	08.00	06.20	05.28	03.42	02.26	03.27	05.09	06.43	08.13	08.56	10.13
	15.09	16.54	18.22	20.58	22.38	00.01	23.08	21.20	19.28	17.40	14.58	14.04
20	09.35	07.56	06.17	05.24	03.38	02.25	03.30	05.13	06.46	08.17	08.59	10.14
	15.12	16.57	18.25	21.01	22.42	00.02	23.04	21.17	19.24	17.37	14.55	14.04
21	09.32	07.53	06.13	05.20	03.35	02.25	03.33	05.16	06.49	08.20	09.03	10.15
	15.15	17.01	18.28	21.04	22.45	00.02	23.01	21.13	19.20	17.33	14.53	14.05
22	09.30	07.49	06.09	05.17	03.32	02.26	03.37	05.19	06.52	08.23	09.06	10.16
	15.19	17.04	18.31	21.08	22.49	00.03	22.58	21.10	19.17	17.30	14.50	14.05
23	09.27	07.46	06.06	05.13	03.29	02.26	03.40	05.22	06.55	08.26	09.09	10.16
	15.22	17.07	18.34	21.11	22.52	00.03	22.55	21.06	19.13	17.26	14.47	14.06
24	09.24	07.42	06.02	05.09	03.25	02.27	03.43	05.25	06.58	08.29	09.12	10.17
	15.25	17.10	18.37	21.14	22.55	00.02	22.51	21.02	19.10	17.23	14.44	14.06
25	09.21	07.39	05.58	05.06	03.22	02.28	03.47	05.28	07.01	07.32	09.16	10.17
	15.29	17.14	18.40	21.17	22.59	00.02	22.48	20.59	19.06	16.19	14.42	14.07
26	09.18	07.35	05.55	05.02	03.19	02.29	03.50	05.31	07.04	07.36	09.19	10.17
	15.32	17.17	18.44	21.21	23.02	00.01	22.45	20.55	19.02	16.16	14.39	14.08
27	09.15	07.32	05.51	04.59	03.16	02.30	03.54	05.34	07.07	07.39	09.22	10.17
	15.36	17.20	18.47	21.24	23.05	00.00	22.41	20.51	18.59	16.12	14.37	14.09
28	09.12	07.28	05.48	04.55	03.13	02.32	03.57	05.38	07.10	07.42	09.25	10.16
	15.39	17.23	18.50	21.27	23.09	23.59	22.38	20.48	18.55	16.09	14.34	14.11
29	09.09		06.44	04.52	03.10	02.34	04.00	05.41	07.13	07.45	09.28	10.16
	15.43		19.53	21.30	23.12	23.58	22.35	20.44	18.51	16.06	14.32	14.12
30	09.06		06.40	04.48	03.07	02.36	04.04	05.44	07.16	07.49	09.31	10.15
	15.46		19.56	21.34	23.15	23.56	22.31	20.41	18.48	16.02	14.29	14.14
31	09.03		06.37		03.04		04.07	05.47		07.52		10.14
	15.50		19.59		23.18		22.28	20.37		15.59		14.16
Potential sun hours	164	235	363	453	576	638	618	512	394	303	193	128
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)

SHADOW - Calendar, graphical

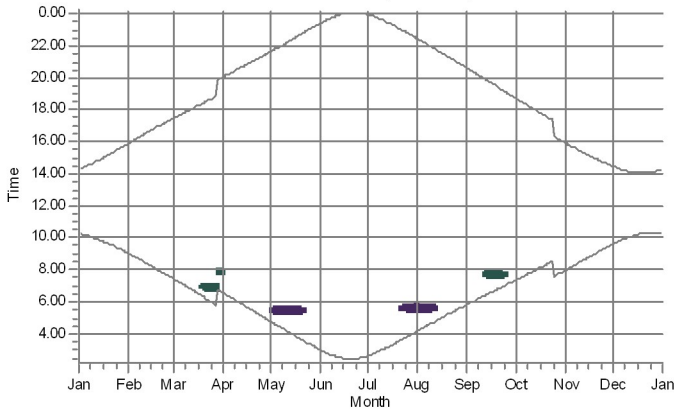
Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas



