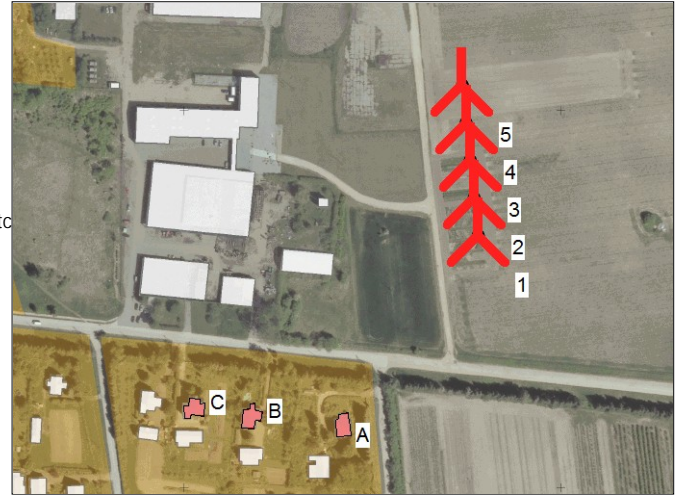


## **2 PRIEDAS**

### **Triukšmo vertinimo rezultatai**

## DECIBEL - Main Result

Noise calculation model:  
ISO 9613-2 General  
Wind speed:  
95% rated power else 10,0 m/s  
Ground attenuation:  
General, fixed, Ground factor: 0,5  
Meteorological coefficient, CO:  
0,0 dB  
Type of demand in calculation:  
2: WTG plus ambient noise is compared to ambient noise plus margin (FR etc)  
Noise values in calculation:  
All noise values are mean values (Lwa) (Normal)  
Pure tones:  
Pure and Impulse tone penalty are added to WTG source noise  
Height above ground level, when no value in NSA object:  
4,0 m Allow override of model height with height from NSA object  
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:  
0,0 dB(A)



Scale 1:5 000  
New WTG Noise sensitive area

### WTGs

| Y | X       | Z         | Row data/Description        | WTG type |           |                | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Noise data |           | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones |
|---|---------|-----------|-----------------------------|----------|-----------|----------------|-------------------|--------------------|----------------|------------|-----------|------------------|-----------------|------------|
|   |         |           |                             | Valid    | Manufact. | Type-generator |                   |                    |                | Creator    | Name      |                  |                 |            |
| 1 | 487 695 | 6 105 167 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 2 | 487 693 | 6 105 192 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 3 | 487 690 | 6 105 217 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 4 | 487 687 | 6 105 242 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 5 | 487 684 | 6 105 266 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |

h) Generic octave distribution used

### Calculation Results

#### Sound Level

| Noise sensitive area No. | Name                      | Y       | X         | Z   | Demands             |                       |                             | Sound Level          |                   |                      |                             | Demands fulfilled ? Noise |
|--------------------------|---------------------------|---------|-----------|-----|---------------------|-----------------------|-----------------------------|----------------------|-------------------|----------------------|-----------------------------|---------------------------|
|                          |                           |         |           |     | Imission height [m] | Ambient noise [dB(A)] | Additional exposure [dB(A)] | Ambient+WTGs [dB(A)] | From WTGs [dB(A)] | Ambient+WTGs [dB(A)] | Additional exposure [dB(A)] |                           |
| A                        | Noise sensitive area: (6) | 487 609 | 6 105 049 | 0,0 | 4,0                 | 55,0                  | 0,0                         | 65,0                 | 36,4              | 55,1                 | 0,1                         | Yes                       |
| B                        | Noise sensitive area: (7) | 487 547 | 6 105 056 | 0,0 | 4,0                 | 54,0                  | 0,0                         | 65,0                 | 34,8              | 54,1                 | 0,1                         | Yes                       |
| C                        | Noise sensitive area: (8) | 487 514 | 6 105 056 | 0,0 | 4,0                 | 54,0                  | 0,0                         | 65,0                 | 33,8              | 54,0                 | 0,0                         | Yes                       |

#### Distances (m)

| WTG | A   | B   | C   |
|-----|-----|-----|-----|
| 1   | 146 | 185 | 213 |
| 2   | 165 | 199 | 225 |
| 3   | 186 | 215 | 239 |
| 4   | 208 | 233 | 255 |
| 5   | 230 | 251 | 271 |

## DECIBEL - Detailed results

Noise calculation model: ISO 9613-2 General 10,0 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 Noise sensitive area: (6)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 146          | 147                | 31,34              | 85,0            | 0,00    | 54,33     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 165          | 166                | 30,20              | 85,0            | 0,00    | 55,39     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 186          | 187                | 29,10              | 85,0            | 0,00    | 56,41     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 208          | 208                | 28,06              | 85,0            | 0,00    | 57,38     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 230          | 230                | 27,12              | 85,0            | 0,00    | 58,25     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 36,41

- Data undefined due to calculation with octave data

#### Noise sensitive area: B Noise sensitive area: (7)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 185          | 186                | 29,14              | 85,0            | 0,00    | 56,38     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 199          | 200                | 28,47              | 85,0            | 0,00    | 57,00     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 215          | 216                | 27,74              | 85,0            | 0,00    | 57,67     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 233          | 233                | 26,99              | 85,0            | 0,00    | 58,36     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 251          | 252                | 26,27              | 85,0            | 0,00    | 59,02     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 34,83

- Data undefined due to calculation with octave data

#### Noise sensitive area: C Noise sensitive area: (8)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 213          | 214                | 27,83              | 85,0            | 0,00    | 57,59     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 225          | 225                | 27,33              | 85,0            | 0,00    | 58,05     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 239          | 239                | 26,76              | 85,0            | 0,00    | 58,57     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 255          | 255                | 26,15              | 85,0            | 0,00    | 59,13     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 271          | 272                | 25,55              | 85,0            | 0,00    | 59,68     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 33,79

- Data undefined due to calculation with octave data

## DECIBEL - Assumptions for noise calculation

Noise calculation model: ISO 9613-2 General 10,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

95% rated power else 10,0 m/s

Ground attenuation:

General, fixed, Ground factor: 0,5

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

2: WTG plus ambient noise is compared to ambient noise plus margin (FR etc.)

Noise values in calculation:

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

Pure tones:

Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m Allow override of model height with height from NSA object

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

0,0 dB(A)

Octave data required

Air absorption

| 63      | 125     | 250     | 500     | 1 000   | 2 000   | 4 000   | 8 000   |
|---------|---------|---------|---------|---------|---------|---------|---------|
| [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] |
| 0,1     | 0,4     | 1,0     | 1,9     | 3,7     | 9,7     | 32,8    | 117,0   |

WTG: Amperius VK 250 8 4.5 !O!

Noise: Noise (0)

Source Source/Date Creator Edited  
PRINCE 2017-09-26 USER 2017-09-28 13:41  
(MEMO)

| Status       | Wind speed<br>[m/s] | LwA,ref<br>[dB(A)] | Pure tones | Octave data  |             |             |             |              |              |              |              |      |
|--------------|---------------------|--------------------|------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|------|
|              |                     |                    |            | 63<br>[dB]   | 125<br>[dB] | 250<br>[dB] | 500<br>[dB] | 1000<br>[dB] | 2000<br>[dB] | 4000<br>[dB] | 8000<br>[dB] |      |
| From Windcat | 10,0                | 85,0               | No         | Generic data | 66,6        | 73,6        | 77,0        | 79,6         | 79,4         | 76,5         | 71,7         | 62,2 |

NSA: Noise sensitive area: (6)-A

Predefined calculation standard:

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

Ambient noise: 55,0 dB(A)

Margin or Allowed additional exposure: 0,0 dB(A)

Sound level always accepted: 65,0 dB(A)

No distance demand

NSA: Noise sensitive area: (7)-B

Predefined calculation standard:

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

Ambient noise: 54,0 dB(A)

Margin or Allowed additional exposure: 0,0 dB(A)

Sound level always accepted: 65,0 dB(A)

No distance demand

NSA: Noise sensitive area: (8)-C

Predefined calculation standard:

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

Ambient noise: 54,0 dB(A)

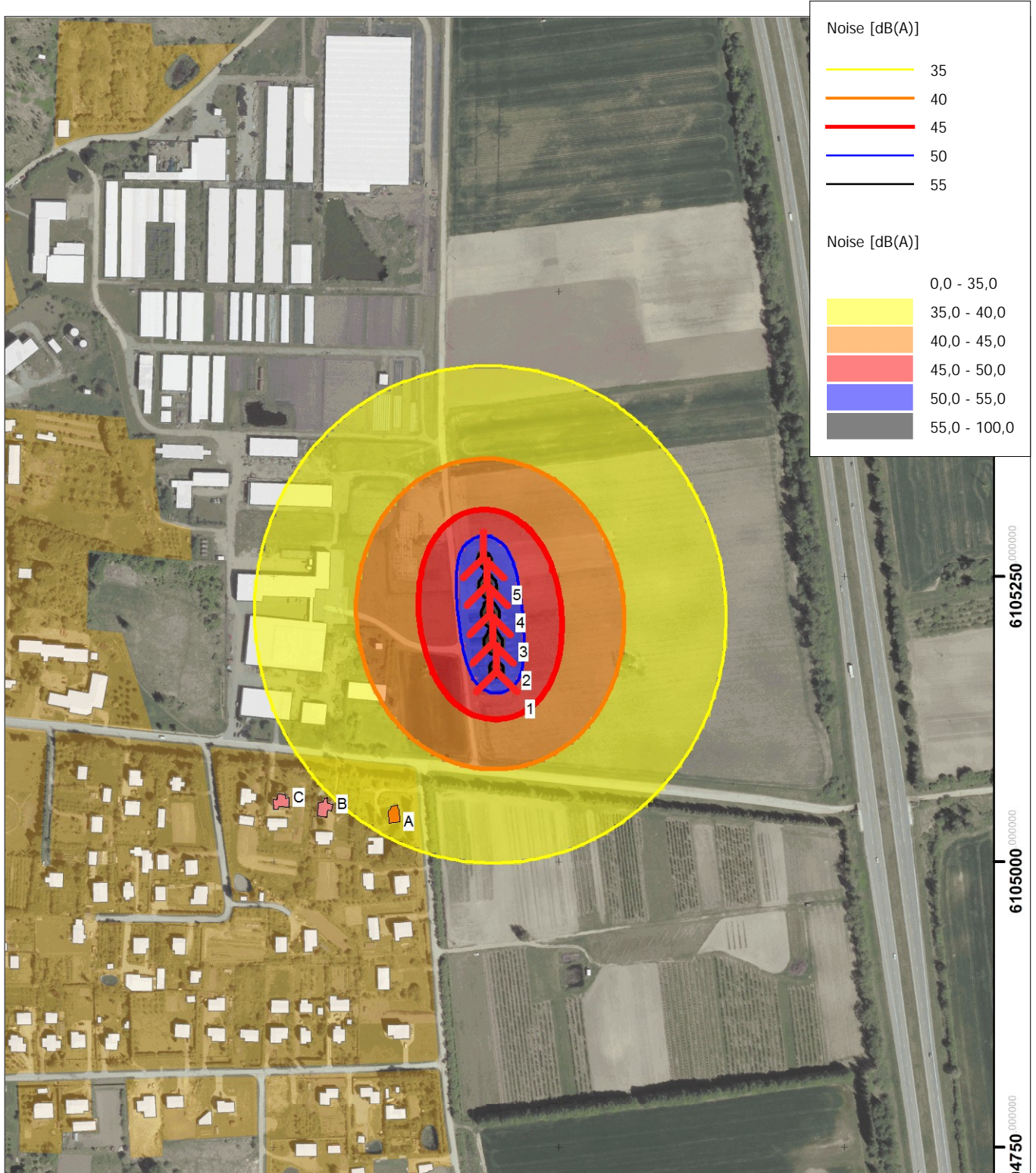
Margin or Allowed additional exposure: 0,0 dB(A)

Sound level always accepted: 65,0 dB(A)

No distance demand

### DECIBEL - Map 95% rated power else 10,0 m/s

Noise calculation model: ISO 9613-2 General 10,0 m/s



New WTG

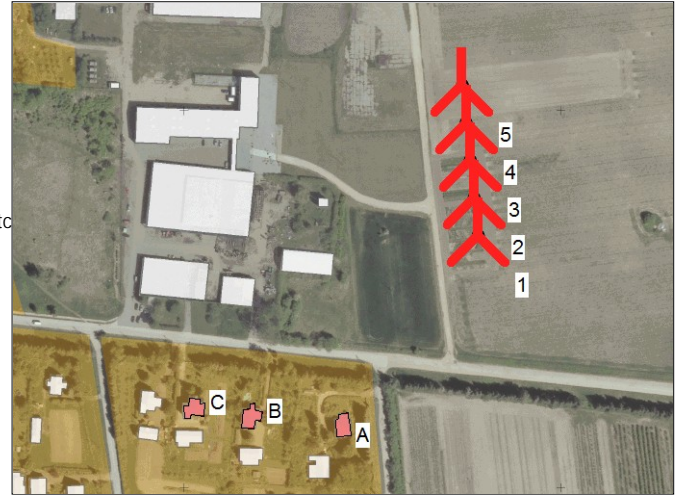
Noise sensitive area

Map: Babtai , Print scale 1:5 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 487 690 North: 6 105 217

Noise calculation model: ISO 9613-2 General. Wind speed: 95% rated power else 10,0 m/s  
Height above sea level: 4,0 m

## DECIBEL - Main Result

Noise calculation model:  
ISO 9613-2 General  
Wind speed:  
95% rated power else 10,0 m/s  
Ground attenuation:  
General, fixed, Ground factor: 0,5  
Meteorological coefficient, CO:  
0,0 dB  
Type of demand in calculation:  
2: WTG plus ambient noise is compared to ambient noise plus margin (FR etc)  
Noise values in calculation:  
All noise values are mean values (Lwa) (Normal)  
Pure tones:  
Pure and Impulse tone penalty are added to WTG source noise  
Height above ground level, when no value in NSA object:  
4,0 m Allow override of model height with height from NSA object  
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:  
0,0 dB(A)



