

**Attachment J: Revised shadow flicker assessment
Example shadow flicker device**



15 October 2015

To Stephen Crowe

Copy to

From Julien Gaschignard

Tel 8687 8810

Subject Lal Lal Wind Farm Shadow Flicker Assessment

Job no. 31/32671

1 Scope of Work

Undertake a shadow-flicker assessment for WestWind Energy Pty Ltd for the proposed wind farm at Lal Lal in Western Victoria using the worst case scenario parameters. The results of the assessment are provided in this brief report.

2 Methodology

The following methodology was used:

1. Request for information, including:
 - Turbine layout (turbine designations and coordinates) details
 - Turbine model including hub height and rotor diameter details
 - Digital contour information for an area at least 5 km from the site boundary
 - Residence (sensitive receivers) designations and coordinates
2. Input of base information into WindPRO (v2.9) wind modelling software
3. Selection of shadow flicker calculation parameters
4. Reporting

3 Lal Lal Wind Farm

Lal Lal Wind Farm is a 60 turbine project split into two areas, located approximately 90km west of Melbourne and approximately 15km from Ballarat.

Figure 1 shows the site layout of the wind and surrounding dwellings as provided by WestWind Energy Pty Ltd.

4 Standards

The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria outlines that shadow flicker needs to be considered in the development of a wind farm “where this is more likely to be an issue for turbines located to the east or west of a dwelling”. This document refers to the draft Australian National Wind Farm Development Guidelines (July, 2010) for specific guidelines. These guidelines set strict limits on the levels of acceptable shadow flicker effect, using two methods:

- An astronomic worst case scenario limited to a maximum of 30 hours per year; and
- A realistic scenario including meteorological parameters limited to a maximum of 10 hours per year. “

The standard practice for shadow flicker simulation is to model the worst case potential scenario in the first instance. This means that limits of 30 hours per year apply to the results of our simulations. This assessment for the worst case scenario is the basis for this report. Once the results of the worst case scenario are analysed, further assessment may be required to model the more realistic scenario.

Based on these guidelines, we have adopted the following parameters:

Parameter	Limit/Description
Shadow flicker limit	30 hr/yr at the receptor
Receptor height	1.5m
Zone of influence of shadows	Either 20% of sun covered by blade with a distance limit of 265 x Max Blade Chord (m)
Maximum angle to the Sun	3 degrees

5 Inputs

The shadow flicker assessment was based on the following inputs:

- Turbine characteristics;
- Turbine layout locations **in GIS format;**
- 10m digital contour information in GIS format (1m contours were provided the individual sites but didn't extend as far as all dwellings so for consistency 10m contours were used for both sites);
- Residential dwellings in GIS format;
- **GIS data was provided in coordinate system GDA 1994, MGA Zone 55.**

6 Assumptions

Key assumptions used in model:

Parameter	Limit/Description
Turbine model	The configuration of the Alstom 122 was used as specified by the WestWind Energy Pty Ltd as similar turbine to what is proposed.
Turbine Tower Height	100m (as specified by WestWind Energy Pty Ltd)
Max Chord Length	4m
Turbine orientation and rotation	Worst case (turbines are always perpendicular to the incident direction of the sunlight and always rotating.) Distances between the rotor plane and the tower axis are negligible.
Maximum Distance of Influence	256 x Max Chord Length (4). Therefore 1024m.
Receptor mode	Greenhouse mode' for receivers (i.e. that the receptors do not face any particular direction, but instead will face all directions. This is most appropriate as the actual properties of the receptors – e.g. location and positioning of windows - are unknown); Existing screening is not included in model using WindPRO.

7 Results

7.1 Worst Case Scenario Results

A table showing the results of the modelled shadow flicker for the Worst Case Scenario for each dwelling (receptor) are shown for the in Appendix A. A summary of these results is shown in Table 1 below where exceedances are indicated in red. Figure 2 shows the locations of the dwellings with exceedances.

Table 1 Hours of Shadow Flicker for Worst Case

Shadow flicker hours per year	Number of dwellings
0 hrs/yr	60
0-30 hrs/yr (Shadow flicker limit)	2
30-50 hours	4
More than 50 hours	2
Total Number of Dwellings Assessed	68

Appendix B contains the Main Results detailed output from the WindPRO software. Appendix C shows the Calendar Results output from WindPRO where for each day of the year the turbine(s) that have contributed to the shadow flicker hours experienced at the receptor.

After initial simulations, the 'worst-case' results from WindPRO indicate that the total shadow flicker exceeds the maximum allowable limit of 30 hours per year at six receptors. Of these, four receptors are host participants and have entered into an agreement with the wind farm. No further mitigation is required at these host landholders. The remaining two locations H18aa and J17ab have shadow flicker of 44.1 hours and 32.7 hours per year respectively.

7.2 Breakdown of Shadow Flicker at H18aa and J17ab

Receptor H18aa experiences shadow flicker from turbine 2 (ESWT02) which is approximately 680m away in a South-East direction (see Figure 1). The shadow flicker from this turbine is experienced in the months of January and February between 7am and 8am; and in October, November and early December between 6.30am and 7.30am. These results are detailed in the Calendar Results on pages 14-15 in Appendix C.

Receptor J17ab experiences shadow flicker from turbines 13 (ESWT13) and 16 (EWST16). Turbine 13 is located approximate 1km away in a South-West direction and contributes to the 19.1hrs of the total shadow flicker between 7.30pm and 8.30pm from November to February. Turbine 16 is located approximate 1km away in an East direction and contributes to the 13.6hrs of the total shadow flicker between 7.30am and 8.30am from March to April and 6.45am to 7.30am in September. These results are detailed in the Calendar results on page 23-24 in Appendix C (please note the WindPRO names turbines sequentially from 1 onwards hence why the turbine numbers do not coincide for these two turbines).

7.3 Limitations of Results

The results presented in this report are presented for the Worst Case Scenario only.

All host dwellings which have been modelled for shadow flicker in this report have been assumed to be exempt from meeting Planning Permit conditions of 30 hours/year limit.

A specific turbine model with turbine parameters was not specified but instead parameters of similar turbine models and specific turbine height and blade width were provided by WestWind Energy Pty Ltd. Any changes to the turbine hub height, blade length or max chord length from those stated in this report would change the position of the sun in relation to the blades of the wind turbine and thus would change the results.

Another limitation as stated in the Inputs section was that 10m contours were used in the model for consistency reasons as the 1m contours didn't extend to all receptor locations. If 1m contours were extended to encompass all receptors, the heights of turbines and receptors would be adjusted to be more accurate and as a result would likely slightly alter the modelled results.

8 Conclusion

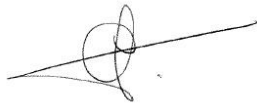
From the 68 dwellings surrounding the wind farm only six dwellings are above the maximum allowable limit of 30 hours per year. The planning permit conditions exempt host landholders from this requirement.

Two dwellings (H18aa and J17ab) have shadow flicker of 44.1 hours and 32.7 hours per year respectively, those dwellings are owned and inhabited by neighbouring non-participant landowners.

A number of mitigation measures can be implemented to meet the planning permit conditions:

- Assess a real case (actual) scenario to take into account modelling for meteorological conditions including cloud cover and wind speed and direction as well as landscape considerations as per the “National Wind Farm Guidelines – Draft July 2010”,
- Assess the actual view of the turbines from the properties for blocked views from wind breaks for example and offer additional screening if required,
- Install and operate a shadow flicker detection system on the relevant wind turbines to shut down their operation at the critical time to reduce shadow flicker effects at those two properties, see example from one wind turbine manufacturer here
- <http://nozebra.ipapercms.dk/Vestas/Communication/Productbrochure/TurbineOptions/VestasShadowDetectionSystem/>

