

Project:

# Flatnahagi Windfarm

EI19127PO  
P/F Magn

Licensed user:

## ENERCON GmbH Aurich

Dreerkamp 5  
DE-26605 Aurich  
04941/927-0  
Eric Merfels / Wind Farm Engineering  
Calculated:  
17.06.2019 09:26/3.2.744

## SHADOW - Main Result

**Calculation:** Total Shadow Flickering - C01a

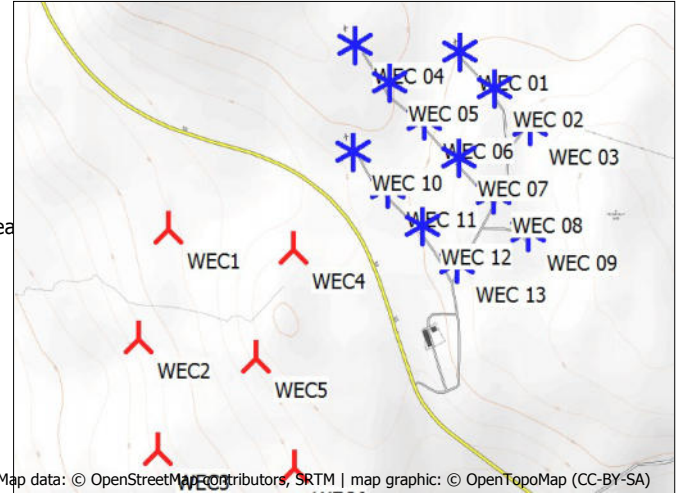
### Assumptions for shadow calculations

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

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\_Husahagi\_20km\_clear  
Obstacles not used in calculation  
Eye height for map: 1,5 m  
Grid resolution: 1,0 m

All coordinates are in  
UTM (north)-WGS84 Zone: 29



Map data: © OpenStreetMap contributors, SRTM | map graphic: © OpenTopoMap (CC-BY-SA)

Scale 1:20.000

▲ New WTG      \* Existing WTG

### WTGs

	Easting	Northing	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]										
WEC 01	613.524	6.879.103	315,8	450692	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 02	613.619	6.879.008	320,6	450691	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 03	613.715	6.878.912	335,1	450690	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 04	613.243	6.879.109	310,0	450689	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 05	613.338	6.879.013	310,0	450688	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 06	613.434	6.878.918	312,7	450687	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 07	613.529	6.878.822	318,5	450686	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 08	613.625	6.878.727	324,5	450685	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 09	613.720	6.878.631	330,0	450684	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 10	613.248	6.878.828	299,7	450683	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 11	613.344	6.878.732	306,7	450682	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 12	613.439	6.878.637	311,6	450681	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC 13	613.534	6.878.541	317,6	450680	Yes	ENERCON GmbH	E-44-900	900	44,0	45,0	984	34,0	
WEC1	612.764	6.878.603	267,5	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	
WEC2	612.695	6.878.309	258,0	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	
WEC3	612.755	6.878.015	250,0	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	
WEC4	613.099	6.878.562	285,2	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	
WEC5	613.007	6.878.269	293,1	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	
WEC6	613.119	6.877.982	285,5	ENERCON GmbH E-82...	Yes	ENERCON GmbH	E-82 E4-3.020	3.020	82,0	78,3	1.603	18,0	