Scale 1:5 000  
New WTG Noise sensitive area

### WTGs

| Y | X       | Z         | Row data/Description        | WTG type |           |                | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Noise data |           | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones |
|---|---------|-----------|-----------------------------|----------|-----------|----------------|-------------------|--------------------|----------------|------------|-----------|------------------|-----------------|------------|
|   |         |           |                             | Valid    | Manufact. | Type-generator |                   |                    |                | Creator    | Name      |                  |                 |            |
| 1 | 487 695 | 6 105 167 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 2 | 487 693 | 6 105 192 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 3 | 487 690 | 6 105 217 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 4 | 487 687 | 6 105 242 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |
| 5 | 487 684 | 6 105 266 | 0,0 Amperius VK 250 8 4.... | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | USER       | Noise (0) | 10,0             | 85,0            | No h       |

h) Generic octave distribution used

## Calculation Results

### Sound Level

| Noise sensitive area No. Name | Y       | X         | Z   | Demands             |                       |                             | Sound Level          |                   |                      |                             | Distance to noise demand [m] | Demands fulfilled ? Noise |
|-------------------------------|---------|-----------|-----|---------------------|-----------------------|-----------------------------|----------------------|-------------------|----------------------|-----------------------------|------------------------------|---------------------------|
|                               |         |           |     | Imission height [m] | Ambient noise [dB(A)] | Additional exposure [dB(A)] | Ambient+WTGs [dB(A)] | From WTGs [dB(A)] | Ambient+WTGs [dB(A)] | Additional exposure [dB(A)] |                              |                           |
| A Noise sensitive area: (6)   | 487 609 | 6 105 049 | 0,0 | 4,0                 | 49,0                  | 0,0                         | 55,0                 | 36,4              | 49,2                 | 0,2                         | 141                          | Yes                       |
| B Noise sensitive area: (7)   | 487 547 | 6 105 056 | 0,0 | 4,0                 | 49,0                  | 0,0                         | 55,0                 | 34,8              | 49,2                 | 0,2                         | 179                          | Yes                       |
| C Noise sensitive area: (8)   | 487 514 | 6 105 056 | 0,0 | 4,0                 | 49,0                  | 0,0                         | 55,0                 | 33,8              | 49,1                 | 0,1                         | 207                          | Yes                       |

### Distances (m)

| WTG | A   | B   | C   |
|-----|-----|-----|-----|
| 1   | 146 | 185 | 213 |
| 2   | 165 | 199 | 225 |
| 3   | 186 | 215 | 239 |
| 4   | 208 | 233 | 255 |
| 5   | 230 | 251 | 271 |

## DECIBEL - Detailed results

Noise calculation model: ISO 9613-2 General 10,0 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 Noise sensitive area: (6)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 146          | 147                | 31,34              | 85,0            | 0,00    | 54,33     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 165          | 166                | 30,20              | 85,0            | 0,00    | 55,39     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 186          | 187                | 29,10              | 85,0            | 0,00    | 56,41     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 208          | 208                | 28,06              | 85,0            | 0,00    | 57,38     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 230          | 230                | 27,12              | 85,0            | 0,00    | 58,25     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 36,41

- Data undefined due to calculation with octave data

Noise sensitive area: B Noise sensitive area: (7)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 185          | 186                | 29,14              | 85,0            | 0,00    | 56,38     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 199          | 200                | 28,47              | 85,0            | 0,00    | 57,00     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 215          | 216                | 27,74              | 85,0            | 0,00    | 57,67     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 233          | 233                | 26,99              | 85,0            | 0,00    | 58,36     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 251          | 252                | 26,27              | 85,0            | 0,00    | 59,02     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 34,83

- Data undefined due to calculation with octave data

Noise sensitive area: C Noise sensitive area: (8)

| WTG |              | 95% rated power    |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|--------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m] | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 213          | 214                | 27,83              | 85,0            | 0,00    | 57,59     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 225          | 225                | 27,33              | 85,0            | 0,00    | 58,05     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 3   | 239          | 239                | 26,76              | 85,0            | 0,00    | 58,57     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 4   | 255          | 255                | 26,15              | 85,0            | 0,00    | 59,13     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 5   | 271          | 272                | 25,55              | 85,0            | 0,00    | 59,68     | -         | -        | 0,00      | 0,00       | -      | 0,00      |

Sum 33,79

- Data undefined due to calculation with octave data

## DECIBEL - Assumptions for noise calculation

Noise calculation model: ISO 9613-2 General 10,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

95% rated power else 10,0 m/s

Ground attenuation:

General, fixed, Ground factor: 0,5

Meteorological coefficient, CO:

0,0 dB

Type of demand in calculation:

2: WTG plus ambient noise is compared to ambient noise plus margin (FR etc.)

Noise values in calculation:

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

Pure tones:

Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m Allow override of model height with height from NSA object

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

0,0 dB(A)

Octave data required

Air absorption

| 63      | 125     | 250     | 500     | 1 000   | 2 000   | 4 000   | 8 000   |
|---------|---------|---------|---------|---------|---------|---------|---------|
| [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] | [db/km] |
| 0,1     | 0,4     | 1,0     | 1,9     | 3,7     | 9,7     | 32,8    | 117,0   |

WTG: Amperius VK 250 8 4.5 !O!

Noise: Noise (0)

Source Source/Date Creator Edited  
PRINCE 2017-09-26 USER 2017-09-28 13:41  
(MEMO)

| Status       | Wind speed<br>[m/s] | LwA,ref<br>[dB(A)] | Pure tones | Octave data  |             |             |             |              |              |              |              |      |
|--------------|---------------------|--------------------|------------|--------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|------|
|              |                     |                    |            | 63<br>[dB]   | 125<br>[dB] | 250<br>[dB] | 500<br>[dB] | 1000<br>[dB] | 2000<br>[dB] | 4000<br>[dB] | 8000<br>[dB] |      |
| From Windcat | 10,0                | 85,0               | No         | Generic data | 66,6        | 73,6        | 77,0        | 79,6         | 79,4         | 76,5         | 71,7         | 62,2 |

NSA: Noise sensitive area: (6)-A

Predefined calculation standard:

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

Ambient noise: 49,0 dB(A)

Margin or Allowed additional exposure: 0,0 dB(A)

Sound level always accepted: 55,0 dB(A)

No distance demand

NSA: Noise sensitive area: (7)-B

Predefined calculation standard:

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

Ambient noise: 49,0 dB(A)

Margin or Allowed additional exposure: 0,0 dB(A)

Sound level always accepted: 55,0 dB(A)

No distance demand

NSA: Noise sensitive area: (8)-C

Predefined calculation standard:

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

Ambient noise: 49,0 dB(A)

Margin or Allowed additional exposure: 0,0 dB(A)

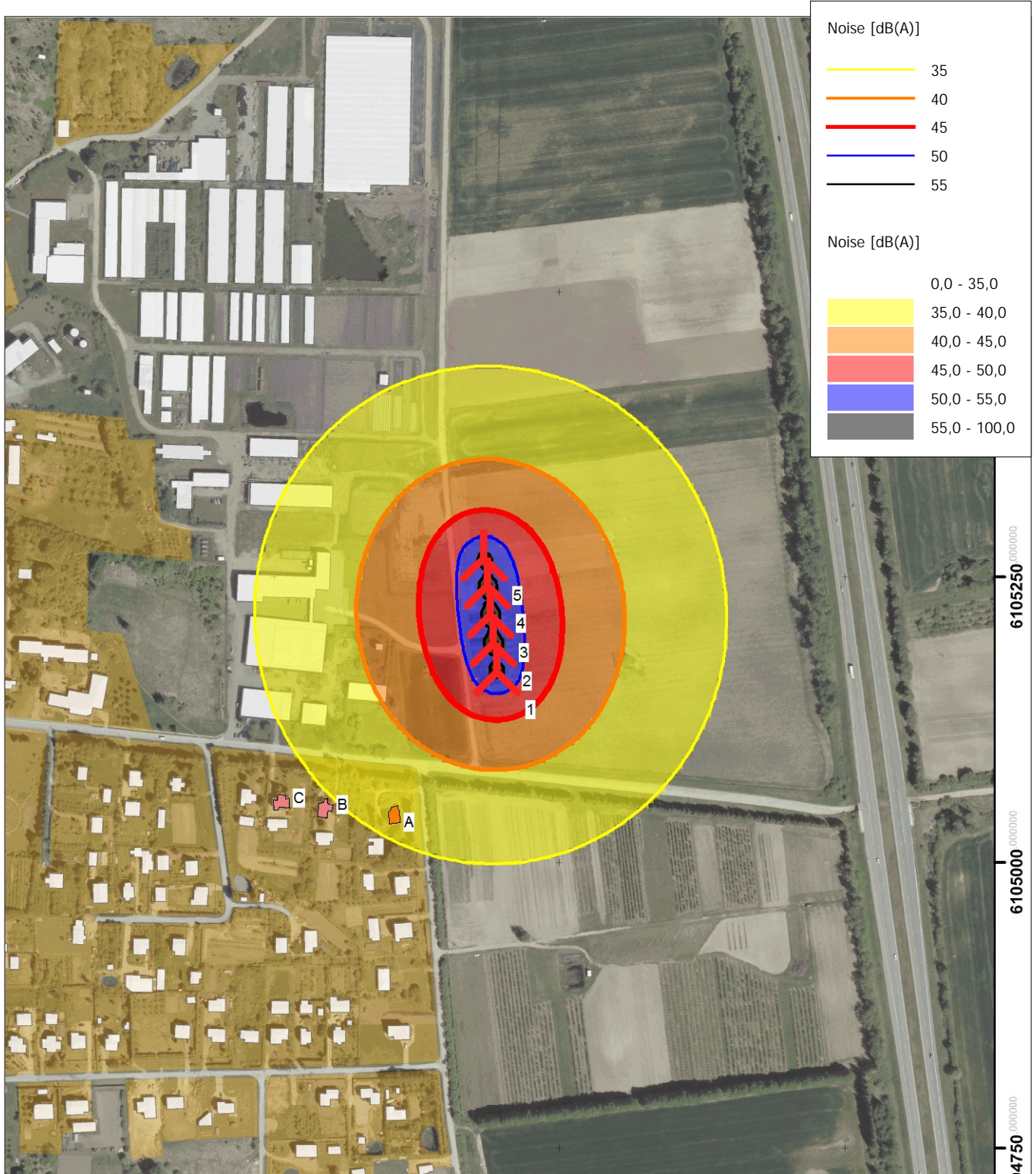
Sound level always accepted: 55,0 dB(A)

No distance demand



### DECIBEL - Map 95% rated power else 10,0 m/s

Noise calculation model: ISO 9613-2 General 10,0 m/s



New WTG

Noise sensitive area

Map: Babtai , Print scale 1:5 000, Map center Lithuanian TM LKS94-LKS94 (LT) East: 487 690 North: 6 105 217

Noise calculation model: ISO 9613-2 General. Wind speed: 95% rated power else 10,0 m/s  
Height above sea level: 4,0 m

### **3 PRIEDAS**

#### **Šešliavimo vertinimo rezultatai**

## SHADOW - Main Result

### 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) []  
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
1,41 2,36 4,03 5,55 8,35 8,36 8,16 7,72 5,06 3,23 1,33 0,98

Operational time  
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
261 393 465 559 645 475 572 869 1140 1059 606 326 7370  
Idle start wind speed: Cut in wind speed from power curve

All coordinates are in  
Lithuanian TM LKS94-LKS94 (LT)



Scale 1:6 000  
New WTG Shadow receptor

### WTGs

| Y | X       | 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] |
| 1 | 487 695 | 6 105 167 | 0,0 Amperius VK 250 8 4.5 !O! hub: 18,0 m...No | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | 2 500                    | 0,0       |
| 2 | 487 693 | 6 105 192 | 0,0 Amperius VK 250 8 4.5 !O! hub: 18,0 m...No | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | 2 500                    | 0,0       |
| 3 | 487 690 | 6 105 217 | 0,0 Amperius VK 250 8 4.5 !O! hub: 18,0 m...No | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | 2 500                    | 0,0       |
| 4 | 487 687 | 6 105 242 | 0,0 Amperius VK 250 8 4.5 !O! hub: 18,0 m...No | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | 2 500                    | 0,0       |
| 5 | 487 684 | 6 105 266 | 0,0 Amperius VK 250 8 4.5 !O! hub: 18,0 m...No | No       | Amperius  | VK 250-8       | 8                 | 4,5                | 18,0           | 2 500                    | 0,0       |

### Shadow receptor-Input

| No. | Y       | X         | Z   | Width [m] | Height [m] | Height a.g.l. [m] | Degrees from south cw [°] | Slope of window [°] | Direction mode     |
|-----|---------|-----------|-----|-----------|------------|-------------------|---------------------------|---------------------|--------------------|
| A   | 487 609 | 6 105 049 | 0,0 | 1,0       | 1,0        | 1,0               | 0,0                       | 90,0                | "Green house mode" |
| B   | 487 547 | 6 105 055 | 0,0 | 1,0       | 1,0        | 1,0               | 0,0                       | 90,0                | "Green house mode" |
| C   | 487 511 | 6 105 059 | 0,0 | 1,0       | 1,0        | 1,0               | 0,0                       | 90,0                | "Green house mode" |

### Calculation Results

| No. | Shadow, worst case             |                                  |                                  | Shadow, expected values        |  |
|-----|--------------------------------|----------------------------------|----------------------------------|--------------------------------|--|
|     | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] | Shadow hours per year [h/year] |  |
| A   | 0:00                           | 0                                | 0:00                             | 0:00                           |  |
| B   | 0:00                           | 0                                | 0:00                             | 0:00                           |  |
| C   | 3:57                           | 45                               | 0:07                             | 1:10                           |  |

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

| No. | Name  | Worst case [h/year] | Expected [h/year] |
|-----|---|---------------------|-------------------|
| 1   | Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (3) | 1:25                | 0:25              |
| 2   | Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (4) | 2:32                | 0:44              |
| 3   | Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (5) | 0:00                | 0:00              |
| 4   | Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (6) | 0:00                | 0:00              |
| 5   | Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (7) | 0:00                | 0:00              |

**SHADOW - Calendar**

Shadow receptor: A - Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
| 1,41 | 2,36 | 4,03 | 5,55 | 8,35 | 8,36 | 8,16 | 7,72 | 5,06 | 3,23 | 1,33 | 0,98 |

Operational time

|     |     |     |     |     |     |     |     |       |       |     |     |       |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N   | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 261 | 393 | 465 | 559 | 645 | 475 | 572 | 869 | 1 140 | 1 059 | 606 | 326 | 7 370 |