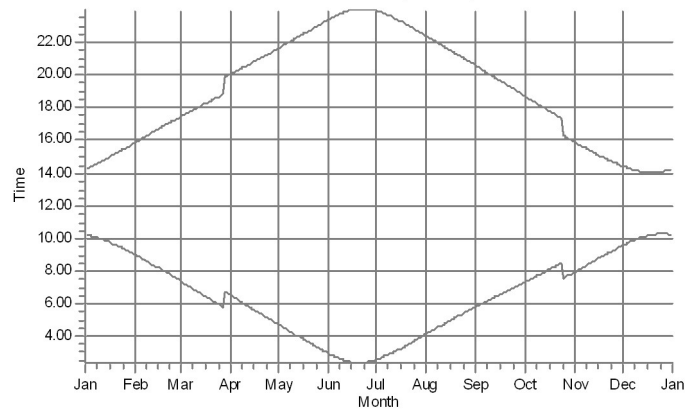
SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas

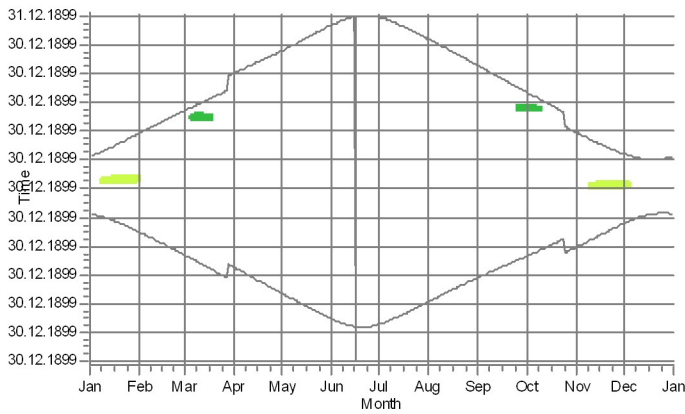
G: Asuinrakennus G (Heiniäho)



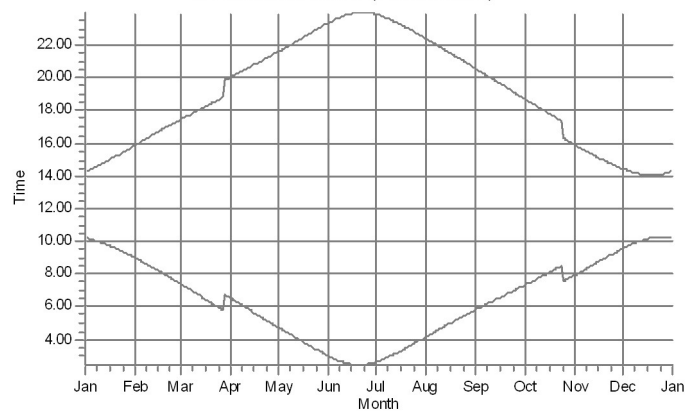
H: Asuinrakennus H (Mäkelä)