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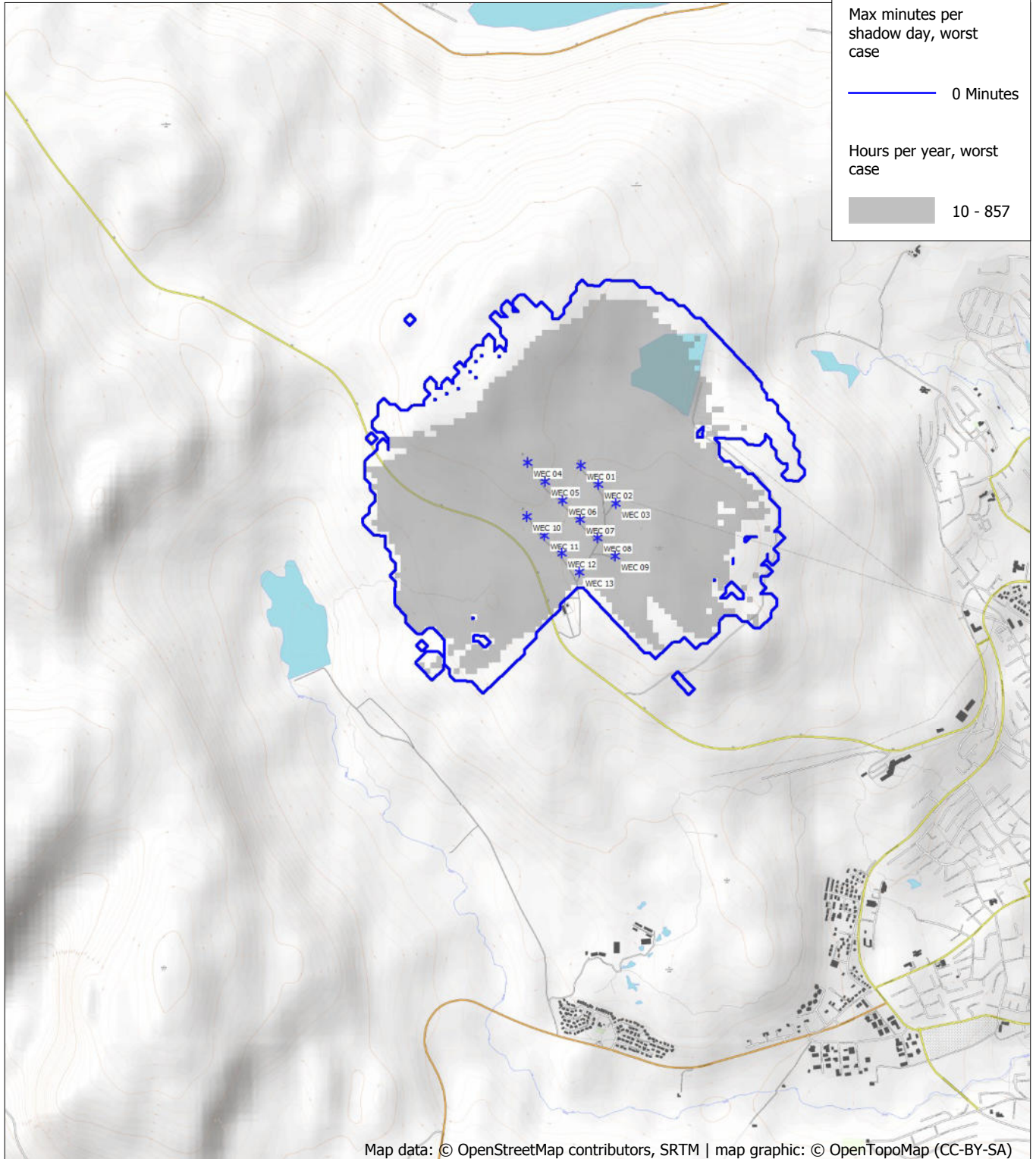
Eric Merfels / Wind Farm Engineering

Calculated:

16.04.2019 09:17/3.2.737

## SHADOW - Map

**Calculation:** Initial Shadow Flickering - C01a



0 500 1000 1500 2000 m

Map: TMS Map 001 , Print scale 1:30.000, Map center UTM (north)-WGS84 Zone: 29 East: 613.100 North: 6.878.400

\* Existing WTG

Flicker map level: Height Contours: CONTOURLINE\_Husahagi\_20km\_clean2.wpo (3)