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

|                     | January | February | March | April | May   | June  | July  | August | September | October | November | December |
|---------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|
| 1                   | 08:51   | 08:18    | 07:18 | 06:59 | 05:47 | 04:54 | 04:49 | 05:32  | 06:30     | 07:26   | 07:27    | 08:25    |
|                     | 16:06   | 17:00    | 17:59 | 20:01 | 20:59 | 21:52 | 22:08 | 21:30  | 20:20     | 19:04   | 16:50    | 16:02    |
| 2                   | 08:51   | 08:16    | 07:15 | 06:57 | 05:45 | 04:53 | 04:50 | 05:34  | 06:31     | 07:28   | 07:29    | 08:27    |
|                     | 16:08   | 17:02    | 18:01 | 20:03 | 21:01 | 21:54 | 22:08 | 21:28  | 20:18     | 19:01   | 16:48    | 16:02    |
| 3                   | 08:51   | 08:15    | 07:13 | 06:54 | 05:43 | 04:52 | 04:51 | 05:35  | 06:33     | 07:30   | 07:31    | 08:28    |
|                     | 16:09   | 17:04    | 18:03 | 20:05 | 21:03 | 21:55 | 22:07 | 21:26  | 20:15     | 18:58   | 16:46    | 16:01    |
| 4                   | 08:50   | 08:13    | 07:10 | 06:52 | 05:41 | 04:51 | 04:52 | 05:37  | 06:35     | 07:32   | 07:33    | 08:30    |
|                     | 16:10   | 17:07    | 18:05 | 20:07 | 21:05 | 21:56 | 22:07 | 21:24  | 20:13     | 18:56   | 16:44    | 16:00    |
| 5                   | 08:50   | 08:11    | 07:08 | 06:49 | 05:38 | 04:51 | 04:53 | 05:39  | 06:37     | 07:34   | 07:36    | 08:32    |
|                     | 16:11   | 17:09    | 18:07 | 20:08 | 21:07 | 21:57 | 22:06 | 21:22  | 20:10     | 18:53   | 16:42    | 15:59    |
| 6                   | 08:49   | 08:09    | 07:05 | 06:47 | 05:36 | 04:50 | 04:54 | 05:41  | 06:39     | 07:35   | 07:38    | 08:33    |
|                     | 16:13   | 17:11    | 18:09 | 20:10 | 21:09 | 21:58 | 22:05 | 21:20  | 20:08     | 18:51   | 16:40    | 15:59    |
| 7                   | 08:49   | 08:07    | 07:03 | 06:44 | 05:34 | 04:49 | 04:55 | 05:43  | 06:41     | 07:37   | 07:40    | 08:34    |
|                     | 16:14   | 17:13    | 18:11 | 20:12 | 21:11 | 22:00 | 22:05 | 21:18  | 20:05     | 18:48   | 16:38    | 15:58    |
| 8                   | 08:48   | 08:05    | 07:01 | 06:42 | 05:32 | 04:48 | 04:56 | 05:45  | 06:43     | 07:39   | 07:42    | 08:36    |
|                     | 16:16   | 17:15    | 18:13 | 20:14 | 21:13 | 22:01 | 22:04 | 21:16  | 20:03     | 18:46   | 16:36    | 15:58    |
| 9                   | 08:48   | 08:03    | 06:58 | 06:39 | 05:30 | 04:48 | 04:57 | 05:46  | 06:44     | 07:41   | 07:44    | 08:37    |
|                     | 16:17   | 17:17    | 18:15 | 20:16 | 21:15 | 22:02 | 22:03 | 21:14  | 20:00     | 18:43   | 16:34    | 15:57    |
| 10                  | 08:47   | 08:01    | 06:56 | 06:37 | 05:28 | 04:47 | 04:58 | 05:48  | 06:46     | 07:43   | 07:46    | 08:38    |
|                     | 16:19   | 17:19    | 18:17 | 20:18 | 21:16 | 22:02 | 22:02 | 21:12  | 19:58     | 18:41   | 16:32    | 15:57    |
| 11                  | 08:46   | 07:59    | 06:53 | 06:34 | 05:26 | 04:47 | 04:59 | 05:50  | 06:48     | 07:45   | 07:48    | 08:40    |
|                     | 16:20   | 17:21    | 18:19 | 20:20 | 21:18 | 22:03 | 22:01 | 21:10  | 19:55     | 18:38   | 16:30    | 15:57    |
| 12                  | 08:45   | 07:57    | 06:50 | 06:32 | 05:24 | 04:46 | 05:01 | 05:52  | 06:50     | 07:47   | 07:50    | 08:41    |
|                     | 16:22   | 17:23    | 18:21 | 20:22 | 21:20 | 22:04 | 22:00 | 21:08  | 19:52     | 18:36   | 16:28    | 15:56    |
| 13                  | 08:44   | 07:54    | 06:48 | 06:29 | 05:23 | 04:46 | 05:02 | 05:54  | 06:52     | 07:49   | 07:52    | 08:42    |
|                     | 16:24   | 17:26    | 18:23 | 20:24 | 21:22 | 22:05 | 21:59 | 21:05  | 19:50     | 18:33   | 16:27    | 15:56    |
| 14                  | 08:44   | 07:52    | 06:45 | 06:27 | 05:21 | 04:46 | 05:03 | 05:56  | 06:54     | 07:51   | 07:54    | 08:43    |
|                     | 16:25   | 17:28    | 18:25 | 20:26 | 21:24 | 22:06 | 21:58 | 21:03  | 19:47     | 18:31   | 16:25    | 15:56    |
| 15                  | 08:43   | 07:50    | 06:43 | 06:24 | 05:19 | 04:45 | 05:05 | 05:58  | 06:56     | 07:53   | 07:56    | 08:44    |
|                     | 16:27   | 17:30    | 18:27 | 20:28 | 21:26 | 22:06 | 21:57 | 21:01  | 19:45     | 18:29   | 16:23    | 15:56    |
| 16                  | 08:41   | 07:48    | 06:40 | 06:22 | 05:17 | 04:45 | 05:06 | 05:59  | 06:58     | 07:55   | 07:58    | 08:45    |
|                     | 16:29   | 17:32    | 18:29 | 20:30 | 21:27 | 22:07 | 21:56 | 20:59  | 19:42     | 18:26   | 16:21    | 15:56    |
| 17                  | 08:40   | 07:46    | 06:38 | 06:20 | 05:15 | 04:45 | 05:07 | 06:01  | 06:59     | 07:57   | 08:00    | 08:46    |
|                     | 16:31   | 17:34    | 18:31 | 20:32 | 21:29 | 22:07 | 21:54 | 20:56  | 19:40     | 18:24   | 16:20    | 15:56    |
| 18                  | 08:39   | 07:43    | 06:35 | 06:17 | 05:14 | 04:45 | 05:09 | 06:03  | 07:01     | 07:59   | 08:02    | 08:46    |
|                     | 16:32   | 17:36    | 18:33 | 20:34 | 21:31 | 22:08 | 21:53 | 20:54  | 19:37     | 18:21   | 16:18    | 15:57    |
| 19                  | 08:38   | 07:41    | 06:33 | 06:15 | 05:12 | 04:45 | 05:10 | 06:05  | 07:03     | 08:01   | 08:04    | 08:47    |
|                     | 16:34   | 17:38    | 18:35 | 20:36 | 21:33 | 22:08 | 21:52 | 20:52  | 19:34     | 18:19   | 16:17    | 15:57    |
| 20                  | 08:37   | 07:39    | 06:30 | 06:12 | 05:10 | 04:45 | 05:12 | 06:07  | 07:05     | 08:03   | 08:06    | 08:48    |
|                     | 16:36   | 17:40    | 18:37 | 20:38 | 21:34 | 22:08 | 21:50 | 20:49  | 19:32     | 18:17   | 16:15    | 15:57    |
| 21                  | 08:35   | 07:37    | 06:28 | 06:10 | 05:09 | 04:45 | 05:13 | 06:09  | 07:07     | 08:05   | 08:08    | 08:48    |
|                     | 16:38   | 17:42    | 18:39 | 20:40 | 21:36 | 22:09 | 21:49 | 20:47  | 19:29     | 18:14   | 16:14    | 15:58    |
| 22                  | 08:34   | 07:34    | 06:25 | 06:08 | 05:07 | 04:45 | 05:15 | 06:11  | 07:09     | 08:07   | 08:09    | 08:49    |
|                     | 16:40   | 17:45    | 18:41 | 20:42 | 21:38 | 22:09 | 21:47 | 20:45  | 19:27     | 18:12   | 16:13    | 15:58    |
| 23                  | 08:33   | 07:32    | 06:22 | 06:05 | 05:06 | 04:45 | 05:17 | 06:13  | 07:11     | 08:09   | 08:11    | 08:49    |
|                     | 16:42   | 17:47    | 18:43 | 20:44 | 21:39 | 22:09 | 21:46 | 20:42  | 19:24     | 18:10   | 16:11    | 15:58    |
| 24                  | 08:31   | 07:30    | 06:20 | 06:03 | 05:04 | 04:46 | 05:18 | 06:14  | 07:13     | 08:11   | 08:13    | 08:50    |
|                     | 16:44   | 17:49    | 18:45 | 20:46 | 21:41 | 22:09 | 21:44 | 20:40  | 19:22     | 18:07   | 16:10    | 15:59    |
| 25                  | 08:30   | 07:27    | 06:17 | 06:01 | 05:03 | 04:46 | 05:20 | 06:16  | 07:14     | 08:13   | 08:15    | 08:50    |
|                     | 16:46   | 17:51    | 18:47 | 20:48 | 21:42 | 22:09 | 21:43 | 20:38  | 19:19     | 17:05   | 16:09    | 16:00    |
| 26                  | 08:28   | 07:25    | 06:15 | 05:58 | 05:02 | 04:47 | 05:22 | 06:18  | 07:16     | 08:15   | 08:17    | 08:51    |
|                     | 16:48   | 17:53    | 18:49 | 20:50 | 21:44 | 22:09 | 21:41 | 20:35  | 19:16     | 17:03   | 16:07    | 16:00    |
| 27                  | 08:27   | 07:23    | 06:12 | 05:56 | 05:00 | 04:47 | 05:23 | 06:20  | 07:18     | 08:17   | 08:19    | 08:51    |
|                     | 16:50   | 17:55    | 18:51 | 20:51 | 21:45 | 22:09 | 21:39 | 20:33  | 19:14     | 17:01   | 16:06    | 16:01    |
| 28                  | 08:25   | 07:20    | 06:10 | 05:54 | 04:59 | 04:48 | 05:25 | 06:22  | 07:20     | 08:19   | 08:20    | 08:51    |
|                     | 16:52   | 17:57    | 18:53 | 20:53 | 21:47 | 22:09 | 21:37 | 20:30  | 19:11     | 16:58   | 16:05    | 16:02    |
| 29                  | 08:23   |          | 07:07 | 05:51 | 04:58 | 04:48 | 05:27 | 06:24  | 07:22     | 08:21   | 08:22    | 08:51    |
|                     | 16:54   |          | 19:55 | 20:55 | 21:48 | 22:09 | 21:36 | 20:28  | 19:09     | 16:56   | 16:04    | 16:03    |
| 30                  | 08:22   |          | 07:05 | 05:49 | 04:57 | 04:49 | 05:28 | 06:26  | 07:24     | 08:23   | 08:24    | 08:51    |
|                     | 16:56   |          | 19:57 | 20:57 | 21:50 | 22:08 | 21:34 | 20:25  | 19:06     | 16:54   | 16:03    | 16:04    |
| 31                  | 08:20   |          | 07:02 |       | 04:55 |       | 05:30 | 06:28  |           | 07:25   |          | 08:51    |
|                     | 16:58   |          | 19:59 |       | 21:51 |       | 21:32 | 20:23  |           | 16:52   |          | 16:05    |
| Potential sun hours | 243     | 270      | 366   | 423   | 500   | 518   | 520   | 464    | 383       | 326     | 254      | 226      |
| 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

Shadow receptor: B - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (7)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Table with 12 columns (Jan-Dec) and 1 row of data: 1,41 2,36 4,03 5,55 8,35 8,36 8,16 7,72 5,06 3,23 1,33 0,98

Operational time

Table with 12 columns (N-Sum) and 1 row of data: 261 393 465 559 645 475 572 869 1 140 1 059 606 326 7 370

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

Main data table with 12 columns (January-December) and 34 rows of data. Includes sunrise/sunset times, potential sun hours, and various reduction metrics.

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

Matrix layout table with 4 columns: Day in month, Sun rise/set, Minutes with flicker, and WTG causing flicker times.

SHADOW - Calendar

Shadow receptor: C - Shadow Receptor: 1,0 x 1,0 Azimuth: 0,0° Slope: 90,0° (8)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Table with 12 columns (Jan-Dec) and 1 row of values: 1,41 2,36 4,03 5,55 8,35 8,36 8,16 7,72 5,06 3,23 1,33 0,98

Operational time

Table with 13 columns (N, NNE, ENE, E, ESE, SSE, S, SSW, WSW, W, WNW, NNW, Sum) and 1 row of values: 261 393 465 559 645 475 572 869 1 140 1 059 606 326 7 370

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

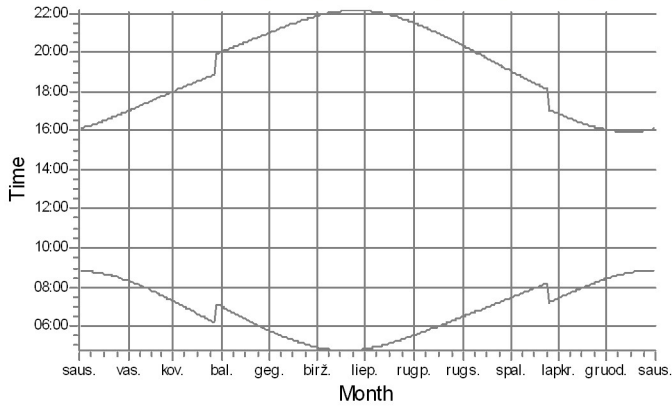
Main data table with columns for months (January-December) and rows for each day (1-31) showing sunrise, sunset, and shadow times. Includes summary rows at the bottom for sun hours and reductions.

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

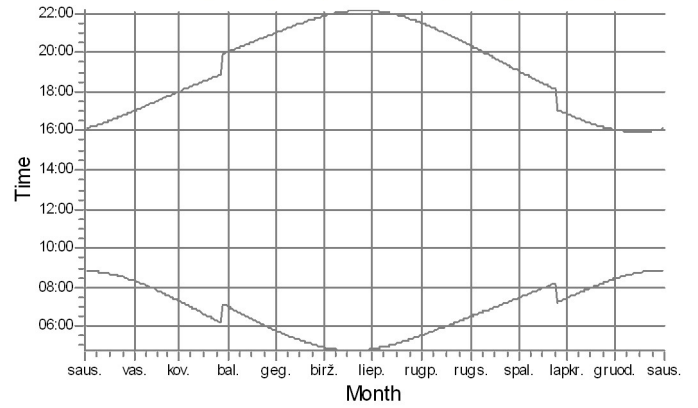
Matrix with 4 columns: Day in month, Sun rise/set, Minutes with flicker, First/Last time with flicker (WTG causing flicker).