Regards



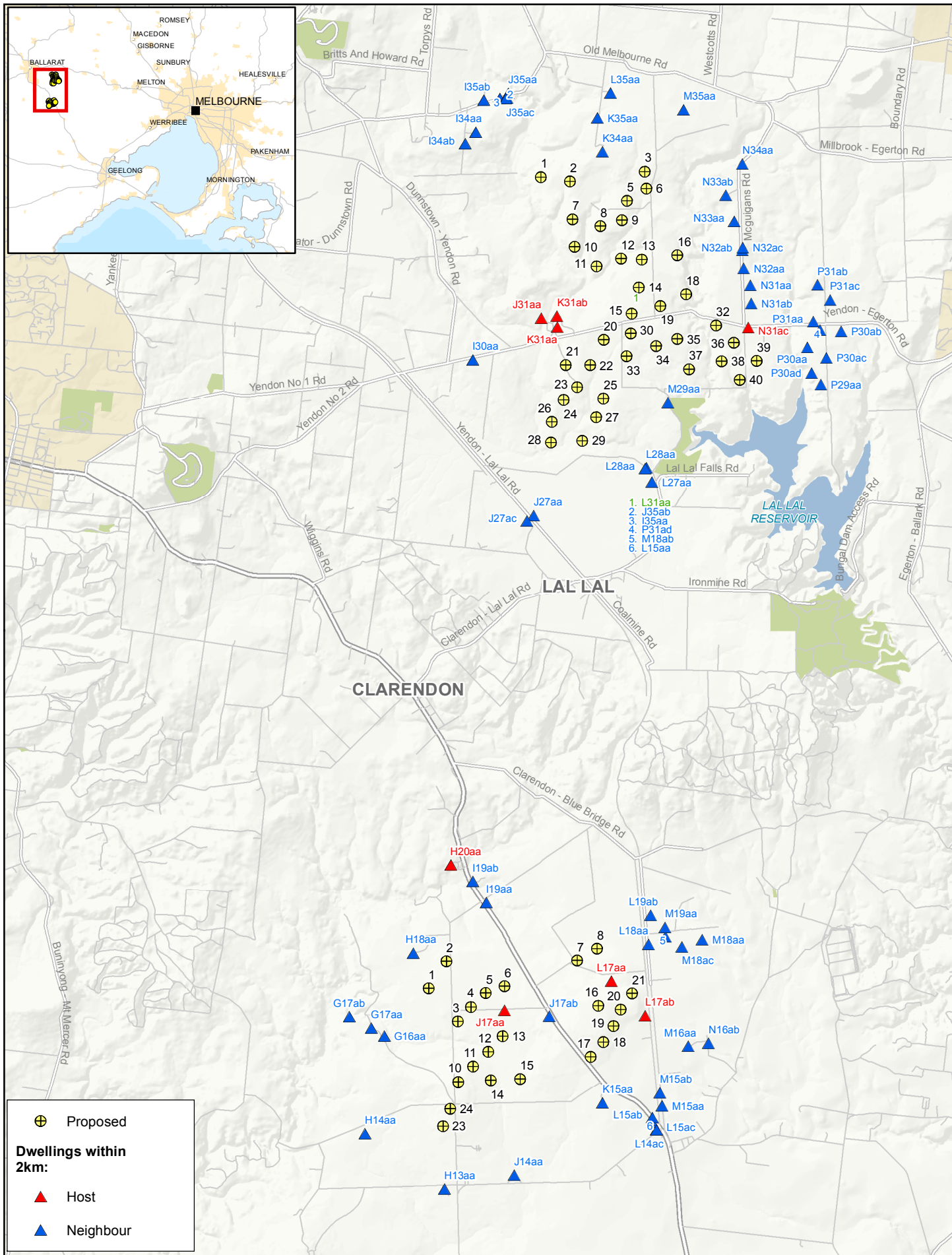
Julien Gaschignard

Principal Renewable Energy Engineer

Figures

Figure 1 – Site Layout

Figure 2 – Shadow Flicker Exceedances



WestWind Energy Pty Ltd
Lal Lal Wind Farm Shadow Flicker Assessment

Job Number 31-32671
Revision C
Date 14 Apr 2015

Site Layout

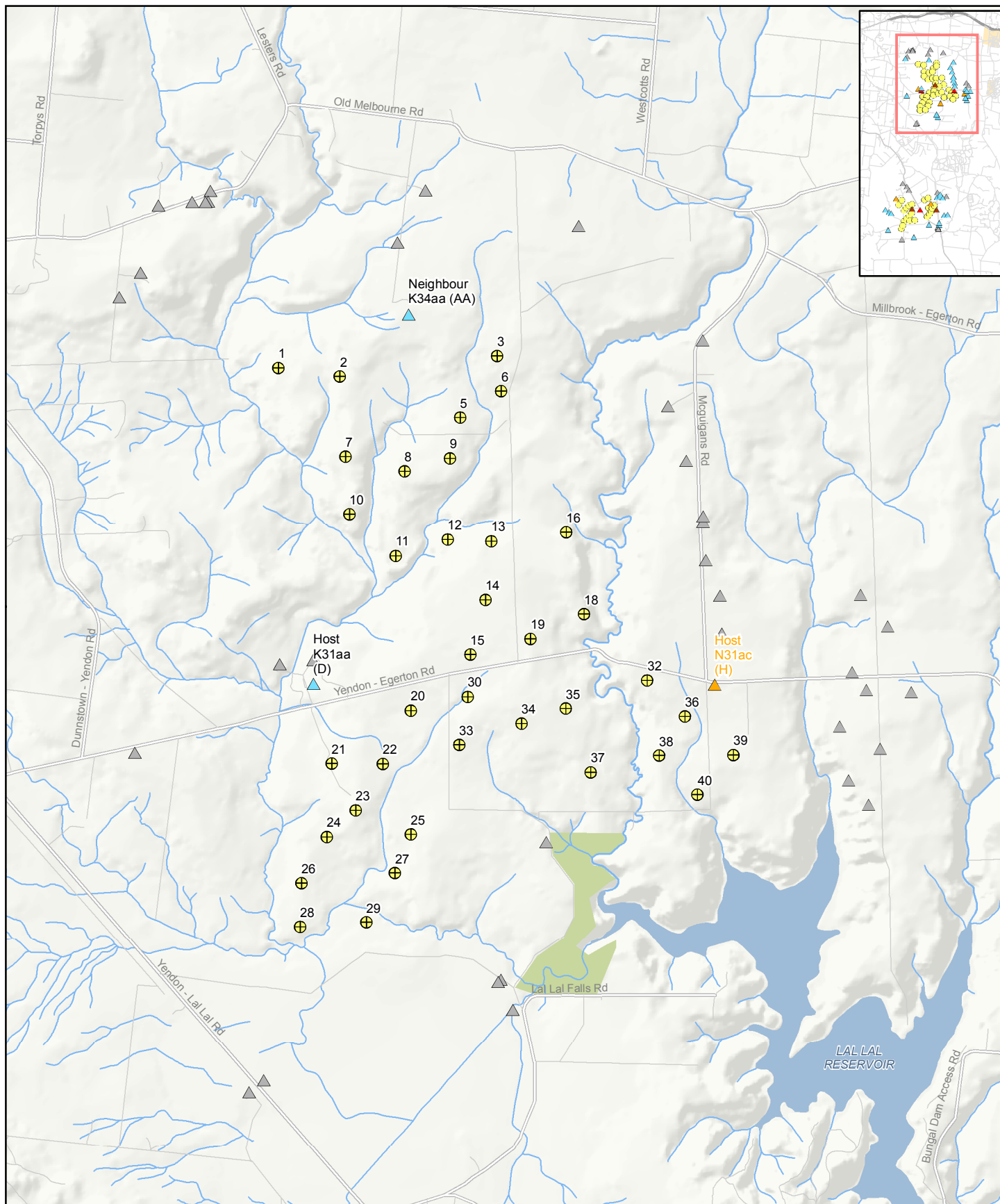
Figure 1

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180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

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Data source: Turbines and Dwellings supplied by client, base data supplied from DSE (Jan 2015). Created by:cillingworth

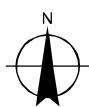
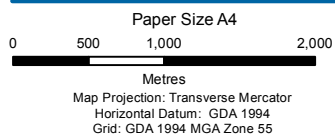


Modelled Shadow Flicker hours/year

- ▲ 0 hrs/yr
- ▲ 0 - 30 hrs/yr
- ▲ 30 - 50 hrs/yr

⊕ Proposed Turbines

Please refer to Appendix A for more detailed results of exceedances from WindPRO modelling software



WestWind Energy Pty Ltd
Lal Lal Wind Farm Shadow Flicker Assessment

North Site
Shadow Flicker Exceedances - Worst Case Scenario

Job Number 31-32671
Revision C
Date 14 Apr 2015

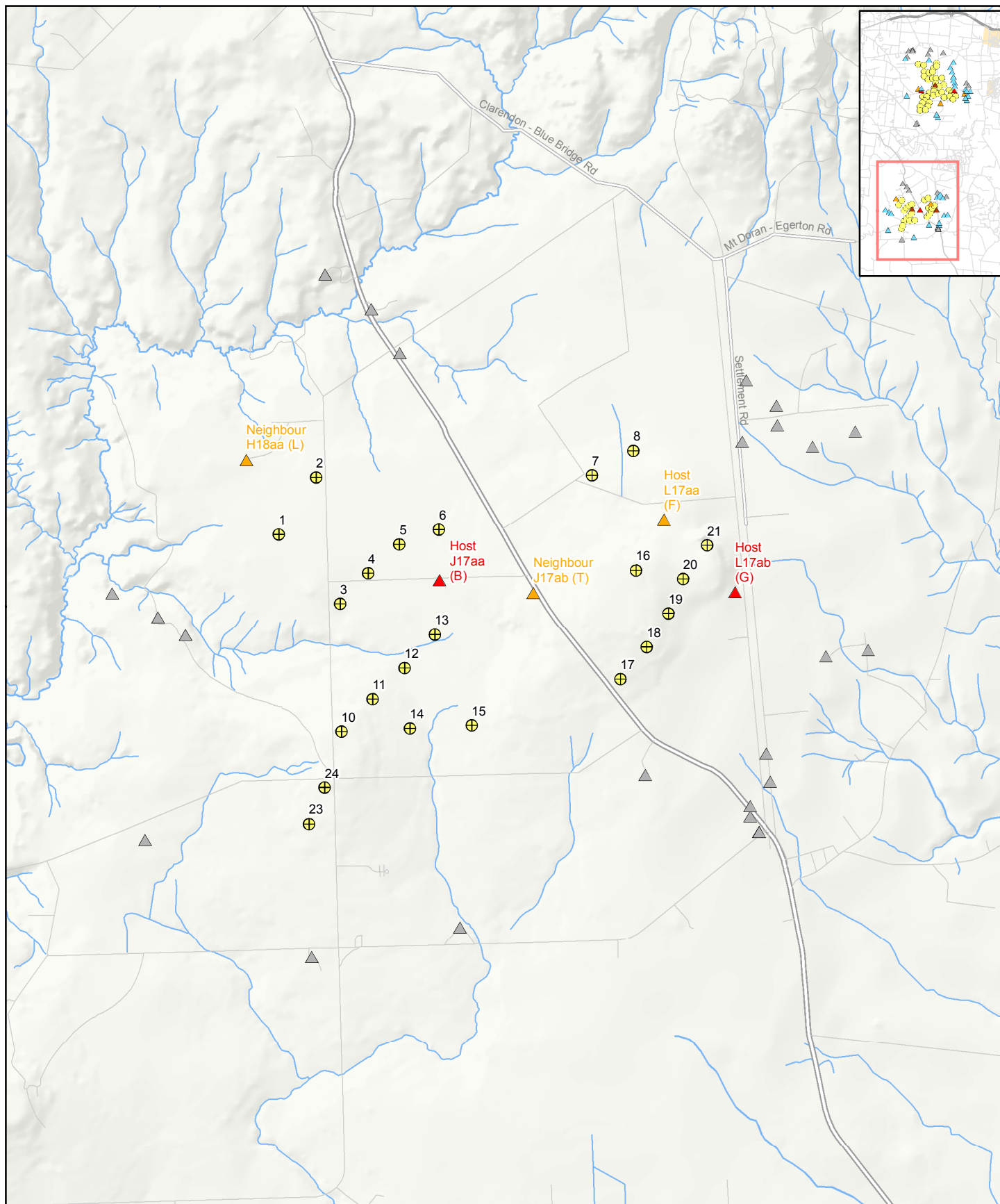
Figure 2

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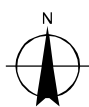
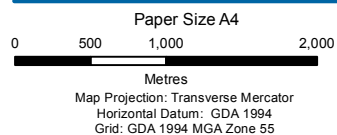


Modelled Shadow Flicker hours/year

- 0 hrs/yr
- 30 - 50 hrs/yr
- > 50 hrs/yr

Proposed Turbines

Please refer to Appendix A for more detailed results of exceedances from WindPRO modelling software



WestWind Energy Pty Ltd
Lal Lal Wind Farm Shadow Flicker Assessment

Job Number 31-32671
Revision C
Date 14 Apr 2015

South Site
Shadow Flicker Exceedances - Worst Case Scenario

Figure 2

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Data source: Turbines and Dwellings supplied by client, base data supplied from DSE (Jan 2015). Created by:cillingworth

Appendix A – Total Shadow Flicker hours per year for all Receptors

(Blue highlighting indicates where dwelling has exceeded shadow flicker limit of 30hrs/year)