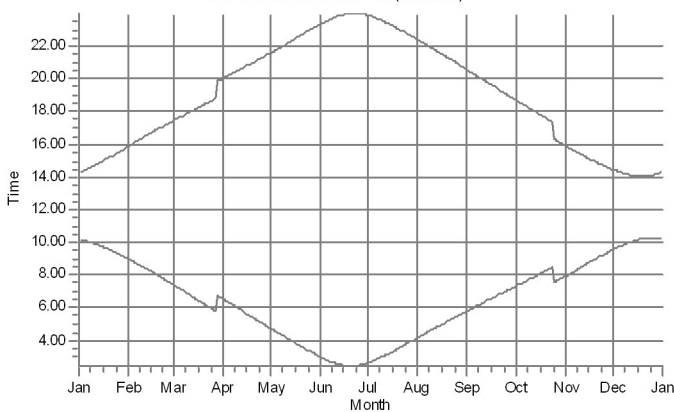
I: Lomarakennus I



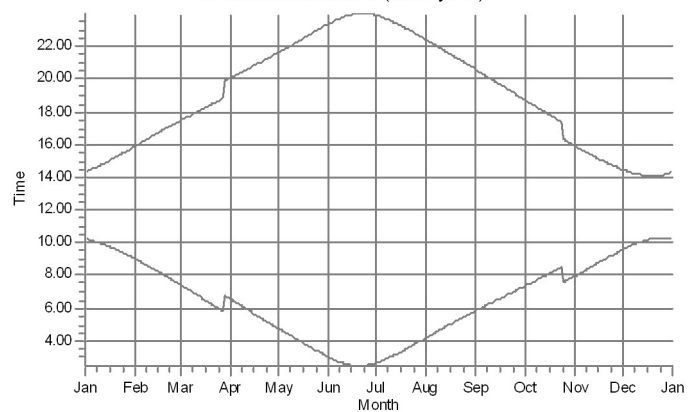
J: Lomarakennus J (Hautakaarto)



K: Asuinrakennus K (Takalo)



L: Lomarakennus L (Haukijärvi)



WTG:

T1: Generic 60200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (709)

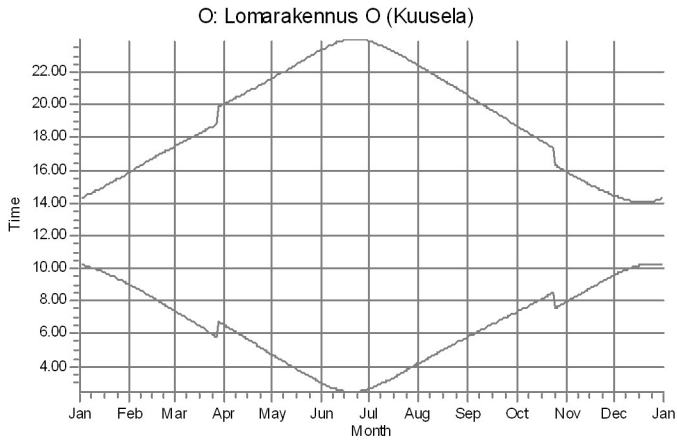
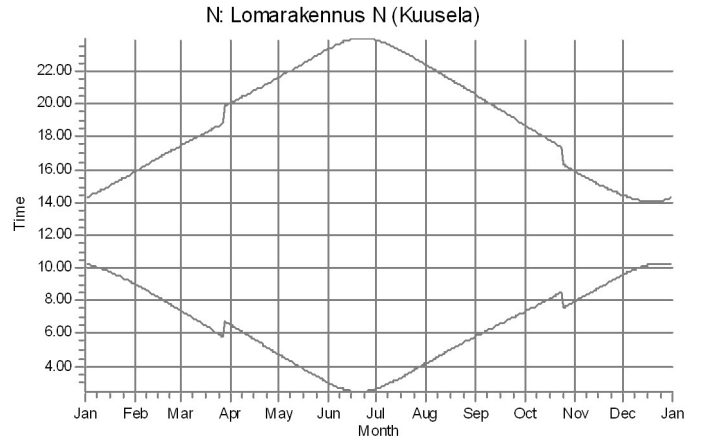
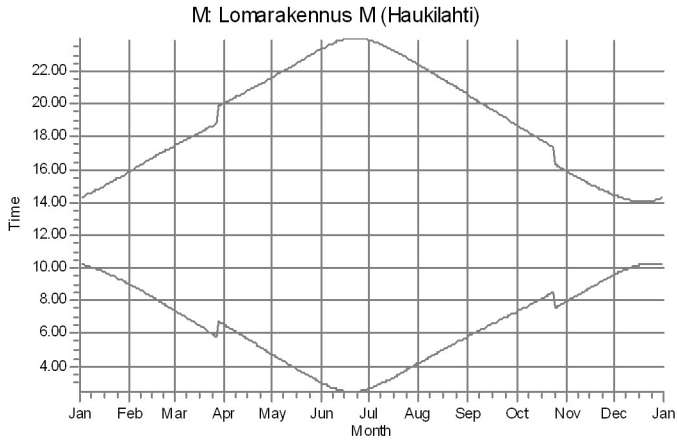
T2: Generic 60200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (706)

T3: Generic 60200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (710)

T7: Generic 60200 7200 200.0 IOR hub: 200.0 m (TOT: 300.0 m) (711)