## SHADOW - Calendar, graphical

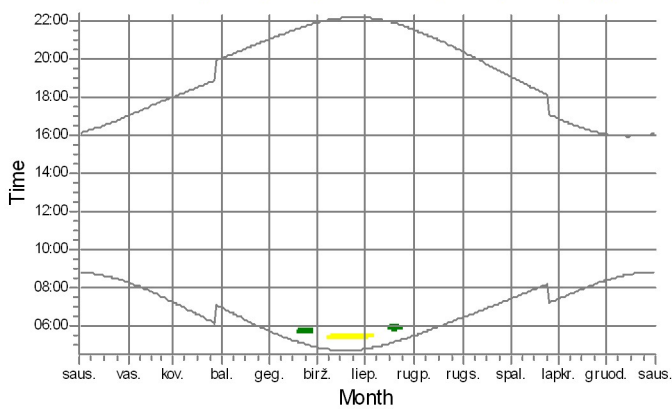
A: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (6)



B: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (7)



C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)



### WTGs

- 1: Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (3)
- 2: Amperius VK 250 8 4.5 !O! hub: 18,0 m (TOT: 20,3 m) (4)

## SHADOW - Calendar per WTG

WTG: 1 - Amperius VK 250 8 4.5 IO! hub: 18,0 m (TOT: 20,3 m) (3)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
1,41 2,36 4,03 5,55 8,35 8,36 8,16 7,72 5,06 3,23 1,33 0,98

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
261 393 465 559 645 475 572 869 1 140 1 059 606 326 7 370

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

|                             | January        | February       | March          | April          | May            | June           | July           | August                 | September      | October        | November       | December       |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------|----------------|----------------|----------------|----------------|
| 1                           | 08:51<br>16:06 | 08:18<br>17:00 | 07:18<br>17:59 | 06:59<br>20:01 | 05:47<br>20:59 | 04:54<br>21:52 | 04:49<br>22:08 | 05:32<br>21:30         | 06:30<br>20:20 | 07:26<br>19:04 | 07:27<br>16:50 | 08:25<br>16:02 |
| 2                           | 08:51<br>16:08 | 08:16<br>17:02 | 07:15<br>18:01 | 06:57<br>20:03 | 05:45<br>21:01 | 04:53<br>21:54 | 04:50<br>22:08 | 05:34<br>21:28         | 06:31<br>20:18 | 07:28<br>19:01 | 07:29<br>16:48 | 08:27<br>16:02 |
| 3                           | 08:51<br>16:09 | 08:15<br>17:04 | 07:13<br>18:03 | 06:54<br>20:05 | 05:43<br>21:03 | 04:52<br>21:55 | 04:51<br>22:07 | 05:35<br>21:26         | 06:33<br>20:15 | 07:30<br>18:58 | 07:31<br>16:46 | 08:28<br>16:01 |
| 4                           | 08:50<br>16:10 | 08:13<br>17:07 | 07:10<br>18:05 | 06:52<br>20:07 | 05:41<br>21:05 | 04:51<br>21:56 | 04:52<br>22:07 | 05:37<br>21:24         | 06:35<br>20:13 | 07:32<br>18:56 | 07:33<br>16:44 | 08:30<br>16:00 |
| 5                           | 08:50<br>16:11 | 08:11<br>17:09 | 07:08<br>18:07 | 06:49<br>20:08 | 05:38<br>21:07 | 04:51<br>21:57 | 04:53<br>22:06 | 05:39<br>21:22         | 06:37<br>20:10 | 07:34<br>18:53 | 07:36<br>16:41 | 08:32<br>15:59 |
| 6                           | 08:49<br>16:13 | 08:09<br>17:11 | 07:05<br>18:09 | 06:47<br>20:10 | 05:36<br>21:09 | 04:50<br>21:58 | 04:54<br>22:05 | 05:41<br>21:20         | 06:39<br>20:08 | 07:35<br>18:51 | 07:38<br>16:40 | 08:33<br>15:59 |
| 7                           | 08:49<br>16:14 | 08:07<br>17:13 | 07:03<br>18:11 | 06:44<br>20:12 | 05:34<br>21:11 | 04:49<br>22:00 | 04:55<br>22:05 | 05:43<br>21:18         | 06:41<br>20:05 | 07:37<br>18:48 | 07:40<br>16:38 | 08:34<br>15:58 |
| 8                           | 08:48<br>16:16 | 08:05<br>17:15 | 07:01<br>18:13 | 06:42<br>20:14 | 05:32<br>21:13 | 04:48<br>22:01 | 04:56<br>22:04 | 05:45<br>21:16         | 06:43<br>20:03 | 07:39<br>18:46 | 07:42<br>16:36 | 08:36<br>15:58 |
| 9                           | 08:48<br>16:17 | 08:03<br>17:17 | 06:58<br>18:15 | 06:39<br>20:16 | 05:30<br>21:15 | 04:48<br>22:02 | 04:57<br>22:03 | 05:46<br>21:14         | 06:44<br>20:00 | 07:41<br>18:43 | 07:44<br>16:34 | 08:37<br>15:57 |
| 10                          | 08:47<br>16:19 | 08:01<br>17:19 | 06:56<br>18:17 | 06:37<br>20:18 | 05:28<br>21:16 | 04:47<br>22:02 | 04:58<br>22:02 | 05:48<br>21:12         | 06:46<br>19:58 | 07:43<br>18:41 | 07:46<br>16:32 | 08:38<br>15:57 |
| 11                          | 08:46<br>16:20 | 07:59<br>17:21 | 06:53<br>18:19 | 06:34<br>20:20 | 05:26<br>21:18 | 04:47<br>22:03 | 04:59<br>22:01 | 05:50<br>21:10         | 06:48<br>19:55 | 07:45<br>18:38 | 07:48<br>16:30 | 08:40<br>15:57 |
| 12                          | 08:45<br>16:22 | 07:57<br>17:23 | 06:50<br>18:21 | 06:32<br>20:22 | 05:24<br>21:20 | 04:46<br>22:04 | 05:01<br>22:00 | 05:52<br>21:08         | 06:50<br>19:52 | 07:47<br>18:36 | 07:50<br>16:28 | 08:41<br>15:56 |
| 13                          | 08:44<br>16:24 | 07:54<br>17:26 | 06:48<br>18:23 | 06:29<br>20:24 | 05:23<br>21:22 | 04:46<br>22:05 | 05:02<br>21:59 | 05:54<br>21:05         | 06:52<br>19:50 | 07:49<br>18:33 | 07:52<br>16:26 | 08:42<br>15:56 |
| 14                          | 08:44<br>16:25 | 07:52<br>17:28 | 06:45<br>18:25 | 06:27<br>20:26 | 05:21<br>21:24 | 04:46<br>22:06 | 05:03<br>21:58 | 05:56<br>21:03         | 06:54<br>19:47 | 07:51<br>18:31 | 07:54<br>16:25 | 08:43<br>15:56 |
| 15                          | 08:43<br>16:27 | 07:50<br>17:30 | 06:43<br>18:27 | 06:24<br>20:28 | 05:19<br>21:26 | 04:45<br>22:06 | 05:05<br>21:57 | 05:58<br>21:01         | 06:56<br>19:45 | 07:53<br>18:29 | 07:56<br>16:23 | 08:44<br>15:56 |
| 16                          | 08:41<br>16:29 | 07:48<br>17:32 | 06:40<br>18:29 | 06:22<br>20:30 | 05:17<br>21:27 | 04:45<br>22:07 | 05:06<br>21:56 | 05:59<br>20:59         | 06:58<br>19:42 | 07:55<br>18:26 | 07:58<br>16:21 | 08:45<br>15:56 |
| 17                          | 08:40<br>16:31 | 07:46<br>17:34 | 06:38<br>18:31 | 06:20<br>20:32 | 05:15<br>21:29 | 04:45<br>22:07 | 05:07<br>21:54 | 05:54-05:59/5<br>06:01 | 06:59<br>19:40 | 07:57<br>18:24 | 08:00<br>16:20 | 08:46<br>15:56 |
| 18                          | 08:39<br>16:32 | 07:43<br>17:36 | 06:35<br>18:33 | 06:17<br>20:34 | 05:14<br>21:31 | 04:45<br>22:08 | 05:09<br>21:53 | 05:54-06:00/6<br>06:03 | 07:01<br>19:37 | 07:59<br>18:21 | 08:02<br>16:18 | 08:46<br>15:57 |
| 19                          | 08:38<br>16:34 | 07:41<br>17:38 | 06:33<br>18:35 | 06:15<br>20:36 | 05:12<br>21:33 | 04:45<br>22:08 | 05:10<br>21:52 | 05:53-06:00/7<br>06:05 | 07:03<br>19:34 | 08:01<br>18:19 | 08:04<br>16:17 | 08:47<br>15:57 |
| 20                          | 08:37<br>16:36 | 07:39<br>17:40 | 06:30<br>18:37 | 06:12<br>20:38 | 05:10<br>21:34 | 04:45<br>22:08 | 05:12<br>21:50 | 05:53-05:59/6<br>06:07 | 07:05<br>19:32 | 08:03<br>18:17 | 08:06<br>16:15 | 08:48<br>15:57 |
| 21                          | 08:35<br>16:38 | 07:37<br>17:42 | 06:28<br>18:39 | 06:10<br>20:40 | 05:09<br>21:36 | 04:45<br>22:09 | 05:13<br>21:49 | 05:54-06:00/6<br>06:09 | 07:07<br>19:29 | 08:05<br>18:14 | 08:08<br>16:14 | 08:48<br>15:57 |
| 22                          | 08:34<br>16:40 | 07:34<br>17:44 | 06:25<br>18:41 | 06:08<br>20:42 | 05:07<br>21:38 | 04:45<br>22:09 | 05:15<br>21:47 | 05:54-05:59/5<br>06:11 | 07:09<br>19:27 | 08:07<br>18:12 | 08:09<br>16:13 | 08:49<br>15:58 |
| 23                          | 08:33<br>16:42 | 07:32<br>17:47 | 06:22<br>18:43 | 06:05<br>20:44 | 05:06<br>21:39 | 04:45<br>22:09 | 05:17<br>21:46 | 05:56-05:59/3<br>06:13 | 07:11<br>19:24 | 08:09<br>18:10 | 08:11<br>16:11 | 08:50<br>15:58 |
| 24                          | 08:31<br>16:44 | 07:30<br>17:49 | 06:20<br>18:45 | 06:03<br>20:46 | 05:04<br>21:41 | 04:46<br>22:09 | 05:18<br>21:44 | 06:14<br>20:40         | 07:13<br>19:21 | 08:11<br>18:07 | 08:13<br>16:10 | 08:50<br>15:59 |
| 25                          | 08:30<br>16:46 | 07:27<br>17:51 | 06:17<br>18:47 | 06:01<br>20:48 | 05:03<br>21:42 | 04:46<br>22:09 | 05:20<br>21:43 | 06:16<br>20:38         | 07:14<br>19:19 | 07:13<br>17:05 | 08:15<br>16:09 | 08:50<br>16:00 |
| 26                          | 08:28<br>16:48 | 07:25<br>17:53 | 06:15<br>18:49 | 05:58<br>20:50 | 05:02<br>21:44 | 04:47<br>22:09 | 05:22<br>21:41 | 06:18<br>20:35         | 07:16<br>19:16 | 07:15<br>17:03 | 08:17<br>16:07 | 08:51<br>16:00 |
| 27                          | 08:27<br>16:50 | 07:23<br>17:55 | 06:12<br>18:51 | 05:56<br>20:51 | 05:00<br>21:45 | 04:47<br>22:09 | 05:23<br>21:39 | 06:20<br>20:33         | 07:18<br>19:14 | 07:17<br>17:01 | 08:19<br>16:06 | 08:51<br>16:01 |
| 28                          | 08:25<br>16:52 | 07:20<br>17:57 | 06:10<br>18:53 | 05:54<br>20:53 | 04:59<br>21:47 | 04:48<br>22:09 | 05:25<br>21:37 | 06:22<br>20:30         | 07:20<br>19:11 | 07:19<br>16:58 | 08:20<br>16:05 | 08:51<br>16:02 |
| 29                          | 08:23<br>16:54 |                | 07:07<br>19:55 | 05:51<br>20:55 | 04:58<br>21:48 | 04:48<br>22:09 | 05:27<br>21:36 | 06:24<br>20:28         | 07:22<br>19:09 | 07:21<br>16:56 | 08:22<br>16:04 | 08:51<br>16:03 |
| 30                          | 08:22<br>16:56 |                | 07:05<br>19:57 | 05:49<br>20:57 | 04:57<br>21:50 | 04:49<br>22:08 | 05:28<br>21:34 | 06:26<br>20:25         | 07:24<br>19:06 | 07:23<br>16:54 | 08:24<br>16:03 | 08:51<br>16:04 |
| 31                          | 08:20<br>16:58 |                | 07:02<br>19:59 | 04:55<br>21:51 | 04:55<br>21:51 |                | 05:30<br>21:32 | 06:28<br>20:23         |                | 07:25<br>16:52 |                | 08:51<br>16:05 |
| Potential sun hours         | 243            | 270            | 366            | 423            | 500            | 518            | 520            | 464                    | 383            | 326            | 254            | 226            |
| Sum of minutes with flicker | 0              | 0              | 0              | 0              | 43             | 0              | 42             | 0                      | 0              | 0              | 0              | 0              |

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-Last time (hh:mm) with flicker/Minutes with flicker  
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker



## SHADOW - Calendar per WTG

WTG: 2 - Amperius VK 250 8 4.5 IO! hub: 18,0 m (TOT: 20,3 m) (4)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec  
1,41 2,36 4,03 5,55 8,35 8,36 8,16 7,72 5,06 3,23 1,33 0,98

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum  
261 393 465 559 645 475 572 869 1 140 1 059 606 326 7 370