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
H20aa	A	Host	0.0
J17aa	B	Host	102.1
J31aa	C	Host	0.0
K31aa	D	Host	22.5
K31ab	E	Host	0.0
L17aa	F	Host	46.6
L17ab	G	Host	112.9
N31ac	H	Host	31.6
G17aa	I	Neighbour	0.0
H13aa	J	Neighbour	0.0
H14aa	K	Neighbour	0.0
H18aa	L	Neighbour	44.1
I19aa	M	Neighbour	0.0
I30aa	N	Neighbour	0.0
I34aa	O	Neighbour	0.0
I34ab	P	Neighbour	0.0
I35aa	Q	Neighbour	0.0
I35ab	R	Neighbour	0.0
J14aa	S	Neighbour	0.0
J17ab	T	Neighbour	32.7
J27aa	U	Neighbour	0.0
J27ac	V	Neighbour	0.0
J35aa	W	Neighbour	0.0
J35ab	X	Neighbour	0.0
J35ac	Y	Neighbour	0.0
K15aa	Z	Neighbour	0.0
K34aa	AA	Neighbour	18.6

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
K35aa	AB	Neighbour	0.0
L14ac	AC	Neighbour	0.0
L15aa	AD	Neighbour	0.0
L15ab	AE	Neighbour	0.0
L18aa	AF	Neighbour	0.0
L19ab	AG	Neighbour	0.0
L27aa	AH	Neighbour	0.0
L28aa	AI	Neighbour	0.0
L35aa	AJ	Neighbour	0.0
M15aa	AK	Neighbour	0.0
M15ab	AL	Neighbour	0.0
M16aa	AM	Neighbour	0.0
M18aa	AN	Neighbour	0.0
M18ab	AO	Neighbour	0.0
M18ac	AP	Neighbour	0.0
M19aa	AQ	Neighbour	0.0
M29aa	AR	Neighbour	0.0
M35aa	AS	Neighbour	0.0
N16ab	AT	Neighbour	0.0
N31aa	AU	Neighbour	0.0
N31ab	AV	Neighbour	0.0
N32aa	AW	Neighbour	0.0
N32ab	AX	Neighbour	0.0
N32ac	AY	Neighbour	0.0
N33aa	AZ	Neighbour	0.0
N33ab	BA	Neighbour	0.0
N34aa	BB	Neighbour	0.0
P29aa	BC	Neighbour	0.0
P30aa	BD	Neighbour	0.0
P30ab	BE	Neighbour	0.0
P30ac	BF	Neighbour	0.0
P30ad	BG	Neighbour	0.0

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
P31aa	BH	Neighbour	0.0
P31ab	BI	Neighbour	0.0
P31ac	BJ	Neighbour	0.0
P31ad	BK	Neighbour	0.0
L15ac	BL	Neighbour	0.0
I19ab	BM	Neighbour	0.0
G17ab	BN	Neighbour	0.0
G16aa	BO	Neighbour	0.0
L28aa	BP	Neighbour	0.0

Appendix B – Main Results Output from WindPRO

Project: **32671_LalLal_20150316** Description: Vic wind farm in Lal Lal near Ballarat

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SHADOW - Main Result

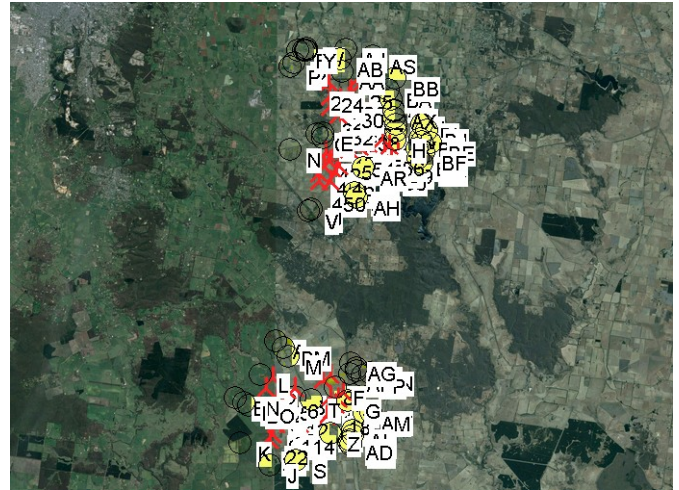
Calculation: Scenario 2 - fixed distance 1km

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
 The calculated times are "worst case" given by the following assumptions:
 The sun is shining all the day, from sunrise to sunset
 The rotor plane is always perpendicular to the line from the WTG to the sun
 The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values.
 A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
 Height contours used: Height Contours: elevation_10m.wpo (5)
 Obstacles not used in calculation
 Eye height: 1.5 m
 Grid resolution: 5.0 m



Scale 1:400,000

New WTG

Shadow receptor

WTGs

UTM (south)-WGS84 Zone: 55				WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
East	North	Z	Row data/Description	Valid	Manufact.					Calculation distance [m]	RPM [RPM]
		[m]									
1	233,500	5,817,822	392.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
2	233,855	5,818,367	390.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
3	234,084	5,817,161	390.9 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
4	234,351	5,817,454	395.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
5	234,648	5,817,731	398.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
6	235,025	5,817,868	399.9 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
7	236,483	5,818,385	407.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
8	236,876	5,818,621	404.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
9	234,095	5,815,947	410.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
10	234,393	5,816,255	398.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
11	234,695	5,816,555	393.4 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
12	234,986	5,816,872	397.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
13	234,746	5,815,979	393.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
14	235,337	5,816,007	397.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
15	236,903	5,817,482	430.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
16	236,754	5,816,449	418.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
17	237,003	5,816,752	424.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
18	237,212	5,817,071	420.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
19	237,353	5,817,401	420.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
20	237,579	5,817,722	420.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
21	233,785	5,815,068	397.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
22	233,936	5,815,414	407.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
23	235,749	5,834,082	520.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
24	236,335	5,834,001	532.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
25	237,834	5,834,197	540.5 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
26	237,479	5,833,611	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
27	237,872	5,833,859	527.1 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
28	236,389	5,833,239	526.5 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
29	236,950	5,833,099	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
30	237,383	5,833,222	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
31	236,427	5,832,689	510.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
32	236,867	5,832,295	501.8 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
33	237,362	5,832,449	511.1 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
34	237,778	5,832,435	518.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
35	237,722	5,831,876	516.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
36	237,577	5,831,353	509.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
37	238,492	5,832,517	516.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
38	238,291	5,832,052	515.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0

To be continued on next page...

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:22 PM / 2
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

UTM (south)-WGS84 Zone: 55				WTG type								Shadow data	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM	
			[m]					[kW]	[m]	[m]	[m]	[RPM]	
39	238,663	5,831,739	510.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
40	238,151	5,831,503	510.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
41	237,011	5,830,822	493.5	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
42	236,257	5,830,315	483.3	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
43	236,743	5,830,314	484.1	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
44	236,485	5,829,872	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
45	236,209	5,829,620	480.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
46	237,009	5,829,643	480.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
47	235,970	5,829,179	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
48	236,860	5,829,275	475.4	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
49	235,956	5,828,763	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
50	236,585	5,828,803	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
51	237,553	5,830,953	500.7	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
52	239,265	5,831,110	510.8	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
53	237,473	5,830,494	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
54	238,063	5,830,698	506.4	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
55	238,489	5,830,840	505.7	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
56	239,624	5,830,764	503.8	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
57	238,726	5,830,234	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
58	239,378	5,830,392	492.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
59	240,083	5,830,399	500.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
60	239,743	5,830,020	490.1	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	

Shadow receptor-Input

UTM (south)-WGS84 Zone: 55									
No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	233,938	5,820,296	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
B	235,026	5,817,386	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
C	235,760	5,831,259	480.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
D	236,084	5,831,076	480.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
E	236,079	5,831,300	480.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
F	237,170	5,817,965	414.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
G	237,848	5,817,275	404.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
H	239,908	5,831,068	509.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
I	232,345	5,817,030	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
J	233,813	5,813,799	378.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
K	232,224	5,814,915	377.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
L	233,189	5,818,529	390.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
M	234,649	5,819,546	386.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
N	234,381	5,830,418	500.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
O	234,437	5,834,986	542.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
P	234,231	5,834,755	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Q	234,926	5,835,662	539.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
R	234,605	5,835,628	538.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
S	235,221	5,814,079	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
T	235,924	5,817,263	415.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
U	235,611	5,827,300	470.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
V	235,470	5,827,188	470.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
W	235,101	5,835,765	534.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
X	235,080	5,835,665	538.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Y	235,054	5,835,659	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Z	236,990	5,815,534	401.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AA	236,991	5,834,590	544.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AB	236,884	5,835,273	547.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AC	238,074	5,814,991	388.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AD	237,993	5,815,139	389.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AE	237,993	5,815,237	390.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"

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Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:22 PM / 3

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GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

UTM (south)-WGS84 Zone: 55

No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
AF	237,913	5,818,705	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AG	237,955	5,819,290	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AH	237,982	5,827,972	460.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AI	237,867	5,828,259	460.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AJ	237,151	5,835,770	552.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AK	238,182	5,815,469	390.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AL	238,142	5,815,735	393.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AM	238,711	5,816,662	390.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AN	238,991	5,818,801	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AO	238,248	5,818,860	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AP	238,584	5,818,659	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AQ	238,239	5,819,045	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AR	238,304	5,829,565	480.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AS	238,613	5,835,432	560.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AT	239,115	5,816,724	386.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AU	239,957	5,831,913	519.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AV	239,974	5,831,555	515.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AW	239,820	5,832,252	521.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AX	239,795	5,832,616	529.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AY	239,798	5,832,667	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AZ	239,635	5,833,198	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BA	239,461	5,833,716	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BB	239,792	5,834,345	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BC	241,371	5,829,923	491.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BD	241,097	5,830,670	502.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BE	241,778	5,830,993	510.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BF	241,481	5,830,456	504.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BG	241,181	5,830,156	492.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BH	241,214	5,831,184	504.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BI	241,297	5,831,922	512.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BJ	241,554	5,831,622	509.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BK	241,352	5,831,017	507.3	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BL	238,074	5,814,990	388.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BM	234,381	5,819,964	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BN	231,912	5,817,260	370.3	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BO	232,610	5,816,865	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BP	237,842	5,828,237	460.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	0:00	0	0:00
B	102:04	173	0:57
C	0:00	0	0:00
D	22:29	56	0:31
E	0:00	0	0:00
F	46:36	90	0:38
G	112:51	180	1:02
H	31:34	56	0:44
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	44:07	82	0:43
M	0:00	0	0:00
N	0:00	0	0:00

To be continued on next page...