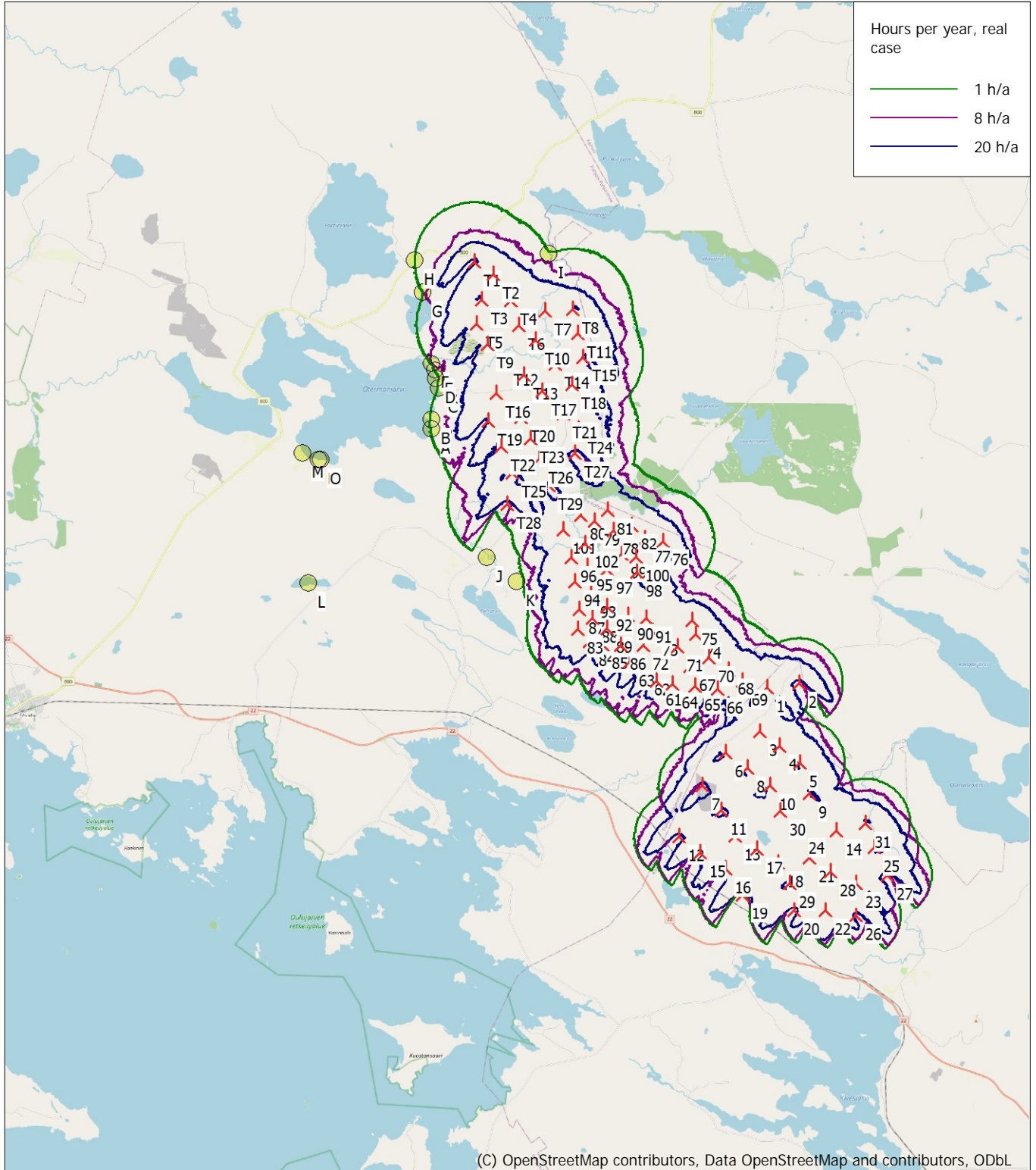
SHADOW - Calendar, graphical

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas



SHADOW - Map

Calculation: Haarasuonkangas_VE2_RD200x29xHH200_2023058 + Turkkiselkä + Takiangkangas



Map: EMD OpenStreetMap , Print scale 1:200 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 509 790 North: 7 163 490
New WTG Shadow receptor
Flicker map level: Height Contours: CONTOURLINE_Pyhäntä_Pilpankangas_0.wpo (2)
Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m