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

|                             | January        | February       | March          | April          | May            | June           | July           | August                 | September      | October        | November       | December       |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------|----------------|----------------|----------------|----------------|
| 1                           | 08:51<br>16:06 | 08:18<br>17:00 | 07:18<br>17:59 | 06:59<br>20:01 | 05:47<br>20:59 | 04:54<br>21:52 | 04:49<br>22:08 | 05:30-05:35/5<br>21:30 | 05:32<br>20:20 | 06:30<br>19:04 | 07:27<br>16:50 | 08:25<br>16:02 |
| 2                           | 08:51<br>16:08 | 08:16<br>17:02 | 07:15<br>18:01 | 06:57<br>20:03 | 05:45<br>21:01 | 04:53<br>21:54 | 04:50<br>22:08 | 05:29-05:34/5<br>21:28 | 05:34<br>20:18 | 06:31<br>19:01 | 07:28<br>16:48 | 08:27<br>16:02 |
| 3                           | 08:51<br>16:09 | 08:15<br>17:04 | 07:13<br>18:03 | 06:54<br>20:05 | 05:43<br>21:03 | 04:52<br>21:55 | 04:51<br>22:07 | 05:30-05:34/4<br>21:26 | 05:35<br>20:15 | 06:33<br>18:58 | 07:30<br>16:46 | 08:28<br>16:01 |
| 4                           | 08:50<br>16:10 | 08:13<br>17:07 | 07:10<br>18:05 | 06:52<br>20:07 | 05:41<br>21:05 | 04:51<br>21:56 | 04:52<br>22:07 | 05:31-05:34/3<br>21:24 | 05:37<br>20:13 | 06:35<br>18:56 | 07:32<br>16:44 | 08:30<br>16:00 |
| 5                           | 08:50<br>16:11 | 08:11<br>17:09 | 07:08<br>18:07 | 06:49<br>20:08 | 05:38<br>21:07 | 04:51<br>21:57 | 04:53<br>22:06 | 05:32-05:34/2<br>21:22 | 05:39<br>20:10 | 06:37<br>18:53 | 07:34<br>16:41 | 08:32<br>15:59 |
| 6                           | 08:49<br>16:13 | 08:09<br>17:11 | 07:05<br>18:09 | 06:47<br>20:10 | 05:36<br>21:09 | 04:50<br>21:58 | 04:54<br>22:05 | 05:41<br>21:20         | 06:39<br>20:08 | 07:35<br>18:51 | 07:38<br>16:40 | 08:33<br>15:59 |
| 7                           | 08:49<br>16:14 | 08:07<br>17:13 | 07:03<br>18:11 | 06:44<br>20:12 | 05:34<br>21:11 | 04:49<br>22:00 | 04:55<br>22:05 | 05:43<br>21:18         | 06:41<br>20:05 | 07:37<br>18:48 | 07:40<br>16:38 | 08:34<br>15:58 |
| 8                           | 08:48<br>16:16 | 08:05<br>17:15 | 07:01<br>18:13 | 06:42<br>20:14 | 05:32<br>21:13 | 04:48<br>22:01 | 04:48<br>22:04 | 05:26-05:29/3<br>21:16 | 05:45<br>20:03 | 06:43<br>18:46 | 07:39<br>16:36 | 08:36<br>15:58 |
| 9                           | 08:48<br>16:17 | 08:03<br>17:17 | 06:58<br>18:15 | 06:39<br>20:16 | 05:30<br>21:15 | 04:48<br>22:02 | 04:57<br>22:03 | 05:25-05:29/4<br>21:14 | 05:46<br>20:00 | 06:44<br>18:43 | 07:41<br>16:34 | 08:37<br>15:57 |
| 10                          | 08:47<br>16:19 | 08:01<br>17:19 | 06:56<br>18:17 | 06:37<br>20:18 | 05:28<br>21:16 | 04:47<br>22:02 | 04:58<br>22:02 | 05:25-05:30/5<br>21:12 | 05:48<br>19:58 | 06:46<br>18:43 | 07:43<br>16:32 | 08:38<br>15:57 |
| 11                          | 08:46<br>16:20 | 07:59<br>17:21 | 06:53<br>18:19 | 06:34<br>20:20 | 05:26<br>21:18 | 04:47<br>22:03 | 04:59<br>22:01 | 05:25-05:30/5<br>21:10 | 05:50<br>19:55 | 06:48<br>18:38 | 07:45<br>16:30 | 08:40<br>15:57 |
| 12                          | 08:45<br>16:22 | 07:57<br>17:23 | 06:50<br>18:21 | 06:32<br>20:22 | 05:24<br>21:20 | 04:46<br>22:04 | 04:56<br>22:00 | 05:25-05:30/5<br>21:08 | 05:52<br>19:52 | 06:50<br>18:36 | 07:47<br>16:28 | 08:41<br>15:56 |
| 13                          | 08:44<br>16:24 | 07:54<br>17:26 | 06:48<br>18:23 | 06:29<br>20:24 | 05:23<br>21:22 | 04:46<br>22:05 | 04:46<br>21:59 | 05:25-05:31/6<br>21:05 | 05:54<br>19:50 | 06:52<br>18:33 | 07:49<br>16:26 | 08:42<br>15:56 |
| 14                          | 08:44<br>16:25 | 07:52<br>17:28 | 06:45<br>18:25 | 06:27<br>20:26 | 05:21<br>21:24 | 04:46<br>22:06 | 04:46<br>21:58 | 05:26-05:32/6<br>21:03 | 05:56<br>19:47 | 06:54<br>18:31 | 07:51<br>16:25 | 08:43<br>15:56 |
| 15                          | 08:43<br>16:27 | 07:50<br>17:30 | 06:43<br>18:27 | 06:24<br>20:28 | 05:19<br>21:26 | 04:45<br>22:06 | 04:45<br>21:57 | 05:26-05:32/6<br>21:01 | 05:58<br>19:45 | 06:56<br>18:29 | 07:53<br>16:23 | 08:44<br>15:56 |
| 16                          | 08:41<br>16:29 | 07:48<br>17:32 | 06:40<br>18:29 | 06:22<br>20:30 | 05:17<br>21:27 | 04:45<br>22:07 | 04:45<br>21:56 | 05:25-05:31/6<br>21:05 | 05:59<br>19:42 | 06:58<br>18:26 | 07:55<br>16:21 | 08:45<br>15:56 |
| 17                          | 08:40<br>16:31 | 07:46<br>17:34 | 06:38<br>18:31 | 06:20<br>20:32 | 05:15<br>21:29 | 04:45<br>22:07 | 04:45<br>21:54 | 05:25-05:32/7<br>21:07 | 06:01<br>19:40 | 06:59<br>18:24 | 07:57<br>16:20 | 08:46<br>15:56 |
| 18                          | 08:39<br>16:32 | 07:43<br>17:36 | 06:35<br>18:33 | 06:17<br>20:34 | 05:14<br>21:31 | 04:45<br>22:08 | 04:45<br>21:53 | 05:26-05:32/6<br>21:05 | 06:03<br>19:37 | 07:01<br>18:21 | 07:59<br>16:18 | 08:46<br>15:57 |
| 19                          | 08:38<br>16:34 | 07:41<br>17:38 | 06:33<br>18:35 | 06:15<br>20:36 | 05:12<br>21:33 | 04:45<br>22:08 | 04:45<br>21:52 | 05:27-05:33/6<br>21:05 | 06:05<br>19:34 | 07:03<br>18:19 | 08:01<br>16:17 | 08:47<br>15:57 |
| 20                          | 08:37<br>16:36 | 07:39<br>17:40 | 06:30<br>18:37 | 06:12<br>20:38 | 05:10<br>21:34 | 04:45<br>22:08 | 04:45<br>21:50 | 05:27-05:33/6<br>21:05 | 06:07<br>19:49 | 07:05<br>18:32 | 08:03<br>16:15 | 08:48<br>15:57 |
| 21                          | 08:35<br>16:38 | 07:37<br>17:42 | 06:28<br>18:39 | 06:10<br>20:40 | 05:09<br>21:36 | 04:45<br>22:09 | 04:45<br>21:49 | 05:27-05:33/6<br>21:05 | 06:09<br>19:29 | 07:07<br>18:14 | 08:05<br>16:14 | 08:48<br>15:57 |
| 22                          | 08:34<br>16:40 | 07:34<br>17:44 | 06:25<br>18:41 | 06:08<br>20:42 | 05:07<br>21:38 | 04:45<br>22:09 | 04:45<br>21:47 | 05:27-05:33/6<br>21:05 | 06:11<br>19:27 | 07:09<br>18:12 | 08:07<br>16:13 | 08:49<br>15:58 |
| 23                          | 08:33<br>16:42 | 07:32<br>17:47 | 06:22<br>18:43 | 06:05<br>20:44 | 05:06<br>21:39 | 04:45<br>22:09 | 04:45<br>21:46 | 05:27-05:33/6<br>21:05 | 06:13<br>19:24 | 07:11<br>18:10 | 08:09<br>16:11 | 08:50<br>15:58 |
| 24                          | 08:31<br>16:44 | 07:30<br>17:49 | 06:20<br>18:45 | 06:03<br>20:46 | 05:04<br>21:41 | 04:46<br>22:09 | 04:46<br>21:44 | 05:28-05:34/6<br>21:05 | 06:14<br>19:21 | 07:13<br>18:07 | 08:11<br>16:10 | 08:50<br>15:59 |
| 25                          | 08:30<br>16:46 | 07:27<br>17:51 | 06:17<br>18:47 | 06:01<br>20:48 | 05:03<br>21:42 | 04:46<br>22:09 | 04:46<br>21:43 | 05:27-05:34/7<br>21:05 | 06:16<br>19:19 | 07:14<br>17:05 | 08:13<br>16:09 | 08:50<br>16:00 |
| 26                          | 08:28<br>16:48 | 07:25<br>17:53 | 06:15<br>18:49 | 05:58<br>20:50 | 05:02<br>21:44 | 04:46<br>22:09 | 04:46<br>21:41 | 05:28-05:35/7<br>21:05 | 06:18<br>19:35 | 07:16<br>18:03 | 08:15<br>16:07 | 08:51<br>16:00 |
| 27                          | 08:27<br>16:50 | 07:23<br>17:55 | 06:12<br>18:51 | 05:56<br>20:51 | 05:00<br>21:45 | 04:47<br>22:09 | 04:47<br>21:39 | 05:28-05:34/6<br>21:05 | 06:20<br>19:14 | 07:18<br>17:01 | 08:19<br>16:06 | 08:51<br>16:01 |
| 28                          | 08:25<br>16:52 | 07:20<br>17:57 | 06:10<br>18:53 | 05:54<br>20:53 | 04:59<br>21:47 | 04:48<br>22:09 | 04:48<br>21:37 | 05:29-05:35/6<br>21:05 | 06:22<br>19:11 | 07:20<br>16:58 | 08:19<br>16:05 | 08:51<br>16:02 |
| 29                          | 08:23<br>16:54 | 07:17<br>19:05 | 06:07<br>19:55 | 05:51<br>20:55 | 04:58<br>21:48 | 04:48<br>22:09 | 04:48<br>21:36 | 05:28-05:34/6<br>21:05 | 06:24<br>19:09 | 07:22<br>16:56 | 08:21<br>16:04 | 08:51<br>16:03 |
| 30                          | 08:22<br>16:56 | 07:15<br>19:05 | 06:05<br>19:57 | 05:49<br>20:57 | 04:57<br>21:50 | 04:49<br>22:08 | 04:49<br>21:34 | 05:29-05:35/6<br>21:05 | 06:26<br>19:06 | 07:24<br>16:54 | 08:24<br>16:03 | 08:51<br>16:04 |
| 31                          | 08:20<br>16:58 | 07:12<br>19:02 | 06:02<br>19:59 | 05:55<br>20:57 | 04:55<br>21:51 | 04:48<br>22:08 | 04:48<br>21:32 | 05:30<br>20:23         | 06:28<br>19:06 | 07:25<br>16:52 | 08:25<br>16:03 | 08:51<br>16:05 |
| Potential sun hours         | 243            | 270            | 366            | 423            | 500            | 518            | 520            | 464                    | 383            | 326            | 254            | 226            |
| Sum of minutes with flicker | 0              | 0              | 0              | 0              | 0              | 133            | 19             | 0                      | 0              | 0              | 0              | 0              |

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-Last time (hh:mm) with flicker/Minutes with flicker  
Sun set (hh:mm) First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

### SHADOW - Calendar per WTG

WTG: 3 - Amperius VK 250 8 4.5 IO! hub: 18,0 m (TOT: 20,3 m) (5)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
| 1,41 | 2,36 | 4,03 | 5,55 | 8,35 | 8,36 | 8,16 | 7,72 | 5,06 | 3,23 | 1,33 | 0,98 |

Operational time

|     |     |     |     |     |     |     |     |       |       |     |     |       |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N   | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 261 | 393 | 465 | 559 | 645 | 475 | 572 | 869 | 1 140 | 1 059 | 606 | 326 | 7 370 |