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:22 PM / 4

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
O	0:00	0	0:00
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	0	0:00
S	0:00	0	0:00
T	32:43	102	0:28
U	0:00	0	0:00
V	0:00	0	0:00
W	0:00	0	0:00
X	0:00	0	0:00
Y	0:00	0	0:00
Z	0:00	0	0:00
AA	18:35	52	0:27
AB	0:00	0	0:00
AC	0:00	0	0:00
AD	0:00	0	0:00
AE	0:00	0	0:00
AF	0:00	0	0:00
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:22 PM / 5
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (183)	0:00	
2	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (184)	44:07	
3	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (185)	14:25	
4	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (186)	28:17	
5	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (187)	59:22	
6	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (188)	0:00	
7	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (189)	46:36	
8	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (190)	0:00	
9	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (191)	0:00	
10	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (192)	0:00	
11	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (193)	0:00	
12	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (194)	19:06	
13	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (195)	0:00	
14	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (196)	0:00	
15	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (197)	28:30	
16	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (198)	0:00	
17	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (199)	0:00	
18	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (200)	57:12	
19	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (201)	50:17	
20	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (202)	0:00	
21	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (203)	0:00	
22	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (204)	0:00	
23	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (205)	0:00	
24	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (206)	0:00	
25	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (207)	18:35	
26	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (208)	0:00	
27	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (209)	0:00	
28	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (210)	0:00	
29	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (211)	0:00	
30	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (212)	0:00	
31	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (213)	0:00	
32	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (214)	0:00	
33	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (215)	0:00	
34	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (216)	0:00	
35	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (217)	0:00	
36	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (218)	0:00	
37	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (219)	0:00	
38	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (220)	0:00	
39	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (221)	0:00	
40	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (222)	0:00	
41	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (223)	22:29	
42	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (224)	0:00	
43	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (225)	0:00	
44	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (226)	0:00	
45	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (227)	0:00	
46	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (228)	0:00	
47	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (229)	0:00	
48	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (230)	0:00	
49	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (231)	0:00	
50	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (232)	0:00	
51	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (233)	0:00	
52	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (234)	31:34	
53	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (235)	0:00	
54	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (236)	0:00	
55	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (237)	0:00	
56	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (238)	0:00	
57	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (239)	0:00	
58	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (240)	0:00	
59	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (241)	0:00	
60	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (242)	0:00	

Appendix C – Calendar Results Output from WindPRO

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 1
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** A - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (1)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:45	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:45	20:17	20:44
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:47
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:03	07:29	07:41	07:27	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project: 32671_LalLal_20150316	Description: Vic wind farm in Lal Lal near Ballarat	Printed/Page 14/04/2015 12:26 PM / 2
Licensed user: GHD Services Pty Ltd Attn.: Software Licencing & Compliance 145 Ann Street BRISBANE QLD 4000 61 7 4720 0463 Chris Davies / Christopher.Davies@ghd.com Calculated: 14/04/2015 12:22 PM/2.9.285		

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** B - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (2)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	06:38	07:09	07:38	18:29 (4)	07:05
	20:50	20:38	20:06	19:20	18:58 (4)	17:39
2	06:07	06:39	07:10	07:39	18:30 (4)	07:06
	20:50	20:38	20:04	19:18	18:56 (4)	17:38
3	06:08	06:41	07:11	07:40	18:31 (4)	07:07
	20:50	20:37	20:03	19:17	18:55 (4)	17:37
4	06:09	06:42	07:12	07:41	18:33 (4)	07:08
	20:50	20:36	20:02	19:15	18:53 (4)	17:35
5	06:10	06:43	19:46 (3)	07:13	06:42	17:37 (4)
	20:50	20:35	19:52 (3)	20:00	18:14	17:50 (4)
6	06:11	06:44	19:42 (3)	07:14	06:43	07:10
	20:50	20:34	19:56 (3)	19:59	18:12	17:33
7	06:11	06:45	19:40 (3)	07:15	06:44	07:11
	20:50	20:33	19:58 (3)	19:57	18:11	17:32
8	06:12	06:46	19:40 (3)	07:16	06:45	07:11
	20:50	20:32	20:00 (3)	19:56	18:09	17:31
9	06:13	06:47	19:38 (3)	07:17	06:45	07:12
	20:50	20:31	20:01 (3)	19:54	18:08	17:30
10	06:14	06:48	19:37 (3)	07:18	06:46	07:13
	20:50	20:30	20:02 (3)	19:53	18:06	17:29
11	06:15	06:50	19:36 (3)	07:19	18:45 (4)	06:47
	20:50	20:29	20:03 (3)	19:51	18:58 (4)	18:05
12	06:16	06:51	19:36 (3)	07:20	18:41 (4)	06:48
	20:49	20:27	20:03 (3)	19:50	19:01 (4)	18:04
13	06:17	06:52	19:35 (3)	07:21	18:39 (4)	06:49
	20:49	20:26	20:04 (3)	19:48	19:03 (4)	18:02
14	06:18	06:53	19:35 (3)	07:22	18:37 (4)	06:50
	20:49	20:25	20:03 (3)	19:47	19:05 (4)	18:01
15	06:19	06:54	19:34 (3)	07:23	18:35 (4)	06:51
	20:49	20:24	20:01 (3)	19:45	19:06 (4)	17:59
16	06:20	06:55	19:34 (3)	07:24	18:33 (4)	06:52
	20:48	20:23	20:00 (3)	19:44	19:07 (4)	17:58
17	06:22	06:56	19:35 (3)	07:24	18:32 (4)	06:53
	20:48	20:22	20:00 (3)	19:42	19:08 (4)	17:57
18	06:23	06:57	19:35 (3)	07:25	18:31 (4)	06:54
	20:47	20:20	19:59 (3)	19:41	19:09 (4)	17:55
19	06:24	06:58	19:35 (3)	07:26	18:29 (4)	06:54
	20:47	20:19	19:57 (3)	19:39	19:08 (4)	17:54
20	06:25	06:59	19:36 (3)	07:27	18:28 (4)	06:55
	20:47	20:18	19:56 (3)	19:38	19:08 (4)	17:53
21	06:26	07:01	19:36 (3)	07:28	18:28 (4)	06:56
	20:46	20:17	19:55 (3)	19:36	19:08 (4)	17:51
22	06:27	07:02	19:37 (3)	07:29	18:27 (4)	06:57
	20:45	20:15	19:54 (3)	19:35	19:08 (4)	17:50
23	06:28	07:03	19:38 (3)	07:30	18:27 (4)	06:58
	20:45	20:14	19:52 (3)	19:33	19:08 (4)	17:49
24	06:29	07:04	19:40 (3)	07:31	18:27 (4)	06:59
	20:44	20:13	19:51 (3)	19:32	19:08 (4)	17:47
25	06:30	07:05	19:42 (3)	07:32	18:26 (4)	07:00
	20:44	20:11	19:50 (3)	19:30	19:08 (4)	17:46
26	06:31	07:06	19:47 (3)	07:33	18:26 (4)	07:01
	20:43	20:10	19:48 (3)	19:29	19:07 (4)	17:45
27	06:33	07:07		07:34	18:27 (4)	07:02
	20:42	20:09		19:27	19:06 (4)	17:44
28	06:34	07:08		07:35	18:27 (4)	07:03
	20:42	20:07		19:26	19:05 (4)	17:42
29	06:35			07:36	18:27 (4)	07:03
	20:41			19:24	19:03 (4)	17:41
30	06:36			07:36	18:27 (4)	07:04
	20:40			19:23	19:01 (4)	17:40
31	06:37			07:37	18:28 (4)	
	20:39			19:21	18:59 (4)	
Potential sun hours	447	378	383	334	314	288
Total, worst case		431	727	112	636	1667

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 3
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** B - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (2)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