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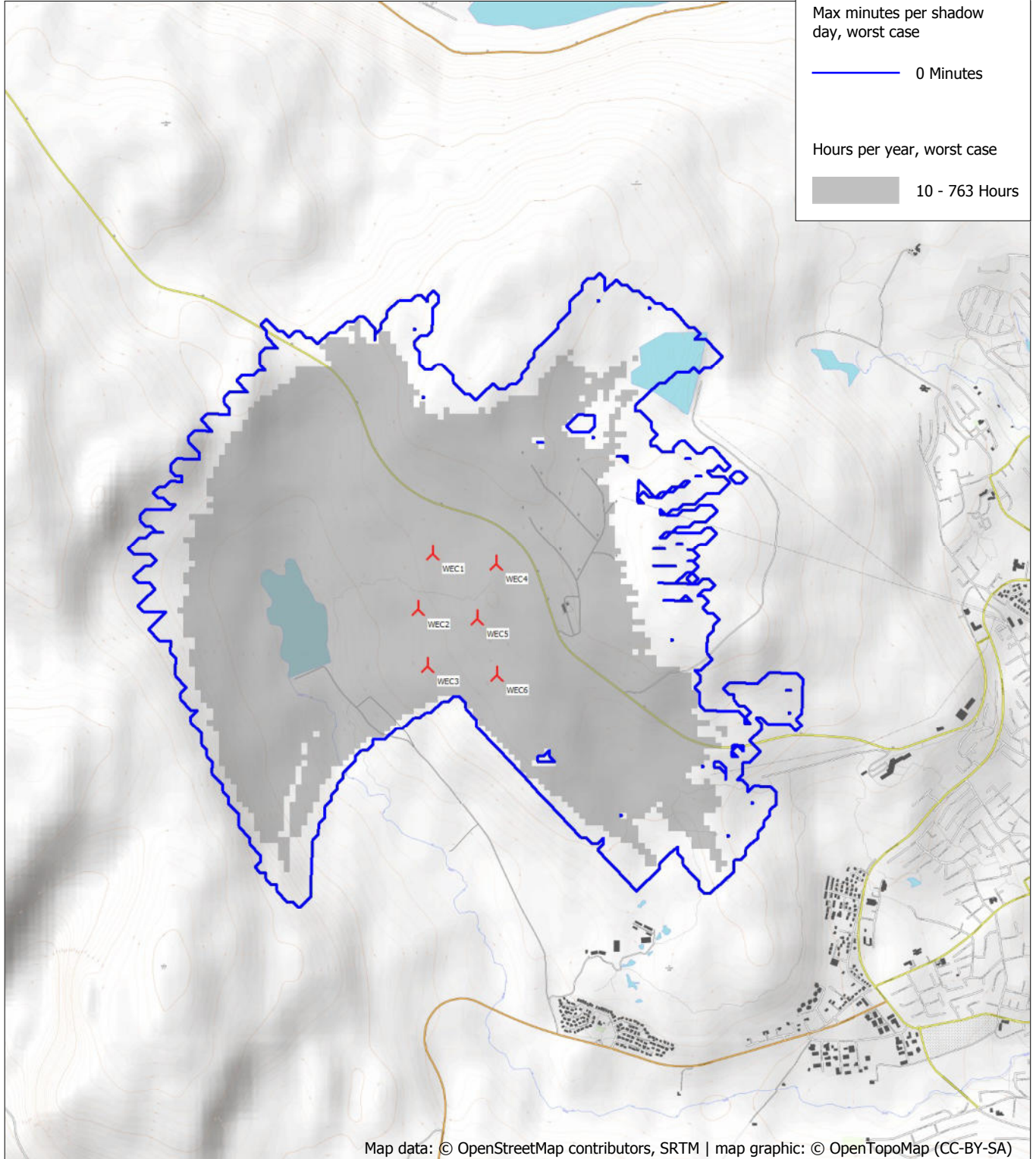
Eric Merfels / Wind Farm Engineering

Calculated:

16.04.2019 09:17/3.2.737

## SHADOW - Map

**Calculation:** Additional Shadow Flickering - C01a



Map data: © OpenStreetMap contributors, SRTM | map graphic: © OpenTopoMap (CC-BY-SA)

0 500 1000 1500 2000 m

Map: TMS Map 001 , Print scale 1:30.000, Map center UTM (north)-WGS84 Zone: 29 East: 613.100 North: 6.878.400

New WTG

Flicker map level: Height Contours: CONTOURLINE\_Husahagi\_20km\_clean2.wpo (3)