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

|                             | January        | February       | March          | April          | May            | June           | July           | August         | September      | October        | November       | December       |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1                           | 08:51<br>16:06 | 08:18<br>17:00 | 07:18<br>17:59 | 06:59<br>20:01 | 05:47<br>20:59 | 04:54<br>21:52 | 04:49<br>22:08 | 05:32<br>21:30 | 06:30<br>20:20 | 07:26<br>19:04 | 07:27<br>16:50 | 08:25<br>16:02 |
| 2                           | 08:51<br>16:08 | 08:16<br>17:02 | 07:15<br>18:01 | 06:57<br>20:03 | 05:45<br>21:01 | 04:53<br>21:54 | 04:50<br>22:08 | 05:34<br>21:28 | 06:31<br>20:18 | 07:28<br>19:01 | 07:29<br>16:48 | 08:27<br>16:02 |
| 3                           | 08:51<br>16:09 | 08:15<br>17:04 | 07:13<br>18:03 | 06:54<br>20:05 | 05:43<br>21:03 | 04:52<br>21:55 | 04:51<br>22:07 | 05:35<br>21:26 | 06:33<br>20:15 | 07:30<br>18:58 | 07:31<br>16:46 | 08:29<br>16:01 |
| 4                           | 08:50<br>16:10 | 08:13<br>17:07 | 07:10<br>18:05 | 06:52<br>20:07 | 05:41<br>21:05 | 04:51<br>21:56 | 04:52<br>22:07 | 05:37<br>21:24 | 06:35<br>20:13 | 07:32<br>18:56 | 07:33<br>16:44 | 08:30<br>16:00 |
| 5                           | 08:50<br>16:11 | 08:11<br>17:09 | 07:08<br>18:07 | 06:49<br>20:08 | 05:38<br>21:07 | 04:51<br>21:57 | 04:53<br>22:06 | 05:39<br>21:22 | 06:37<br>20:10 | 07:34<br>18:53 | 07:36<br>16:41 | 08:32<br>15:59 |
| 6                           | 08:49<br>16:13 | 08:09<br>17:11 | 07:05<br>18:09 | 06:47<br>20:10 | 05:36<br>21:09 | 04:50<br>21:58 | 04:54<br>22:05 | 05:41<br>21:20 | 06:39<br>20:08 | 07:35<br>18:51 | 07:38<br>16:40 | 08:33<br>15:59 |
| 7                           | 08:49<br>16:14 | 08:07<br>17:13 | 07:03<br>18:11 | 06:44<br>20:12 | 05:34<br>21:11 | 04:49<br>22:00 | 04:55<br>22:05 | 05:43<br>21:18 | 06:41<br>20:05 | 07:37<br>18:48 | 07:40<br>16:38 | 08:34<br>15:58 |
| 8                           | 08:48<br>16:16 | 08:05<br>17:15 | 07:01<br>18:13 | 06:42<br>20:14 | 05:32<br>21:13 | 04:48<br>22:01 | 04:56<br>22:04 | 05:45<br>21:16 | 06:43<br>20:03 | 07:39<br>18:46 | 07:42<br>16:36 | 08:36<br>15:58 |
| 9                           | 08:48<br>16:17 | 08:03<br>17:17 | 06:58<br>18:15 | 06:39<br>20:16 | 05:30<br>21:15 | 04:48<br>22:02 | 04:57<br>22:03 | 05:46<br>21:14 | 06:44<br>20:00 | 07:41<br>18:43 | 07:44<br>16:34 | 08:37<br>15:57 |
| 10                          | 08:47<br>16:19 | 08:01<br>17:19 | 06:56<br>18:17 | 06:37<br>20:18 | 05:28<br>21:16 | 04:47<br>22:02 | 04:58<br>22:02 | 05:48<br>21:12 | 06:46<br>19:58 | 07:43<br>18:41 | 07:46<br>16:32 | 08:38<br>15:57 |
| 11                          | 08:46<br>16:20 | 07:59<br>17:21 | 06:53<br>18:19 | 06:34<br>20:20 | 05:26<br>21:18 | 04:47<br>22:03 | 04:59<br>22:01 | 05:50<br>21:10 | 06:48<br>19:55 | 07:45<br>18:38 | 07:48<br>16:30 | 08:40<br>15:57 |
| 12                          | 08:45<br>16:22 | 07:57<br>17:23 | 06:50<br>18:21 | 06:32<br>20:22 | 05:24<br>21:20 | 04:46<br>22:04 | 05:01<br>22:00 | 05:52<br>21:08 | 06:50<br>19:52 | 07:47<br>18:36 | 07:50<br>16:28 | 08:41<br>15:56 |
| 13                          | 08:44<br>16:24 | 07:54<br>17:26 | 06:48<br>18:23 | 06:29<br>20:24 | 05:23<br>21:22 | 04:46<br>22:05 | 05:02<br>21:59 | 05:54<br>21:05 | 06:52<br>19:50 | 07:49<br>18:33 | 07:52<br>16:26 | 08:42<br>15:56 |
| 14                          | 08:44<br>16:25 | 07:52<br>17:28 | 06:45<br>18:25 | 06:27<br>20:26 | 05:21<br>21:24 | 04:46<br>22:06 | 05:03<br>21:58 | 05:56<br>21:03 | 06:54<br>19:47 | 07:51<br>18:31 | 07:54<br>16:25 | 08:43<br>15:56 |
| 15                          | 08:43<br>16:27 | 07:50<br>17:30 | 06:43<br>18:27 | 06:24<br>20:28 | 05:19<br>21:26 | 04:45<br>22:06 | 05:05<br>21:57 | 05:58<br>21:01 | 06:56<br>19:45 | 07:53<br>18:29 | 07:56<br>16:23 | 08:44<br>15:56 |
| 16                          | 08:41<br>16:29 | 07:48<br>17:32 | 06:40<br>18:29 | 06:22<br>20:30 | 05:17<br>21:27 | 04:45<br>22:07 | 05:06<br>21:56 | 05:59<br>20:59 | 06:58<br>19:42 | 07:55<br>18:26 | 07:58<br>16:21 | 08:45<br>15:56 |
| 17                          | 08:40<br>16:31 | 07:46<br>17:34 | 06:38<br>18:31 | 06:20<br>20:32 | 05:15<br>21:29 | 04:45<br>22:07 | 05:07<br>21:54 | 06:01<br>20:56 | 06:59<br>19:40 | 07:57<br>18:24 | 08:00<br>16:20 | 08:46<br>15:56 |
| 18                          | 08:39<br>16:32 | 07:43<br>17:36 | 06:35<br>18:33 | 06:17<br>20:34 | 05:14<br>21:31 | 04:45<br>22:08 | 05:09<br>21:53 | 06:03<br>20:54 | 07:01<br>19:37 | 07:59<br>18:21 | 08:02<br>16:18 | 08:46<br>15:57 |
| 19                          | 08:38<br>16:34 | 07:41<br>17:38 | 06:33<br>18:35 | 06:15<br>20:36 | 05:12<br>21:33 | 04:45<br>22:08 | 05:10<br>21:52 | 06:05<br>20:52 | 07:03<br>19:34 | 08:01<br>18:19 | 08:04<br>16:17 | 08:47<br>15:57 |
| 20                          | 08:37<br>16:36 | 07:39<br>17:40 | 06:30<br>18:37 | 06:12<br>20:38 | 05:10<br>21:34 | 04:45<br>22:08 | 05:12<br>21:50 | 06:07<br>20:49 | 07:05<br>19:32 | 08:03<br>18:17 | 08:06<br>16:15 | 08:48<br>15:57 |
| 21                          | 08:35<br>16:38 | 07:37<br>17:42 | 06:28<br>18:39 | 06:10<br>20:40 | 05:09<br>21:36 | 04:45<br>22:09 | 05:13<br>21:49 | 06:09<br>20:47 | 07:07<br>19:29 | 08:05<br>18:14 | 08:08<br>16:14 | 08:48<br>15:57 |
| 22                          | 08:34<br>16:40 | 07:34<br>17:44 | 06:25<br>18:41 | 06:08<br>20:42 | 05:07<br>21:38 | 04:45<br>22:09 | 05:15<br>21:47 | 06:11<br>20:45 | 07:09<br>19:27 | 08:07<br>18:12 | 08:09<br>16:13 | 08:49<br>15:58 |
| 23                          | 08:33<br>16:42 | 07:32<br>17:47 | 06:22<br>18:43 | 06:05<br>20:44 | 05:06<br>21:39 | 04:45<br>22:09 | 05:17<br>21:46 | 06:13<br>20:42 | 07:11<br>19:24 | 08:09<br>18:10 | 08:11<br>16:11 | 08:50<br>15:58 |
| 24                          | 08:31<br>16:44 | 07:30<br>17:49 | 06:20<br>18:45 | 06:03<br>20:46 | 05:04<br>21:41 | 04:46<br>22:09 | 05:18<br>21:44 | 06:14<br>20:40 | 07:13<br>19:21 | 08:11<br>18:07 | 08:13<br>16:10 | 08:50<br>15:59 |
| 25                          | 08:30<br>16:46 | 07:27<br>17:51 | 06:17<br>18:47 | 06:01<br>20:48 | 05:03<br>21:42 | 04:46<br>22:09 | 05:20<br>21:43 | 06:16<br>20:38 | 07:14<br>19:19 | 07:13<br>17:05 | 08:15<br>16:09 | 08:50<br>16:00 |
| 26                          | 08:28<br>16:48 | 07:25<br>17:53 | 06:15<br>18:49 | 05:58<br>20:50 | 05:02<br>21:44 | 04:46<br>22:09 | 05:22<br>21:41 | 06:18<br>20:35 | 07:16<br>19:16 | 07:15<br>17:03 | 08:17<br>16:07 | 08:51<br>16:00 |
| 27                          | 08:27<br>16:50 | 07:23<br>17:55 | 06:12<br>18:51 | 05:56<br>20:51 | 05:00<br>21:45 | 04:47<br>22:09 | 05:23<br>21:39 | 06:20<br>20:33 | 07:18<br>19:14 | 07:17<br>17:01 | 08:19<br>16:06 | 08:51<br>16:01 |
| 28                          | 08:25<br>16:52 | 07:20<br>17:57 | 06:10<br>18:53 | 05:54<br>20:53 | 04:59<br>21:47 | 04:48<br>22:09 | 05:25<br>21:37 | 06:22<br>20:30 | 07:20<br>19:11 | 07:19<br>16:58 | 08:20<br>16:05 | 08:51<br>16:02 |
| 29                          | 08:23<br>16:54 | 07:18<br>19:55 | 06:07<br>20:55 | 05:51<br>21:48 | 04:58<br>22:09 | 04:48<br>22:09 | 05:27<br>21:36 | 06:24<br>20:28 | 07:22<br>19:09 | 07:21<br>16:56 | 08:22<br>16:04 | 08:51<br>16:03 |
| 30                          | 08:22<br>16:56 | 07:15<br>19:57 | 06:05<br>20:57 | 05:49<br>21:50 | 04:57<br>21:50 | 04:49<br>22:08 | 05:28<br>21:34 | 06:26<br>20:25 | 07:24<br>19:06 | 07:23<br>16:54 | 08:24<br>16:03 | 08:51<br>16:04 |
| 31                          | 08:20<br>16:58 | 07:12<br>19:59 | 06:02<br>21:59 | 05:45<br>21:51 | 04:55<br>21:51 | 04:55<br>21:32 | 05:30<br>20:23 | 06:28<br>19:06 | 07:25<br>16:52 | 07:25<br>16:52 | 08:51<br>16:05 | 08:51<br>16:05 |
| Potential sun hours         | 243            | 270            | 366            | 423            | 500            | 518            | 520            | 464            | 383            | 326            | 254            | 226            |
| Sum of minutes with flicker | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |

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 | Last time (hh:mm) with flicker | Minutes with flicker |
|              | Sun set (hh:mm)  | First time (hh:mm) with flicker | Last time (hh:mm) with flicker | Minutes with flicker |

## SHADOW - Calendar per WTG

WTG: 4 - Amperius VK 250 8 4.5 IO! hub: 18,0 m (TOT: 20,3 m) (6)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
| 1,41 | 2,36 | 4,03 | 5,55 | 8,35 | 8,36 | 8,16 | 7,72 | 5,06 | 3,23 | 1,33 | 0,98 |

Operational time

|     |     |     |     |     |     |     |     |       |       |     |     |       |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N   | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 261 | 393 | 465 | 559 | 645 | 475 | 572 | 869 | 1 140 | 1 059 | 606 | 326 | 7 370 |