July		August		September		October		November		December			
1	07:41 17:16	55	15:25 (5) 16:20 (5)	07:25 17:36	06:46 18:02		06:01 18:28	22	17:19 (4) 17:41 (4)	06:18 19:58	24	19:07 (3) 19:31 (3)	05:57 20:30
2	07:41 17:16	56	15:25 (5) 16:21 (5)	07:24 17:37	06:45 18:03		05:59 18:29	16	17:22 (4) 17:38 (4)	06:17 19:59	22	19:08 (3) 19:30 (3)	05:56 20:31
3	07:41 17:17	56	15:25 (5) 16:21 (5)	07:23 17:38	06:44 18:04		05:57 18:30	7	17:26 (4) 17:33 (4)	06:16 20:00	20	19:09 (3) 19:29 (3)	05:56 20:32
4	07:40 17:17	55	15:26 (5) 16:21 (5)	07:22 17:39	06:42 18:05		06:56 19:30			06:15 20:01	17	19:11 (3) 19:28 (3)	05:56 20:33
5	07:40 17:18	54	15:26 (5) 16:20 (5)	07:21 17:40	06:41 18:06		06:54 19:31			06:14 20:02	12	19:13 (3) 19:25 (3)	05:56 20:34
6	07:40 17:18	54	15:26 (5) 16:20 (5)	07:20 17:41	06:39 18:07		06:53 19:32			06:13 20:03	6	19:16 (3) 19:22 (3)	05:56 20:35
7	07:40 17:19	54	15:27 (5) 16:21 (5)	07:19 17:41	06:38 18:07	13	17:32 (4) 17:45 (4)		06:51 19:33	06:12 20:04			05:56 20:35
8	07:40 17:19	53	15:28 (5) 16:21 (5)	07:18 17:42	06:36 18:08	19	17:29 (4) 17:48 (4)		06:50 19:34	06:11 20:05			05:56 20:36
9	07:39 17:20	53	15:27 (5) 16:20 (5)	07:17 17:43	06:35 18:09	24	17:25 (4) 17:49 (4)		06:48 19:35	06:10 20:07			05:56 20:37
10	07:39 17:20	52	15:28 (5) 16:20 (5)	07:15 17:44	06:33 18:10	26	17:24 (4) 17:50 (4)		06:47 19:36	06:09 20:08			05:56 20:38
11	07:39 17:21	51	15:29 (5) 16:20 (5)	07:14 17:45	06:31 18:11	29	17:22 (4) 17:51 (4)		06:46 19:37	06:08 20:09			05:56 20:39
12	07:38 17:22	51	15:29 (5) 16:20 (5)	07:13 17:46	06:30 18:12	31	17:20 (4) 17:51 (4)		06:44 19:38	06:07 20:10			05:56 20:40
13	07:38 17:22	50	15:30 (5) 16:20 (5)	07:12 17:46	06:28 18:12	33	17:19 (4) 17:52 (4)		06:43 19:39	06:06 20:11			05:56 20:40
14	07:37 17:23	49	15:30 (5) 16:19 (5)	07:11 17:47	06:27 18:13	36	17:17 (4) 17:53 (4)		06:41 19:40	06:05 20:12			05:57 20:41
15	07:37 17:24	48	15:31 (5) 16:19 (5)	07:10 17:48	06:25 18:14	37	17:17 (4) 17:54 (4)		06:40 19:41	06:05 20:13			05:57 20:42
16	07:36 17:24	46	15:32 (5) 16:18 (5)	07:08 17:49	06:24 18:15	40	17:15 (4) 17:55 (4)	4	19:17 (3) 19:21 (3)	06:04 20:14			05:57 20:43
17	07:36 17:25	45	15:33 (5) 16:18 (5)	07:07 17:50	06:22 18:16	41	17:14 (4) 17:55 (4)	8	19:13 (3) 19:21 (3)	06:03 20:15			05:57 20:43
18	07:35 17:26	44	15:33 (5) 16:17 (5)	07:06 17:51	06:21 18:17	41	17:14 (4) 17:55 (4)	12	19:03 (3) 19:23 (3)	06:03 20:16			05:58 20:44
19	07:35 17:26	42	15:35 (5) 16:17 (5)	07:04 17:52	06:19 18:17	42	17:13 (4) 17:55 (4)	15	19:09 (3) 19:24 (3)	06:02 20:17			05:58 20:44
20	07:34 17:27	41	15:35 (5) 16:16 (5)	07:03 17:52	06:18 18:18	42	17:13 (4) 17:55 (4)	17	19:07 (3) 19:24 (3)	06:01 20:18			05:59 20:45
21	07:34 17:28	39	15:36 (5) 16:15 (5)	07:02 17:53	06:16 18:19	41	17:13 (4) 17:54 (4)	19	19:03 (3) 19:26 (3)	06:01 20:20			05:59 20:46
22	07:33 17:29	37	15:38 (5) 16:15 (5)	07:01 17:54	06:14 18:20	41	17:13 (4) 17:54 (4)	21	19:06 (3) 19:27 (3)	06:00 20:21			06:00 20:46
23	07:32 17:29	35	15:39 (5) 16:14 (5)	06:59 17:55	06:13 18:21	40	17:13 (4) 17:53 (4)	22	19:05 (3) 19:27 (3)	06:00 20:22			06:00 20:47
24	07:31 17:30	33	15:40 (5) 16:13 (5)	06:58 17:56	06:11 18:22	39	17:13 (4) 17:52 (4)	24	19:04 (3) 19:28 (3)	05:59 20:23			06:01 20:47
25	07:31 17:31	30	15:41 (5) 16:11 (5)	06:56 17:57	06:10 18:23	38	17:13 (4) 17:51 (4)	26	19:04 (3) 19:30 (3)	05:59 20:24			06:01 20:47
26	07:30 17:32	26	15:43 (5) 16:09 (5)	06:55 17:57	06:08 18:23	37	17:13 (4) 17:50 (4)	27	19:04 (3) 19:31 (3)	05:58 20:25			06:02 20:48
27	07:29 17:32	22	15:46 (5) 16:08 (5)	06:54 17:58	06:07 18:24	34	17:15 (4) 17:49 (4)	27	19:05 (3) 19:32 (3)	05:58 20:26			06:02 20:48
28	07:28 17:33	18	15:48 (5) 16:06 (5)	06:52 17:59	06:05 18:25	32	17:15 (4) 17:47 (4)	28	19:03 (3) 19:33 (3)	05:57 20:27			06:03 20:49
29	07:27 17:34	10	15:52 (5) 16:02 (5)	06:51 18:00	06:04 18:26	30	17:16 (4) 17:46 (4)	29	19:04 (3) 19:33 (3)	05:57 20:28			06:04 20:49
30	07:27 17:35			06:49 18:01	06:02 18:27	27	17:17 (4) 17:44 (4)	28	19:05 (3) 19:33 (3)	05:57 20:29			06:05 20:49
31	07:26 17:36			06:48 18:02			06:19 19:57	26	19:06 (3) 19:32 (3)				06:05 20:49
Potential sun hours	305		331	355	813	378	405	424	101	456			
Total, worst case	1259												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 4
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** C - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (3)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:57
	20:50	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:13	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:56
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:16	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:11	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 5
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km**Shadow receptor:** D - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (4)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:00 (41) 20:06	07:09 19:20	07:38 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:58	06:38 (41) 20:29
2	06:07 20:49	06:40 20:37	07:01 (41) 20:04	07:10 19:18	07:39 17:38	07:31 17:14	07:40 17:16	07:24 17:38	06:45 18:03	05:59 18:29	06:17 19:59	06:36 (41) 20:30
3	06:08 20:49	06:41 20:36	07:01 (41) 20:11	07:11 19:17	07:40 17:37	07:31 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:57 18:29	06:16 20:00	06:35 (41) 20:31
4	06:09 20:50	06:42 20:35	07:01 (41) 20:12	07:12 19:15	07:41 17:36	07:32 17:13	07:40 17:17	07:22 17:39	06:42 18:05	05:56 19:30	06:15 20:01	06:34 (41) 20:32
5	06:10 20:50	06:43 20:34	07:02 (41) 20:13	07:13 19:14	07:42 17:35	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	05:54 19:31	06:14 20:02	06:33 (41) 20:33
6	06:11 20:50	06:44 20:34	07:04 (41) 19:59	07:14 18:12	07:43 17:33	07:33 17:13	07:40 17:18	07:20 17:41	06:39 18:07	05:53 19:32	06:13 20:03	06:32 (41) 20:34
7	06:12 20:50	06:45 20:33	07:05 (41) 19:57	07:15 18:11	07:44 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	05:51 19:33	06:12 20:04	06:31 (41) 20:35
8	06:13 20:50	06:46 20:32	07:06 (41) 19:56	07:16 18:09	07:44 17:31	07:34 17:13	07:39 17:19	07:17 17:42	06:36 18:08	05:50 19:34	06:11 20:05	06:31 (41) 20:36
9	06:14 20:49	06:48 20:30	07:07 (41) 19:54	07:17 18:08	07:45 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	05:48 19:35	06:10 20:06	06:32 (41) 20:37
10	06:15 20:49	06:49 20:29	07:09 (41) 19:53	07:18 18:06	07:46 17:29	07:35 17:12	07:39 17:21	07:15 17:44	06:33 18:10	05:47 19:36	06:09 20:07	06:31 (41) 20:38
11	06:16 20:49	06:50 20:28	07:13 (41) 19:51	07:19 18:05	07:47 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	05:46 19:37	06:08 20:08	06:31 (41) 20:38
12	06:17 20:49	06:51 20:27	07:21 (41) 19:50	07:20 18:04	07:48 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:12	05:44 19:38	06:07 20:09	06:31 (41) 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:21 18:02	07:49 17:27	07:37 17:12	07:37 17:23	07:12 17:47	06:28 18:12	05:43 19:39	06:06 20:11	06:31 (41) 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	07:22 18:01	07:50 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	05:41 19:40	06:06 20:12	06:32 (41) 20:41
15	06:20 20:48	07:07 (41) 20:24	07:23 19:45	07:23 17:59	07:51 17:25	07:38 17:12	07:37 17:24	07:09 17:48	06:25 18:14	05:40 19:40	06:05 20:13	06:32 (41) 20:41
16	06:21 20:48	07:05 (41) 20:23	07:24 19:44	07:24 17:58	07:52 17:24	07:38 17:12	07:36 17:25	07:08 17:49	06:24 18:15	05:38 19:41	06:04 20:14	06:32 (41) 20:42
17	06:22 20:47	07:04 (41) 20:21	07:24 19:42	07:24 17:57	07:53 17:23	07:38 17:12	07:36 17:25	07:07 17:50	06:22 18:16	05:37 19:42	06:03 20:15	06:34 (41) 20:43
18	06:23 20:47	07:03 (41) 20:20	07:25 19:41	07:25 17:55	07:54 17:23	07:39 17:12	07:35 17:26	07:06 17:51	06:21 18:17	05:36 19:43	06:03 20:16	06:34 (41) 20:43
19	06:24 20:47	07:02 (41) 20:19	07:26 19:39	07:26 17:54	07:54 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	05:34 19:44	06:02 20:17	06:34 (41) 20:44
20	06:25 20:46	07:02 (41) 20:18	07:27 19:38	07:27 17:53	07:55 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	05:33 19:45	06:01 20:18	06:36 (41) 20:45
21	06:26 20:46	07:01 (41) 20:16	07:28 19:36	07:28 17:51	07:56 17:20	07:39 17:13	07:33 17:28	07:02 17:53	06:16 18:19	05:32 19:46	06:01 20:19	06:36 (41) 20:45
22	06:27 20:45	07:01 (41) 20:15	07:29 19:35	07:29 17:50	07:57 17:20	07:40 17:13	07:33 17:29	07:00 17:54	06:14 18:20	05:30 19:47	06:00 20:20	06:38 (41) 20:46
23	06:28 20:45	07:00 (41) 20:14	07:30 19:33	07:30 17:49	07:58 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	05:29 19:48	06:00 20:21	06:38 (41) 20:46
24	06:29 20:44	07:00 (41) 20:12	07:31 19:32	07:31 17:47	07:59 17:18	07:40 17:13	07:31 17:30	06:58 17:56	06:11 18:22	05:28 19:49	05:59 20:22	06:40 (41) 20:47
25	06:31 20:43	07:00 (41) 20:11	07:32 19:30	07:32 17:46	08:00 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	05:26 19:50	05:59 20:23	06:42 (41) 20:47
26	06:32 20:43	06:59 (41) 20:10	07:33 19:29	07:33 17:45	08:01 17:17	07:40 17:14	07:30 17:32	06:55 17:57	06:08 18:23	05:25 19:51	05:58 20:24	06:43 (41) 20:47
27	06:33 20:42	06:59 (41) 20:08	07:34 19:27	07:34 17:44	08:02 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	05:24 19:52	05:58 20:25	06:46 (41) 20:48
28	06:34 20:41	06:59 (41) 20:07	07:35 19:26	07:35 17:42	08:03 17:16	07:40 17:15	07:28 17:33	06:52 17:59	06:05 18:25	05:23 19:53	05:58 20:26	06:46 (41) 20:48
29	06:35 20:40	07:00 (41) 20:06	07:36 19:24	07:36 17:41	08:04 17:16	07:40 17:15	07:26 17:34	06:51 18:00	06:04 18:26	05:22 19:54	05:57 20:27	06:47 (41) 20:48
30	06:36 20:40	07:01 (41) 20:05	07:37 19:23	07:37 17:40	08:05 17:15	07:40 17:16	07:26 17:35	06:49 18:01	06:02 18:27	05:20 19:56	05:57 20:28	06:48 (41) 20:49
31	06:37 20:39	07:02 (41) 20:04	07:38 19:21	07:38 17:39	08:06 17:15	07:40 17:16	07:25 17:36	06:48 18:02	06:03 18:28	05:19 19:57	06:41 (41) 20:49	06:49 (41) 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case	412	260	383	334	314	288	305	332	355	404	424	456