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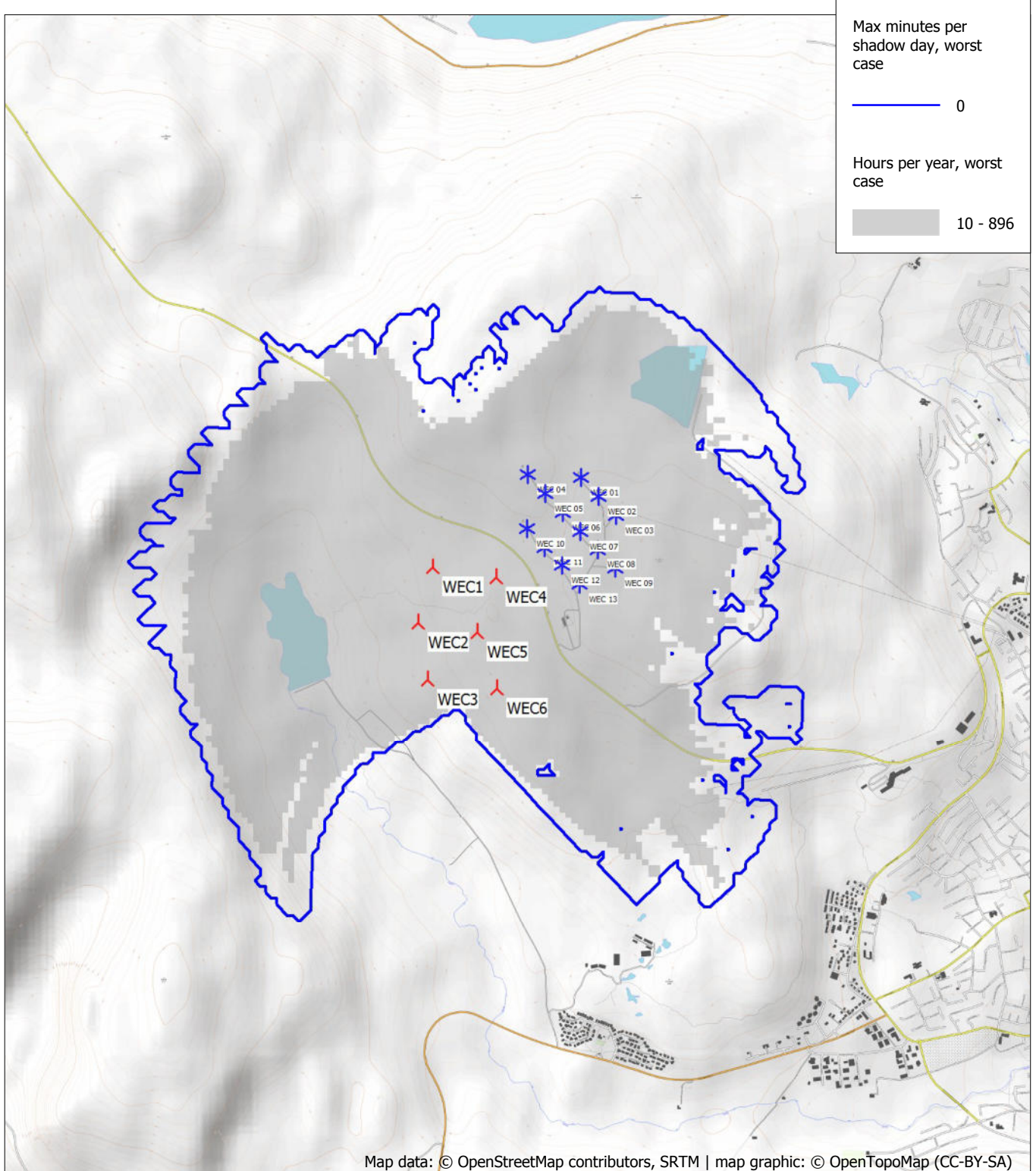
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## SHADOW - Map

Calculation: Total Shadow Flickering - C01a



Map data: © OpenStreetMap contributors, SRTM | map graphic: © OpenTopoMap (CC-BY-SA)

0 500 1000 1500 2000 m

Map: TMS Map 001 , Print scale 1:30.000, Map center UTM (north)-WGS84 Zone: 29 East: 613.100 North: 6.878.400

▲ New WTG

\* Existing WTG

Flicker map level: Height Contours: CONTOURLINE\_Husahagi\_20km\_clean2.wpo (3)