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

|                             | January        | February       | March          | April          | May            | June           | July           | August         | September      | October        | November       | December       |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1                           | 08:51<br>16:06 | 08:18<br>17:00 | 07:18<br>17:59 | 06:59<br>20:01 | 05:47<br>20:59 | 04:54<br>21:52 | 04:49<br>22:08 | 05:32<br>21:30 | 06:30<br>20:20 | 07:26<br>19:04 | 07:27<br>16:50 | 08:25<br>16:02 |
| 2                           | 08:51<br>16:08 | 08:16<br>17:02 | 07:15<br>18:01 | 06:57<br>20:03 | 05:45<br>21:01 | 04:53<br>21:54 | 04:50<br>22:08 | 05:34<br>21:28 | 06:31<br>20:18 | 07:28<br>19:01 | 07:29<br>16:48 | 08:27<br>16:02 |
| 3                           | 08:51<br>16:09 | 08:15<br>17:04 | 07:13<br>18:03 | 06:54<br>20:05 | 05:43<br>21:03 | 04:52<br>21:55 | 04:51<br>22:07 | 05:35<br>21:26 | 06:33<br>20:15 | 07:30<br>18:58 | 07:31<br>16:46 | 08:29<br>16:01 |
| 4                           | 08:50<br>16:10 | 08:13<br>17:07 | 07:10<br>18:05 | 06:52<br>20:07 | 05:41<br>21:05 | 04:51<br>21:56 | 04:52<br>22:07 | 05:37<br>21:24 | 06:35<br>20:13 | 07:32<br>18:56 | 07:33<br>16:44 | 08:30<br>16:00 |
| 5                           | 08:50<br>16:11 | 08:11<br>17:09 | 07:08<br>18:07 | 06:49<br>20:08 | 05:38<br>21:07 | 04:51<br>21:57 | 04:53<br>22:06 | 05:39<br>21:22 | 06:37<br>20:10 | 07:34<br>18:53 | 07:36<br>16:41 | 08:32<br>15:59 |
| 6                           | 08:49<br>16:13 | 08:09<br>17:11 | 07:05<br>18:09 | 06:47<br>20:10 | 05:36<br>21:09 | 04:50<br>21:58 | 04:54<br>22:05 | 05:41<br>21:20 | 06:39<br>20:08 | 07:35<br>18:51 | 07:38<br>16:40 | 08:33<br>15:59 |
| 7                           | 08:49<br>16:14 | 08:07<br>17:13 | 07:03<br>18:11 | 06:44<br>20:12 | 05:34<br>21:11 | 04:49<br>22:00 | 04:55<br>22:05 | 05:43<br>21:18 | 06:41<br>20:05 | 07:37<br>18:48 | 07:40<br>16:38 | 08:34<br>15:58 |
| 8                           | 08:48<br>16:16 | 08:05<br>17:15 | 07:01<br>18:13 | 06:42<br>20:14 | 05:32<br>21:13 | 04:48<br>22:01 | 04:56<br>22:04 | 05:45<br>21:16 | 06:43<br>20:03 | 07:39<br>18:46 | 07:42<br>16:36 | 08:36<br>15:58 |
| 9                           | 08:48<br>16:17 | 08:03<br>17:17 | 06:58<br>18:15 | 06:39<br>20:16 | 05:30<br>21:15 | 04:48<br>22:02 | 04:57<br>22:03 | 05:46<br>21:14 | 06:44<br>20:00 | 07:41<br>18:43 | 07:44<br>16:34 | 08:37<br>15:57 |
| 10                          | 08:47<br>16:19 | 08:01<br>17:19 | 06:56<br>18:17 | 06:37<br>20:18 | 05:28<br>21:16 | 04:47<br>22:02 | 04:58<br>22:02 | 05:48<br>21:12 | 06:46<br>19:58 | 07:43<br>18:41 | 07:46<br>16:32 | 08:38<br>15:57 |
| 11                          | 08:46<br>16:20 | 07:59<br>17:21 | 06:53<br>18:19 | 06:34<br>20:20 | 05:26<br>21:18 | 04:47<br>22:03 | 04:59<br>22:01 | 05:50<br>21:10 | 06:48<br>19:55 | 07:45<br>18:38 | 07:48<br>16:30 | 08:40<br>15:57 |
| 12                          | 08:45<br>16:22 | 07:57<br>17:23 | 06:50<br>18:21 | 06:32<br>20:22 | 05:24<br>21:20 | 04:46<br>22:04 | 05:01<br>22:00 | 05:52<br>21:08 | 06:50<br>19:52 | 07:47<br>18:36 | 07:50<br>16:28 | 08:41<br>15:56 |
| 13                          | 08:44<br>16:24 | 07:54<br>17:26 | 06:48<br>18:23 | 06:29<br>20:24 | 05:23<br>21:22 | 04:46<br>22:05 | 05:02<br>21:59 | 05:54<br>21:05 | 06:52<br>19:50 | 07:49<br>18:33 | 07:52<br>16:26 | 08:42<br>15:56 |
| 14                          | 08:44<br>16:25 | 07:52<br>17:28 | 06:45<br>18:25 | 06:27<br>20:26 | 05:21<br>21:24 | 04:46<br>22:06 | 05:03<br>21:58 | 05:56<br>21:03 | 06:54<br>19:47 | 07:51<br>18:31 | 07:54<br>16:25 | 08:43<br>15:56 |
| 15                          | 08:43<br>16:27 | 07:50<br>17:30 | 06:43<br>18:27 | 06:24<br>20:28 | 05:19<br>21:26 | 04:45<br>22:06 | 05:05<br>21:57 | 05:58<br>21:01 | 06:56<br>19:45 | 07:53<br>18:29 | 07:56<br>16:23 | 08:44<br>15:56 |
| 16                          | 08:41<br>16:29 | 07:48<br>17:32 | 06:40<br>18:29 | 06:22<br>20:30 | 05:17<br>21:27 | 04:45<br>22:07 | 05:06<br>21:56 | 05:59<br>20:59 | 06:58<br>19:42 | 07:55<br>18:26 | 07:58<br>16:21 | 08:45<br>15:56 |
| 17                          | 08:40<br>16:31 | 07:46<br>17:34 | 06:38<br>18:31 | 06:20<br>20:32 | 05:15<br>21:29 | 04:45<br>22:07 | 05:07<br>21:54 | 06:01<br>20:56 | 06:59<br>19:40 | 07:57<br>18:24 | 08:00<br>16:20 | 08:46<br>15:56 |
| 18                          | 08:39<br>16:32 | 07:43<br>17:36 | 06:35<br>18:33 | 06:17<br>20:34 | 05:14<br>21:31 | 04:45<br>22:08 | 05:09<br>21:53 | 06:03<br>20:54 | 07:01<br>19:37 | 07:59<br>18:21 | 08:02<br>16:18 | 08:46<br>15:57 |
| 19                          | 08:38<br>16:34 | 07:41<br>17:38 | 06:33<br>18:35 | 06:15<br>20:36 | 05:12<br>21:33 | 04:45<br>22:08 | 05:10<br>21:52 | 06:05<br>20:52 | 07:03<br>19:34 | 08:01<br>18:19 | 08:04<br>16:17 | 08:47<br>15:57 |
| 20                          | 08:37<br>16:36 | 07:39<br>17:40 | 06:30<br>18:37 | 06:12<br>20:38 | 05:10<br>21:34 | 04:45<br>22:08 | 05:12<br>21:50 | 06:07<br>20:49 | 07:05<br>19:32 | 08:03<br>18:17 | 08:06<br>16:15 | 08:48<br>15:57 |
| 21                          | 08:35<br>16:38 | 07:37<br>17:42 | 06:28<br>18:39 | 06:10<br>20:40 | 05:09<br>21:36 | 04:45<br>22:09 | 05:13<br>21:49 | 06:09<br>20:47 | 07:07<br>19:29 | 08:05<br>18:14 | 08:08<br>16:14 | 08:48<br>15:57 |
| 22                          | 08:34<br>16:40 | 07:34<br>17:44 | 06:25<br>18:41 | 06:08<br>20:42 | 05:07<br>21:38 | 04:45<br>22:09 | 05:15<br>21:47 | 06:11<br>20:45 | 07:09<br>19:27 | 08:07<br>18:12 | 08:09<br>16:12 | 08:49<br>15:58 |
| 23                          | 08:33<br>16:42 | 07:32<br>17:47 | 06:22<br>18:43 | 06:05<br>20:44 | 05:06<br>21:39 | 04:45<br>22:09 | 05:17<br>21:46 | 06:13<br>20:42 | 07:11<br>19:24 | 08:09<br>18:10 | 08:11<br>16:11 | 08:50<br>15:58 |
| 24                          | 08:31<br>16:44 | 07:30<br>17:49 | 06:20<br>18:45 | 06:03<br>20:46 | 05:04<br>21:41 | 04:46<br>22:09 | 05:18<br>21:44 | 06:14<br>20:40 | 07:13<br>19:21 | 08:11<br>18:07 | 08:13<br>16:10 | 08:50<br>15:59 |
| 25                          | 08:30<br>16:46 | 07:27<br>17:51 | 06:17<br>18:47 | 06:01<br>20:48 | 05:03<br>21:42 | 04:46<br>22:09 | 05:20<br>21:43 | 06:16<br>20:38 | 07:14<br>19:19 | 07:13<br>17:05 | 08:15<br>16:09 | 08:50<br>16:00 |
| 26                          | 08:28<br>16:48 | 07:25<br>17:53 | 06:15<br>18:49 | 05:58<br>20:50 | 05:02<br>21:44 | 04:46<br>22:09 | 05:22<br>21:41 | 06:18<br>20:35 | 07:16<br>19:16 | 07:15<br>17:03 | 08:17<br>16:07 | 08:51<br>16:00 |
| 27                          | 08:27<br>16:50 | 07:23<br>17:55 | 06:12<br>18:51 | 05:56<br>20:51 | 05:00<br>21:45 | 04:47<br>22:09 | 05:23<br>21:39 | 06:20<br>20:33 | 07:18<br>19:14 | 07:17<br>17:01 | 08:19<br>16:06 | 08:51<br>16:01 |
| 28                          | 08:25<br>16:52 | 07:20<br>17:57 | 06:10<br>18:53 | 05:54<br>20:53 | 04:59<br>21:47 | 04:48<br>22:09 | 05:25<br>21:37 | 06:22<br>20:30 | 07:20<br>19:11 | 07:19<br>16:58 | 08:20<br>16:05 | 08:51<br>16:02 |
| 29                          | 08:23<br>16:54 | 07:18<br>19:55 | 06:07<br>20:55 | 05:51<br>21:48 | 04:58<br>22:09 | 04:48<br>22:09 | 05:27<br>21:36 | 06:24<br>20:28 | 07:22<br>19:09 | 07:21<br>16:56 | 08:22<br>16:04 | 08:51<br>16:03 |
| 30                          | 08:22<br>16:56 | 07:15<br>19:57 | 06:05<br>20:57 | 05:49<br>21:50 | 04:57<br>21:50 | 04:49<br>22:08 | 05:28<br>21:34 | 06:26<br>20:25 | 07:24<br>19:06 | 07:23<br>16:54 | 08:24<br>16:03 | 08:51<br>16:04 |
| 31                          | 08:20<br>16:58 | 07:12<br>19:59 | 06:02<br>21:59 | 05:45<br>21:51 | 04:55<br>21:51 | 04:55<br>21:32 | 05:30<br>21:23 | 06:28<br>20:23 | 07:25<br>16:52 | 07:25<br>16:52 | 08:51<br>16:05 | 08:51<br>16:05 |
| Potential sun hours         | 243            | 270            | 366            | 423            | 500            | 518            | 520            | 464            | 383            | 326            | 254            | 226            |
| Sum of minutes with flicker | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |

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 | Last time (hh:mm) with flicker | Minutes with flicker |
|              | Sun set (hh:mm)  | First time (hh:mm) with flicker | Last time (hh:mm) with flicker | Minutes with flicker |

## SHADOW - Calendar per WTG

WTG: 5 - Amperius VK 250 8 4.5 IO! hub: 18,0 m (TOT: 20,3 m) (7)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan  | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  |
| 1,41 | 2,36 | 4,03 | 5,55 | 8,35 | 8,36 | 8,16 | 7,72 | 5,06 | 3,23 | 1,33 | 0,98 |

Operational time

|     |     |     |     |     |     |     |     |       |       |     |     |       |
|-----|-----|-----|-----|-----|-----|-----|-----|-------|-------|-----|-----|-------|
| N   | NNE | ENE | E   | ESE | SSE | S   | SSW | WSW   | W     | WNW | NNW | Sum   |
| 261 | 393 | 465 | 559 | 645 | 475 | 572 | 869 | 1 140 | 1 059 | 606 | 326 | 7 370 |

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

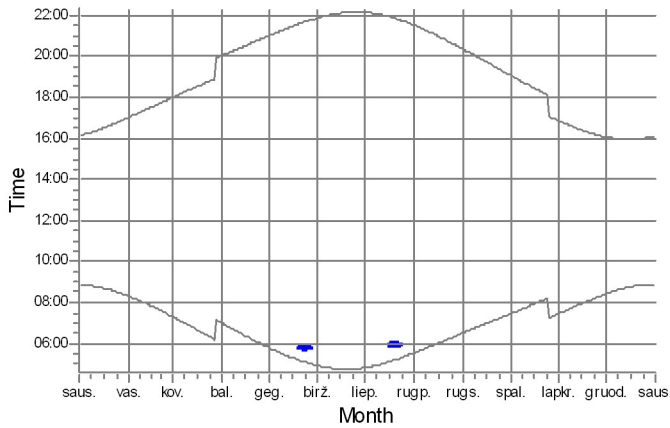
|                             | January        | February       | March          | April          | May            | June           | July           | August         | September      | October        | November       | December       |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 1                           | 08:51<br>16:06 | 08:18<br>17:00 | 07:18<br>17:59 | 06:59<br>20:01 | 05:47<br>20:59 | 04:54<br>21:52 | 04:49<br>22:08 | 05:32<br>21:30 | 06:30<br>20:20 | 07:26<br>19:04 | 07:27<br>16:50 | 08:25<br>16:02 |
| 2                           | 08:51<br>16:08 | 08:16<br>17:02 | 07:15<br>18:01 | 06:57<br>20:03 | 05:45<br>21:01 | 04:53<br>21:54 | 04:50<br>22:08 | 05:34<br>21:28 | 06:31<br>20:18 | 07:28<br>19:01 | 07:29<br>16:48 | 08:27<br>16:02 |
| 3                           | 08:51<br>16:09 | 08:15<br>17:04 | 07:13<br>18:03 | 06:54<br>20:05 | 05:43<br>21:03 | 04:52<br>21:55 | 04:51<br>22:07 | 05:35<br>21:26 | 06:33<br>20:15 | 07:30<br>18:58 | 07:31<br>16:46 | 08:29<br>16:01 |
| 4                           | 08:50<br>16:10 | 08:13<br>17:07 | 07:10<br>18:05 | 06:52<br>20:07 | 05:41<br>21:05 | 04:51<br>21:56 | 04:52<br>22:07 | 05:37<br>21:24 | 06:35<br>20:13 | 07:32<br>18:56 | 07:33<br>16:44 | 08:30<br>16:00 |
| 5                           | 08:50<br>16:11 | 08:11<br>17:09 | 07:08<br>18:07 | 06:49<br>20:08 | 05:38<br>21:07 | 04:51<br>21:57 | 04:53<br>22:06 | 05:39<br>21:22 | 06:37<br>20:10 | 07:34<br>18:53 | 07:36<br>16:41 | 08:32<br>15:59 |
| 6                           | 08:49<br>16:13 | 08:09<br>17:11 | 07:05<br>18:09 | 06:47<br>20:10 | 05:36<br>21:09 | 04:50<br>21:58 | 04:54<br>22:05 | 05:41<br>21:20 | 06:39<br>20:08 | 07:35<br>18:51 | 07:38<br>16:40 | 08:33<br>15:59 |
| 7                           | 08:49<br>16:14 | 08:07<br>17:13 | 07:03<br>18:11 | 06:44<br>20:12 | 05:34<br>21:11 | 04:49<br>22:00 | 04:55<br>22:05 | 05:43<br>21:18 | 06:41<br>20:05 | 07:37<br>18:48 | 07:40<br>16:38 | 08:34<br>15:58 |
| 8                           | 08:48<br>16:16 | 08:05<br>17:15 | 07:01<br>18:13 | 06:42<br>20:14 | 05:32<br>21:13 | 04:48<br>22:01 | 04:56<br>22:04 | 05:45<br>21:16 | 06:43<br>20:03 | 07:39<br>18:46 | 07:42<br>16:36 | 08:36<br>15:58 |
| 9                           | 08:48<br>16:17 | 08:03<br>17:17 | 06:58<br>18:15 | 06:39<br>20:16 | 05:30<br>21:15 | 04:48<br>22:02 | 04:57<br>22:03 | 05:46<br>21:14 | 06:44<br>20:00 | 07:41<br>18:43 | 07:44<br>16:34 | 08:37<br>15:57 |
| 10                          | 08:47<br>16:19 | 08:01<br>17:19 | 06:56<br>18:17 | 06:37<br>20:18 | 05:28<br>21:16 | 04:47<br>22:02 | 04:58<br>22:02 | 05:48<br>21:12 | 06:46<br>19:58 | 07:43<br>18:41 | 07:46<br>16:32 | 08:38<br>15:57 |
| 11                          | 08:46<br>16:20 | 07:59<br>17:21 | 06:53<br>18:19 | 06:34<br>20:20 | 05:26<br>21:18 | 04:47<br>22:03 | 04:59<br>22:01 | 05:50<br>21:10 | 06:48<br>19:55 | 07:45<br>18:38 | 07:48<br>16:30 | 08:40<br>15:57 |
| 12                          | 08:45<br>16:22 | 07:57<br>17:23 | 06:50<br>18:21 | 06:32<br>20:22 | 05:24<br>21:20 | 04:46<br>22:04 | 05:01<br>22:00 | 05:52<br>21:08 | 06:50<br>19:52 | 07:47<br>18:36 | 07:50<br>16:28 | 08:41<br>15:56 |
| 13                          | 08:44<br>16:24 | 07:54<br>17:26 | 06:48<br>18:23 | 06:29<br>20:24 | 05:23<br>21:22 | 04:46<br>22:05 | 05:02<br>21:59 | 05:54<br>21:05 | 06:52<br>19:50 | 07:49<br>18:33 | 07:52<br>16:26 | 08:42<br>15:56 |
| 14                          | 08:44<br>16:25 | 07:52<br>17:28 | 06:45<br>18:25 | 06:27<br>20:26 | 05:21<br>21:24 | 04:46<br>22:06 | 05:03<br>21:58 | 05:56<br>21:03 | 06:54<br>19:47 | 07:51<br>18:31 | 07:54<br>16:25 | 08:43<br>15:56 |
| 15                          | 08:43<br>16:27 | 07:50<br>17:30 | 06:43<br>18:27 | 06:24<br>20:28 | 05:19<br>21:26 | 04:45<br>22:06 | 05:05<br>21:57 | 05:58<br>21:01 | 06:56<br>19:45 | 07:53<br>18:29 | 07:56<br>16:23 | 08:44<br>15:56 |
| 16                          | 08:41<br>16:29 | 07:48<br>17:32 | 06:40<br>18:29 | 06:22<br>20:30 | 05:17<br>21:27 | 04:45<br>22:07 | 05:06<br>21:56 | 05:59<br>20:59 | 06:58<br>19:42 | 07:55<br>18:26 | 07:58<br>16:21 | 08:45<br>15:56 |
| 17                          | 08:40<br>16:31 | 07:46<br>17:34 | 06:38<br>18:31 | 06:20<br>20:32 | 05:15<br>21:29 | 04:45<br>22:07 | 05:07<br>21:54 | 06:01<br>20:56 | 06:59<br>19:40 | 07:57<br>18:24 | 08:00<br>16:20 | 08:46<br>15:56 |
| 18                          | 08:39<br>16:32 | 07:43<br>17:36 | 06:35<br>18:33 | 06:17<br>20:34 | 05:14<br>21:31 | 04:45<br>22:08 | 05:09<br>21:53 | 06:03<br>20:54 | 07:01<br>19:37 | 07:59<br>18:21 | 08:02<br>16:18 | 08:46<br>15:57 |
| 19                          | 08:38<br>16:34 | 07:41<br>17:38 | 06:33<br>18:35 | 06:15<br>20:36 | 05:12<br>21:33 | 04:45<br>22:08 | 05:10<br>21:52 | 06:05<br>20:52 | 07:03<br>19:34 | 08:01<br>18:19 | 08:04<br>16:17 | 08:47<br>15:57 |
| 20                          | 08:37<br>16:36 | 07:39<br>17:40 | 06:30<br>18:37 | 06:12<br>20:38 | 05:10<br>21:34 | 04:45<br>22:08 | 05:12<br>21:50 | 06:07<br>20:49 | 07:05<br>19:32 | 08:03<br>18:17 | 08:06<br>16:15 | 08:48<br>15:57 |
| 21                          | 08:35<br>16:38 | 07:37<br>17:42 | 06:28<br>18:39 | 06:10<br>20:40 | 05:09<br>21:36 | 04:45<br>22:09 | 05:13<br>21:49 | 06:09<br>20:47 | 07:07<br>19:29 | 08:05<br>18:14 | 08:08<br>16:14 | 08:48<br>15:57 |
| 22                          | 08:34<br>16:40 | 07:34<br>17:44 | 06:25<br>18:41 | 06:08<br>20:42 | 05:07<br>21:38 | 04:45<br>22:09 | 05:15<br>21:47 | 06:11<br>20:45 | 07:09<br>19:27 | 08:07<br>18:12 | 08:09<br>16:12 | 08:49<br>15:58 |
| 23                          | 08:33<br>16:42 | 07:32<br>17:47 | 06:22<br>18:43 | 06:05<br>20:44 | 05:06<br>21:39 | 04:45<br>22:09 | 05:17<br>21:46 | 06:13<br>20:42 | 07:11<br>19:24 | 08:09<br>18:10 | 08:11<br>16:11 | 08:50<br>15:58 |
| 24                          | 08:31<br>16:44 | 07:30<br>17:49 | 06:20<br>18:45 | 06:03<br>20:46 | 05:04<br>21:41 | 04:46<br>22:09 | 05:18<br>21:44 | 06:14<br>20:40 | 07:13<br>19:21 | 08:11<br>18:07 | 08:13<br>16:10 | 08:50<br>15:59 |
| 25                          | 08:30<br>16:46 | 07:27<br>17:51 | 06:17<br>18:47 | 06:01<br>20:48 | 05:03<br>21:42 | 04:46<br>22:09 | 05:20<br>21:43 | 06:16<br>20:38 | 07:14<br>19:19 | 07:13<br>17:05 | 08:15<br>16:09 | 08:50<br>16:00 |
| 26                          | 08:28<br>16:48 | 07:25<br>17:53 | 06:15<br>18:49 | 05:58<br>20:50 | 05:02<br>21:44 | 04:46<br>22:09 | 05:22<br>21:41 | 06:18<br>20:35 | 07:16<br>19:16 | 07:15<br>17:03 | 08:17<br>16:07 | 08:51<br>16:00 |
| 27                          | 08:27<br>16:50 | 07:23<br>17:55 | 06:12<br>18:51 | 05:56<br>20:51 | 05:00<br>21:45 | 04:47<br>22:09 | 05:23<br>21:39 | 06:20<br>20:33 | 07:18<br>19:14 | 07:17<br>17:01 | 08:19<br>16:06 | 08:51<br>16:01 |
| 28                          | 08:25<br>16:52 | 07:20<br>17:57 | 06:10<br>18:53 | 05:54<br>20:53 | 04:59<br>21:47 | 04:48<br>22:09 | 05:25<br>21:37 | 06:22<br>20:30 | 07:20<br>19:11 | 07:19<br>16:58 | 08:20<br>16:05 | 08:51<br>16:02 |
| 29                          | 08:23<br>16:54 | 07:18<br>19:55 | 06:07<br>20:55 | 05:51<br>21:48 | 04:58<br>22:09 | 04:48<br>22:09 | 05:27<br>21:36 | 06:24<br>20:28 | 07:22<br>19:09 | 07:21<br>16:56 | 08:22<br>16:04 | 08:51<br>16:03 |
| 30                          | 08:22<br>16:56 | 07:15<br>19:57 | 06:05<br>20:57 | 05:49<br>21:50 | 04:57<br>21:50 | 04:49<br>22:08 | 05:28<br>21:34 | 06:26<br>20:25 | 07:24<br>19:06 | 07:23<br>16:54 | 08:24<br>16:03 | 08:51<br>16:04 |
| 31                          | 08:20<br>16:58 | 07:12<br>19:59 | 06:02<br>21:59 | 05:45<br>21:51 | 04:55<br>21:51 | 04:55<br>21:32 | 05:30<br>20:23 | 06:28<br>19:06 | 07:25<br>16:52 | 07:25<br>16:52 | 08:51<br>16:05 | 08:51<br>16:05 |
| Potential sun hours         | 243            | 270            | 366            | 423            | 500            | 518            | 520            | 464            | 383            | 326            | 254            | 226            |
| Sum of minutes with flicker | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              | 0              |