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 6
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** E - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (5)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:36	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:13	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:16	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:11	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 7
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** F - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (6)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06 20:50	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	16:14 (7) 17:16	16:22 (7) 17:25	16:30 (7) 18:02	06:46 18:28	06:00 19:58	05:57 20:30
2	06:07 20:50	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	16:15 (7) 17:16	16:22 (7) 17:23	16:31 (7) 18:03	06:45 18:29	05:59 19:59	05:56 20:31
3	06:08 20:50	06:40 20:37	07:11 20:03	07:40 19:17	07:07 17:36	07:32 17:13	16:15 (7) 17:16	16:22 (7) 17:22	16:33 (7) 18:04	06:43 18:29	05:57 20:00	05:56 20:32
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:35	07:32 17:13	16:15 (7) 17:17	16:22 (7) 17:21	16:35 (7) 18:05	06:42 19:30	05:56 20:01	05:56 20:33
5	06:10 20:50	06:43 20:35	07:13 20:00	07:42 18:14	07:09 17:34	07:33 17:13	16:16 (7) 17:17	16:22 (7) 17:20	16:38 (7) 18:06	06:40 19:31	05:54 20:02	05:56 20:34
6	06:10 20:50	06:44 20:34	07:14 19:59	07:43 18:12	07:10 17:33	07:34 17:13	16:16 (7) 17:18	16:22 (7) 17:21	16:39 (7) 18:06	06:53 19:32	06:13 20:03	05:56 20:34
7	06:11 20:50	06:45 20:33	07:15 19:57	07:44 18:11	07:11 17:32	07:34 17:12	16:16 (7) 17:19	16:22 (7) 17:21	16:37 (7) 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:12 20:50	06:46 20:32	07:16 19:56	07:45 18:09	07:11 17:31	07:35 17:12	16:17 (7) 17:19	16:23 (7) 17:22	16:36 (7) 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:13 20:50	06:47 20:31	07:17 19:54	07:46 18:08	07:12 17:30	07:35 17:12	16:17 (7) 17:20	16:22 (7) 17:23	16:34 (7) 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:14 20:50	06:48 20:30	07:18 19:53	07:47 18:06	07:13 17:29	07:36 17:12	16:17 (7) 17:20	16:22 (7) 17:24	16:33 (7) 18:10	06:47 19:36	06:09 20:07	05:56 20:38
11	06:15 20:49	06:50 20:29	07:19 19:51	07:48 18:05	07:14 17:28	07:36 17:12	16:17 (7) 17:21	16:22 (7) 17:25	16:31 (7) 18:11	06:45 19:37	06:08 20:09	05:56 20:39
12	06:16 20:49	06:51 20:27	07:20 19:50	07:49 18:03	07:15 17:27	07:37 17:12	16:18 (7) 17:22	16:22 (7) 17:26	16:32 (7) 18:11	06:44 19:38	06:07 20:10	05:56 20:40
13	06:17 20:49	06:52 20:26	07:21 19:48	07:50 18:02	07:16 17:26	07:37 17:12	16:18 (7) 17:22	16:23 (7) 17:26	16:33 (7) 18:12	06:43 19:39	06:06 20:11	05:56 20:40
14	06:18 20:49	06:53 20:25	07:22 19:47	07:51 18:01	07:17 17:25	07:38 17:12	16:19 (7) 17:23	16:22 (7) 17:27	16:34 (7) 18:13	06:41 19:40	06:05 20:12	05:57 20:41
15	06:19 20:48	06:54 20:24	07:23 19:45	07:52 17:59	07:17 17:25	07:38 17:12	16:19 (7) 17:23	16:23 (7) 17:27	16:35 (7) 18:14	06:40 19:41	06:05 20:13	05:57 20:42
16	06:20 20:48	06:55 20:23	07:23 19:44	07:53 17:58	07:18 17:24	07:38 17:12	16:20 (7) 17:24	16:23 (7) 17:28	16:36 (7) 18:15	06:38 19:42	06:04 20:14	05:57 20:42
17	06:21 20:48	06:56 20:22	07:24 19:42	07:54 17:56	07:19 17:23	07:39 17:12	16:20 (7) 17:25	16:23 (7) 17:29	16:37 (7) 18:16	06:37 19:42	06:03 20:15	05:57 20:43
18	06:22 20:47	06:57 20:20	07:25 19:41	07:55 17:55	07:20 17:22	07:39 17:12	16:20 (7) 17:26	16:23 (7) 17:30	16:38 (7) 18:17	06:36 19:43	06:02 20:16	05:58 20:44
19	06:24 20:47	06:58 20:19	07:26 19:39	07:56 17:54	07:21 17:21	07:39 17:12	16:21 (7) 17:26	16:23 (7) 17:30	16:39 (7) 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:18	07:27 19:38	07:57 17:52	07:22 17:21	07:39 17:12	16:20 (7) 17:27	16:23 (7) 17:31	16:40 (7) 18:18	06:33 19:45	06:01 20:18	05:59 20:45
21	06:26 20:46	07:00 20:17	07:28 19:36	07:58 17:51	07:22 17:20	07:40 17:12	16:20 (7) 17:28	16:23 (7) 17:32	16:41 (7) 18:19	06:31 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:01 20:15	07:29 19:35	07:59 17:50	07:23 17:19	07:40 17:13	16:20 (7) 17:29	16:23 (7) 17:33	16:42 (7) 18:20	06:30 19:47	06:00 20:20	05:59 20:46
23	06:28 20:45	07:03 20:14	07:30 19:33	07:58 17:48	07:24 17:19	07:40 17:13	16:21 (7) 17:29	16:23 (7) 17:33	16:43 (7) 18:21	06:29 19:48	06:00 20:22	05:59 20:46
24	06:29 20:44	07:04 20:13	07:31 19:32	07:59 17:47	07:25 17:18	07:40 17:13	16:22 (7) 17:30	16:23 (7) 17:34	16:44 (7) 18:22	06:28 19:49	06:01 20:23	05:59 20:47
25	06:30 20:44	07:05 20:11	07:32 19:30	07:00 17:46	07:25 17:17	07:40 17:13	16:22 (7) 17:31	16:23 (7) 17:35	16:45 (7) 18:23	06:26 19:50	06:01 20:24	05:59 20:47
26	06:31 20:43	07:06 20:10	07:33 19:29	07:01 17:45	07:26 17:17	07:40 17:14	16:22 (7) 17:32	16:23 (7) 17:36	16:46 (7) 18:24	06:25 19:52	06:02 20:25	05:58 20:48
27	06:32 20:42	07:07 20:09	07:34 19:27	07:02 17:43	07:27 17:16	07:41 17:14	16:22 (7) 17:32	16:23 (7) 17:36	16:47 (7) 18:25	06:24 19:53	06:02 20:26	05:58 20:48
28	06:34 20:41	07:08 20:07	07:35 19:26	07:02 17:42	07:28 17:16	07:41 17:14	16:22 (7) 17:33	16:23 (7) 17:37	16:48 (7) 18:26	06:23 19:54	06:03 20:27	05:57 20:48
29	06:35 20:41	07:09 20:06	07:36 19:25	07:03 17:41	07:28 17:15	07:41 17:15	16:22 (7) 17:34	16:23 (7) 17:38	16:49 (7) 18:27	06:21 19:55	06:04 20:28	05:57 20:49
30	06:36 20:40	07:10 20:05	07:37 19:24	07:04 17:40	07:29 17:15	07:41 17:15	16:22 (7) 17:35	16:23 (7) 17:39	16:50 (7) 18:28	06:20 19:56	06:05 20:29	05:57 20:49
31	06:37 20:39	07:11 20:03	07:38 19:21	07:05 17:37	07:30 17:15	07:41 17:15	16:23 (7) 17:36	16:23 (7) 18:01	16:51 (7) 18:01	06:19 19:57	06:05 20:29	05:57 20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case					766	884	1055	91				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 8
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** G - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (7)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	19:24 (18) 06:38	19:24 (18) 07:09	07:38	17:42 (19) 07:05	07:30
	22	19:46 (18) 20:38	20:06 (18) 20:06	19:20	18:42 (15) 17:39	17:14
2	06:07	19:24 (18) 06:39	19:24 (18) 07:10	07:39	17:42 (19) 07:06	07:31
	23	19:47 (18) 20:37	20:06 (18) 20:04	19:18	18:43 (15) 17:38	17:14
3	06:08	19:23 (18) 06:40	19:25 (18) 07:11	07:40	17:41 (19) 07:07	07:32
	25	19:48 (18) 20:37	20:05 (18) 20:03	19:17	18:43 (15) 17:36	17:13
4	06:09	19:23 (18) 06:42	19:25 (18) 07:12	07:41	17:41 (19) 07:08	07:32
	26	19:49 (18) 20:36	20:05 (18) 20:02	19:15	18:43 (15) 17:35	17:13
5	06:10	19:23 (18) 06:43	19:26 (18) 07:13	06:42	16:41 (19) 07:09	07:33
	27	19:50 (18) 20:35	20:04 (18) 20:00	18:14	17:43 (15) 17:34	17:13
6	06:10	19:23 (18) 06:44	19:27 (18) 07:14	06:43	16:41 (19) 07:10	07:34
	28	19:51 (18) 20:34	20:03 (18) 19:59	18:12	17:43 (15) 17:33	17:13
7	06:11	19:23 (18) 06:45	19:27 (18) 07:15	06:44	16:41 (19) 07:10	07:34
	29	19:52 (18) 20:33	20:02 (18) 19:57	18:11	17:43 (15) 17:32	17:12
8	06:12	19:23 (18) 06:46	19:29 (18) 07:16	06:44	16:41 (19) 07:11	07:35
	31	19:54 (18) 20:32	20:01 (18) 19:56	18:09	17:42 (15) 17:31	17:12
9	06:13	19:22 (18) 06:47	19:31 (18) 07:17	06:45	16:41 (19) 07:12	07:35
	32	19:54 (18) 20:31	20:01 (18) 19:54	18:08	17:41 (15) 17:30	17:12
10	06:14	19:22 (18) 06:48	19:32 (18) 07:18	06:46	16:42 (19) 07:13	07:36
	33	19:55 (18) 20:30	19:59 (18) 19:53	18:06	17:40 (15) 17:29	17:12
11	06:15	19:22 (18) 06:49	19:34 (18) 07:19	06:47	16:42 (19) 07:14	07:36
	34	19:56 (18) 20:28	19:57 (18) 19:51	18:05	17:39 (15) 17:28	17:12
12	06:16	19:22 (18) 06:51	19:37 (18) 07:20	06:48	16:43 (19) 07:15	07:37
	35	19:57 (18) 20:27	19:54 (18) 19:50	18:03	17:38 (15) 17:27	17:12
13	06:17	19:22 (18) 06:52	19:41 (18) 07:21	06:49	16:44 (19) 07:16	07:37
	35	19:57 (18) 20:26	19:50 (18) 19:48	18:02	17:37 (15) 17:26	17:12
14	06:18	19:21 (18) 06:53	07:22	06:50	16:45 (19) 07:17	07:38
	37	19:58 (18) 20:25	19:47	18:01	17:35 (15) 17:25	17:12
15	06:19	19:21 (18) 06:54	07:22	06:51	16:47 (19) 07:17	07:38
	38	19:59 (18) 20:24	19:45	17:59	17:33 (15) 17:25	17:12
16	06:20	19:21 (18) 06:55	07:23	18:08 (19) 06:52	16:48 (19) 07:18	07:38
	39	20:00 (18) 20:23	19:44	18:23 (19) 17:58	17:29 (15) 17:24	17:12
17	06:21	19:21 (18) 06:56	07:24	18:03 (19) 06:53	16:50 (19) 07:19	07:39
	40	20:01 (18) 20:22	19:42	18:26 (19) 17:56	17:18 (19) 17:23	17:12
18	06:22	19:21 (18) 06:57	07:25	18:00 (19) 06:53	16:52 (19) 07:20	07:39
	40	20:01 (18) 20:20	19:41	18:28 (19) 17:55	17:16 (19) 17:22	17:12
19	06:24	19:21 (18) 06:58	07:26	17:57 (19) 06:54	16:56 (19) 07:21	07:39
	41	20:02 (18) 20:19	19:39	18:30 (19) 17:54	17:12 (19) 17:21	17:12
20	06:25	19:21 (18) 06:59	07:27	17:55 (19) 06:55	07:22	07:39
	41	20:02 (18) 20:18	19:38	18:31 (19) 17:52	17:21	17:12
21	06:26	19:22 (18) 07:00	07:28	17:53 (19) 06:56	07:22	07:40
	42	20:04 (18) 20:17	19:36	18:33 (19) 17:51	17:20	17:12
22	06:27	19:22 (18) 07:01	07:29	17:52 (19) 06:57	07:23	07:40
	42	20:04 (18) 20:15	19:35	18:34 (19) 17:50	17:19	17:13
23	06:28	19:22 (18) 07:03	07:30	17:50 (19) 06:58	07:24	07:40
	43	20:05 (18) 20:14	19:33	18:35 (19) 17:48	17:19	17:13
24	06:29	19:22 (18) 07:04	07:31	17:49 (19) 06:59	07:25	07:40
	43	20:05 (18) 20:13	19:32	18:35 (19) 17:47	17:18	17:13
25	06:30	19:22 (18) 07:05	07:32	17:48 (19) 07:00	07:25	07:40
	43	20:05 (18) 20:11	19:30	18:36 (19) 17:46	17:17	17:13
26	06:31	19:22 (18) 07:06	07:33	17:47 (19) 07:01	07:26	07:40
	44	20:06 (18) 20:10	19:29	18:36 (19) 17:45	17:17	17:14
27	06:32	19:22 (18) 07:07	07:34	17:46 (19) 07:02	07:27	07:41
	44	20:06 (18) 20:09	19:27	18:37 (19) 17:43	17:16	17:14
28	06:34	19:22 (18) 07:08	07:34	17:45 (19) 07:02	07:28	07:41
	44	20:06 (18) 20:07	19:26	18:37 (19) 17:42	17:16	17:14
29	06:35	19:22 (18) 07:09	07:35	17:43 (19) 07:03	07:28	07:41
	44	20:06 (18) 20:06	19:24	18:37 (15) 17:41	17:15	17:15
30	06:36	19:22 (18) 07:10	07:36	17:43 (19) 07:04	07:29	07:41
	44	20:06 (18) 20:05	19:23	18:39 (15) 17:40	17:15	17:15
31	06:37	19:23 (18) 07:11	07:37	17:42 (19) 07:05	07:30	07:41
	43	20:06 (18) 20:04	19:21	18:41 (15) 17:39	17:14	17:14
Potential sun hours	447	378	383	334	314	288
Total, worst case	1132	411	677	979		