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

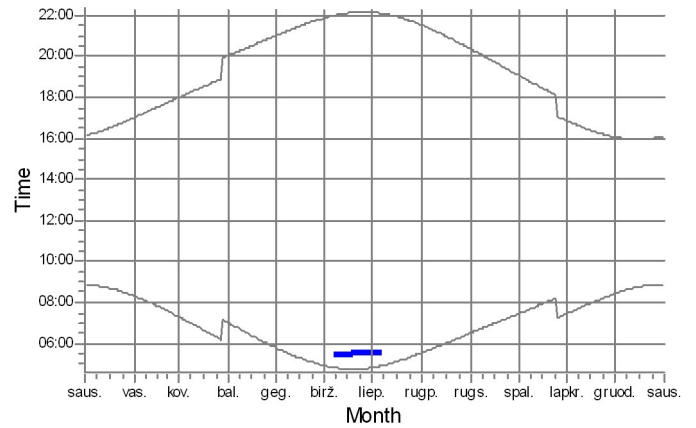
|              |                  |                                 |                                |                      |
|--------------|------------------|---------------------------------|--------------------------------|----------------------|
| Day in month | Sun rise (hh:mm) | First time (hh:mm) with flicker | Last time (hh:mm) with flicker | Minutes with flicker |
|              | Sun set (hh:mm)  | First time (hh:mm) with flicker | Last time (hh:mm) with flicker | Minutes with flicker |

## SHADOW - Calendar per WTG, graphical

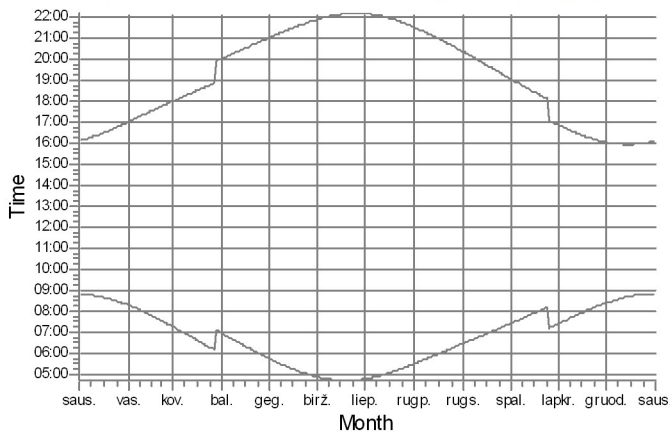
1: Amperius VK 250 8 4.5 !O!hub: 18,0 m (TOT: 20,3 m) (3)



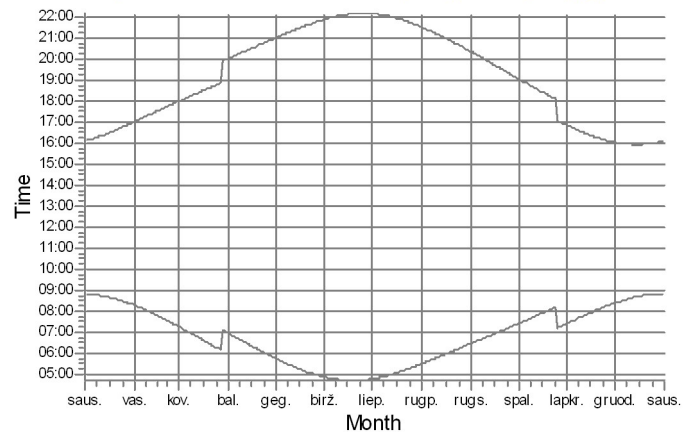
2: Amperius VK 250 8 4.5 !O!hub: 18,0 m (TOT: 20,3 m) (4)



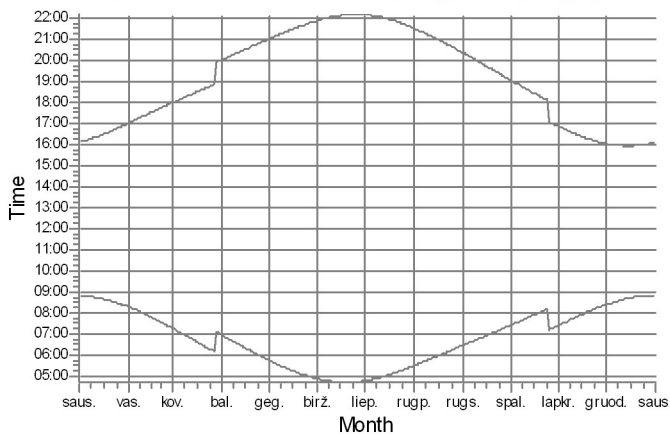
3: Amperius VK 250 8 4.5 !O!hub: 18,0 m (TOT: 20,3 m) (5)



4: Amperius VK 250 8 4.5 !O!hub: 18,0 m (TOT: 20,3 m) (6)



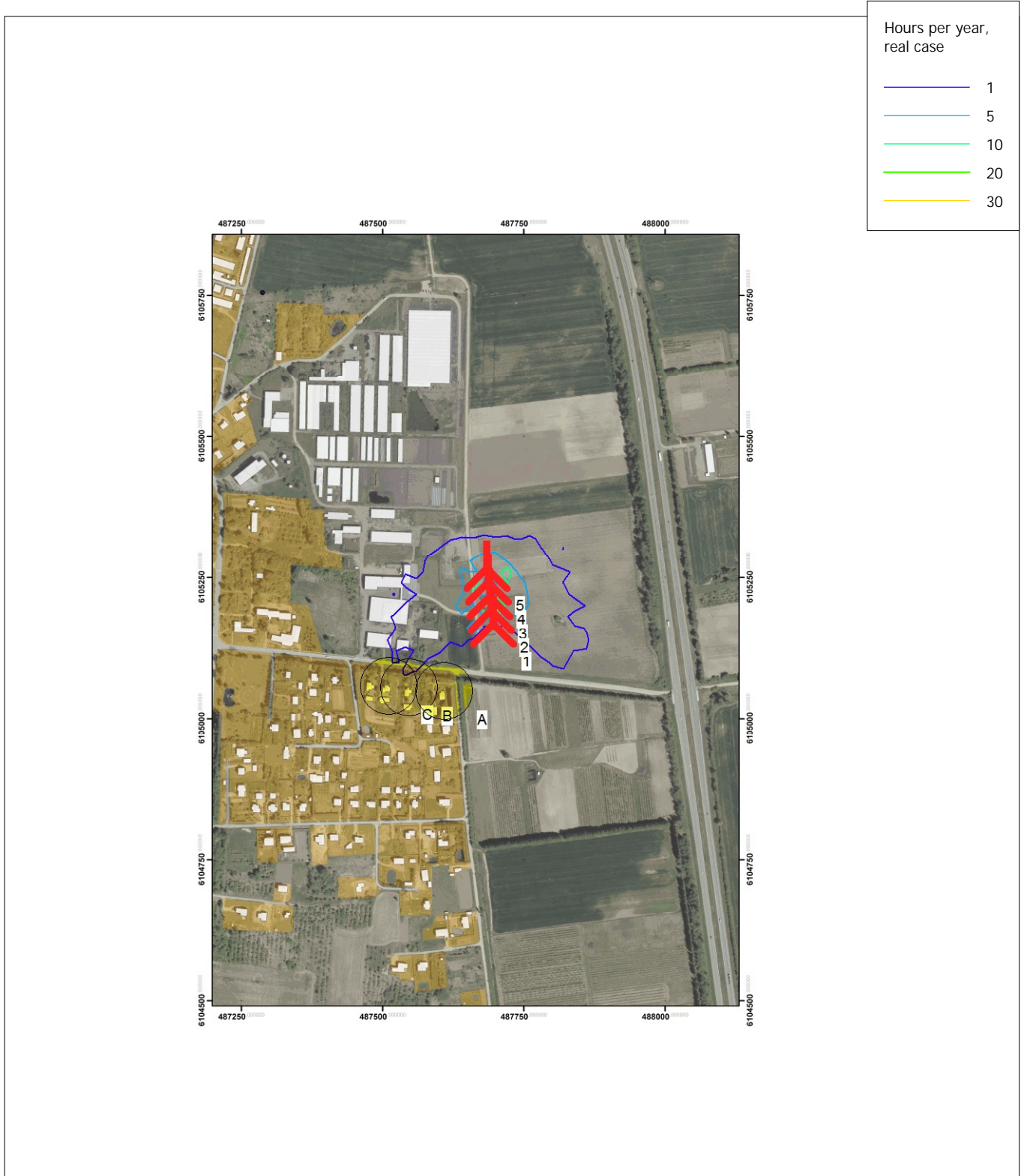
5: Amperius VK 250 8 4.5 !O!hub: 18,0 m (TOT: 20,3 m) (7)



Shadow receptors

C: Shadow Receptor: 1,0 × 1,0 Azimuth: 0,0° Slope: 90,0° (8)

## SHADOW - Map



New WTG

Shadow receptor