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 9
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** G - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (7)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	07:41 17:16	07:25 17:36	06:46 18:02	16:41 (19) 17:38 (15)	06:00 18:28	19:04 (18) 19:38 (18)
2	07:40 17:16	07:24 17:37	06:45 18:03	16:41 (19) 17:39 (15)	05:59 18:29	19:05 (18) 19:38 (18)
3	07:40 17:16	07:23 17:38	06:43 18:04	16:39 (19) 17:39 (15)	05:57 18:29	19:06 (18) 19:38 (18)
4	07:40 17:17	07:22 17:39	06:42 18:05	16:39 (19) 17:40 (15)	06:56 19:30	19:07 (18) 19:38 (18)
5	07:40 17:17	07:21 17:40	06:40 18:06	16:37 (19) 17:39 (15)	06:54 19:31	19:08 (18) 19:37 (18)
6	07:40 17:18	07:20 17:40	06:39 18:06	16:37 (19) 17:39 (15)	06:53 19:32	19:09 (18) 19:37 (18)
7	07:40 17:19	07:19 17:41	06:37 18:07	16:36 (19) 17:38 (15)	06:51 19:33	19:10 (18) 19:37 (18)
8	07:39 17:19	07:18 17:42	06:36 18:08	16:36 (19) 17:38 (15)	06:50 19:34	19:11 (18) 19:37 (18)
9	07:39 17:20	07:16 17:43	06:34 18:09	16:35 (19) 17:37 (15)	06:48 19:35	19:12 (18) 19:37 (18)
10	07:39 17:20	07:15 17:44	06:33 18:10	16:34 (19) 17:35 (15)	06:47 19:36	19:13 (18) 19:36 (18)
11	07:38 17:21	07:14 17:45	06:31 18:11	16:35 (19) 17:35 (15)	06:45 19:37	19:14 (18) 19:36 (18)
12	07:38 17:21	07:13 17:46	06:30 18:11	16:34 (19) 17:33 (15)	06:44 19:38	19:15 (18) 19:36 (18)
13	07:38 17:22	07:12 17:46	06:28 18:12	16:35 (19) 17:31 (15)	06:43 19:39	19:16 (18) 19:36 (18)
14	07:37 17:23	07:11 17:47	06:27 18:13	16:34 (19) 17:29 (15)	06:41 19:40	19:17 (18) 19:36 (18)
15	07:37 17:23	07:09 17:48	06:25 18:14	16:35 (19) 17:27 (19)	06:40 19:41	19:18 (18) 19:36 (18)
16	07:36 17:24	07:08 17:49	06:24 18:15	16:35 (19) 17:26 (19)	06:38 19:42	19:19 (18) 19:36 (18)
17	07:36 17:25	07:07 17:50	06:22 18:16	16:34 (19) 17:24 (19)	06:37 19:42	19:19 (18) 19:36 (18)
18	07:35 17:26	07:06 17:51	06:21 18:16	16:35 (19) 17:24 (19)	06:35 19:43	19:21 (18) 19:36 (18)
19	07:35 17:26	07:04 17:51	06:19 18:17	16:36 (19) 17:22 (19)	06:34 19:44	19:21 (18) 19:36 (18)
20	07:34 17:27	07:03 17:52	06:17 18:18	16:37 (19) 17:22 (19)	06:33 19:45	19:22 (18) 19:37 (18)
21	07:33 17:28	07:02 17:53	06:16 18:19	16:37 (19) 17:20 (19)	06:31 19:46	19:22 (18) 19:37 (18)
22	07:33 17:28	07:00 17:54	06:14 18:20	16:38 (19) 17:18 (19)	06:30 19:47	19:22 (18) 19:37 (18)
23	07:32 17:29	06:59 17:55	06:13 18:21	16:39 (19) 17:17 (19)	06:29 19:48	19:23 (18) 19:38 (18)
24	07:31 17:30	06:58 17:56	06:11 18:22	16:40 (19) 17:14 (19)	06:28 19:49	19:23 (18) 19:38 (18)
25	07:31 17:31	06:56 17:56	06:10 18:22	16:43 (19) 17:12 (19)	06:26 19:50	19:24 (18) 19:39 (18)
26	07:30 17:32	06:55 17:57	06:08 18:23	16:44 (19) 17:09 (19)	06:25 19:51	19:24 (18) 19:40 (18)
27	07:29 17:32	06:54 17:58	06:07 18:24	16:48 (19) 17:06 (19)	06:24 19:53	19:24 (18) 19:41 (18)
28	07:28 17:33	06:52 17:59	06:05 18:25	16:53 (19) 17:00 (19)	06:23 19:54	19:24 (18) 19:42 (18)
29	07:27 17:34	06:51 18:00	06:03 18:26	06:21 19:55	19:09 (18) 19:20 (18)	19:24 (18) 19:42 (18)
30	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:56	19:05 (18) 19:24 (18)	19:24 (18) 19:44 (18)
31	07:26 17:36	06:48 18:01	06:00 18:28	06:19 19:57	19:03 (18) 19:27 (18)	19:24 (18) 19:45 (18)
Potential sun hours	305	331	355	405	424	456
Total, worst case		319	1364	54	1183	652

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 10
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km**Shadow receptor:** H - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (8)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April	May	June	July	August	September		October		November	December	
1	06:06	06:38	07:09		07:38	07:05	07:30	07:40	07:24	06:46		06:00		17:12 (52)	06:18	05:57
	20:49	20:38	20:06		19:20	17:39	17:14	17:16	17:37	18:02		18:28	39	17:51 (52)	19:57	20:29
2	06:07	06:39	07:10		07:39	07:06	07:31	07:40	07:23	06:45		06:59		17:13 (52)	06:17	05:56
	20:49	20:37	20:04		19:18	17:38	17:14	17:16	17:37	18:03		18:28	38	17:51 (52)	19:58	20:30
3	06:08	06:41	07:11		07:40	07:07	07:31	07:40	07:22	06:43		06:57		17:13 (52)	06:16	05:56
	20:49	20:36	20:03		19:17	17:37	17:14	17:17	17:38	18:04		18:29	36	17:49 (52)	20:00	20:31
4	06:09	06:42	07:12		07:41	07:07	07:32	07:40	07:21	06:42		06:56		18:14 (52)	06:15	05:56
	20:49	20:35	20:01	2	18:56 (52)	19:15	17:35	17:13	17:17	18:05		19:30	34	18:48 (52)	20:01	20:32
5	06:10	06:43	07:13		07:42	07:08	07:33	07:40	07:20	06:40		06:54		18:15 (52)	06:14	05:56
	20:49	20:34	20:00	16	19:03 (52)	18:14	17:34	17:13	17:18	18:06		19:31	31	18:46 (52)	20:02	20:33
6	06:11	06:44	07:14		07:43	07:09	07:33	07:39	07:19	06:39		06:53		18:17 (52)	06:13	05:56
	20:49	20:33	19:58	22	19:06 (52)	18:12	17:33	17:13	17:18	18:06		19:32	28	18:45 (52)	20:03	20:34
7	06:12	06:45	07:15		07:44	07:10	07:34	07:39	07:18	06:37		06:51		18:18 (52)	06:12	05:56
	20:49	20:32	19:57	26	19:07 (52)	18:11	17:32	17:13	17:19	18:07		19:33	24	18:42 (52)	20:04	20:35
8	06:13	06:46	07:16		07:45	07:11	07:34	07:39	07:17	06:36		06:50		18:21 (52)	06:11	05:56
	20:49	20:31	19:56	30	19:09 (52)	18:09	17:31	17:12	17:19	18:08		19:34	19	18:40 (52)	20:05	20:36
9	06:13	06:47	07:17		07:46	07:12	07:35	07:39	07:16	06:34		06:48		18:24 (52)	06:10	05:56
	20:49	20:30	19:54	32	19:10 (52)	18:08	17:30	17:12	17:20	18:09		19:35	11	18:35 (52)	20:06	20:37
10	06:14	06:48	07:18		07:47	07:13	07:36	07:38	07:15	06:33		06:47			06:09	05:56
	20:49	20:29	19:53	35	19:11 (52)	18:06	17:29	17:12	17:20	18:10		19:36			20:07	20:37
11	06:15	06:50	07:19		07:48	07:14	07:36	07:38	07:14	06:31		06:45			06:08	05:56
	20:49	20:28	19:51	37	19:12 (52)	18:05	17:28	17:12	17:21	18:11		19:37			20:08	20:38
12	06:16	06:51	07:20		07:49	07:14	07:36	07:38	07:13	06:30		17:32 (52)		06:44	06:07	05:56
	20:49	20:27	19:50	39	19:13 (52)	18:03	17:27	17:12	17:22	18:11	13	17:45 (52)		19:37	20:09	20:39
13	06:17	06:52	07:21		07:50	07:15	07:37	07:37	07:12	06:28		17:28 (52)		06:43	06:06	05:57
	20:49	20:26	19:48	40	19:13 (52)	18:02	17:26	17:12	17:22	18:12	20	17:48 (52)		19:38	20:10	20:40
14	06:18	06:53	07:21		07:51	07:16	07:37	07:37	07:10	06:27		17:25 (52)		06:41	06:06	05:57
	20:48	20:25	19:47	41	19:13 (52)	18:01	17:26	17:12	17:23	18:13	25	17:50 (52)		19:39	20:11	20:41
15	06:19	06:54	07:22		07:52	07:17	07:37	07:36	07:09	06:25		17:23 (52)		06:40	06:05	05:57
	20:48	20:24	19:45	43	19:13 (52)	17:59	17:25	17:12	17:24	18:14	29	17:52 (52)		19:40	20:13	20:41
16	06:21	06:55	07:23		07:53	07:18	07:38	07:36	07:08	06:23		17:21 (52)		06:38	06:04	05:57
	20:48	20:22	19:44	43	19:13 (52)	17:58	17:24	17:12	17:24	18:15	32	17:53 (52)		19:41	20:14	20:42
17	06:22	06:56	07:24		07:54	07:19	07:38	07:35	07:07	06:22		17:19 (52)		06:37	06:03	05:58
	20:47	20:21	19:42	44	19:13 (52)	17:56	17:23	17:12	17:25	18:16	35	17:54 (52)		19:42	20:15	20:43
18	06:23	06:57	07:25		07:55	07:20	07:38	07:35	07:05	06:20		17:18 (52)		06:36	06:03	05:58
	20:47	20:20	19:41	43	19:12 (52)	17:55	17:22	17:12	17:26	18:16	37	17:55 (52)		19:43	20:16	20:43
19	06:24	06:58	07:26		07:56	07:20	07:39	07:34	07:04	06:19		17:17 (52)		06:34	06:02	05:58
	20:46	20:19	19:39	43	19:12 (52)	17:54	17:22	17:12	17:26	18:17	38	17:55 (52)		19:44	20:17	20:44
20	06:25	06:59	07:27		07:57	07:21	07:39	07:34	07:03	06:17		17:15 (52)		06:33	06:01	05:59
	20:46	20:18	19:38	43	19:12 (52)	17:52	17:21	17:12	17:27	18:18	40	17:55 (52)		19:45	20:18	20:44
21	06:26	07:00	07:28		07:58	07:22	07:39	07:33	07:01	06:16		17:15 (52)		06:31	06:01	05:59
	20:45	20:16	19:36	42	19:11 (52)	17:51	17:20	17:13	17:28	18:19	41	17:56 (52)		19:46	20:19	20:45
22	06:27	07:01	07:29		07:59	07:23	07:39	07:32	07:00	06:14		17:13 (52)		06:30	06:00	06:00
	20:45	20:15	19:35	41	19:10 (52)	17:50	17:19	17:13	17:29	18:20	43	17:56 (52)		19:47	20:20	20:45
23	06:28	07:03	07:30		08:00	07:24	07:40	07:32	06:59	06:13		17:13 (52)		06:29	06:00	06:00
	20:44	20:14	19:33	41	19:10 (52)	17:49	17:19	17:13	17:29	18:21	43	17:56 (52)		19:48	20:21	20:46
24	06:29	07:04	07:31		08:01	07:24	07:40	07:31	06:57	06:11		17:12 (52)		06:28	05:59	06:01
	20:44	20:12	19:32	39	19:09 (52)	17:47	17:18	17:13	17:30	18:21	44	17:56 (52)		19:49	20:22	20:46
25	06:30	07:05	07:32		08:02	07:25	07:40	07:30	06:56	06:10		17:13 (52)		06:26	05:59	06:01
	20:43	20:11	19:30	38	19:08 (52)	17:46	17:18	17:14	17:31	18:22	43	17:56 (52)		19:50	20:23	20:47
26	06:31	07:06	07:33		08:03	07:26	07:40	07:29	06:55	06:08		17:12 (52)		06:25	05:58	06:02
	20:42	20:10	19:29	35	19:06 (52)	17:45	17:17	17:14	17:32	18:23	43	17:55 (52)		19:51	20:24	20:47
27	06:33	07:07	07:33		08:04	07:01	07:27	07:40	06:53	06:06		17:11 (52)		06:24	05:58	06:03
	20:42	20:08	19:27	33	19:04 (52)	17:43	17:17	17:14	17:32	18:24	43	17:54 (52)		19:52	20:25	20:48
28	06:34	07:08	07:34		08:05	07:02	07:27	07:40	06:52	06:05		17:12 (52)		06:23	05:58	06:03
	20:41	20:07	19:26	30	19:02 (52)	17:42	17:16	17:15	17:33	18:25	42	17:54 (52)		19:53	20:26	20:48
29	06:35		07:35		08:06	07:03	07:28	07:40	06:50	06:03		17:11 (52)		06:21	05:57	06:04
	20:40		19:24	26	19:00 (52)	17:41	17:16	17:15	17:34	18:00	42	17:53 (52)		19:54	20:27	20:48
30	06:36		07:36		08:07	07:04	07:29	07:40	06:49	06:02		17:12 (52)		06:20	05:57	06:05
	20:40		19:23	21	18:57 (52)	17:40	17:15	17:15	17:35	18:01	41	17:53 (52)		19:55	20:28	20:49
31	06:37		07:37		08:08	07:01	07:29		07:25	06:48				06:19		06:05
	20:39		19:21	15	18:54 (52)		17:15		17:36	18:01				19:56		20:49
Potential sun hours	447	378	383		334	314	288	305	332	355		404		424	456	
Total, worst case			940							694		260				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 11
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** I - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (9)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:04	20:36
8	06:13	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:36
9	06:13	06:47	07:17	06:46	07:12	07:35	07:39	07:17	06:35	06:49	06:10	05:56
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	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
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	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:59	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
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23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
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31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 12
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** J - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (10)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
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	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
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	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
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31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	448	378	383	334	313	288	304	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 13

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** K - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (11)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
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	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
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	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:32	20:02	20:34
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10	06:14	06:49	07:18	06:47	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:07	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:37	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:56
	20:49	20:27	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:36	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:40	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:56	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:37	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:45	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:12	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:27	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:29	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:05	07:29	07:41	07:27	06:50	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 14
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** L - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (12)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	06:38	07:04 (2)	07:09	07:38	07:31
	20:50	20:38	07:46 (2)	20:06	19:20	17:14
2	06:07	06:40	07:04 (2)	07:10	07:39	07:31
	20:50	20:38	07:46 (2)	20:05	19:18	17:14
3	06:08	06:41	07:04 (2)	07:11	07:40	07:32
	20:50	20:37	07:46 (2)	20:03	19:17	17:14
4	06:09	06:42	07:04 (2)	07:12	07:41	07:33
	20:50	20:36	07:46 (2)	20:02	19:15	17:13
5	06:10	06:43	07:05 (2)	07:13	06:42	07:33
	20:50	20:35	07:46 (2)	20:00	18:14	17:13
6	06:11	06:44	07:05 (2)	07:14	06:43	07:34
	20:50	20:34	07:45 (2)	19:59	18:12	17:13
7	06:12	07:15 (2) 06:45	07:06 (2)	07:15	06:44	07:34
	20:50	07:19 (2) 20:33	07:46 (2)	19:57	18:11	17:13
8	06:13	07:12 (2) 06:46	07:07 (2)	07:16	06:45	07:35
	20:50	07:23 (2) 20:32	07:45 (2)	19:56	18:09	17:12
9	06:13	07:11 (2) 06:47	07:08 (2)	07:17	06:46	07:35
	20:50	07:25 (2) 20:31	07:45 (2)	19:54	18:08	17:12
10	06:14	07:10 (2) 06:49	07:09 (2)	07:18	06:46	07:36
	20:50	07:27 (2) 20:30	07:44 (2)	19:53	18:07	17:12
11	06:15	07:09 (2) 06:50	07:10 (2)	07:19	06:47	07:36
	20:50	07:29 (2) 20:29	07:43 (2)	19:52	18:05	17:12
12	06:16	07:08 (2) 06:51	07:11 (2)	07:20	06:48	07:37
	20:49	07:30 (2) 20:28	07:41 (2)	19:50	18:04	17:12
13	06:17	07:07 (2) 06:52	07:12 (2)	07:21	06:49	07:37
	20:49	07:31 (2) 20:26	07:40 (2)	19:49	18:02	17:12
14	06:18	07:06 (2) 06:53	07:14 (2)	07:22	06:50	07:38
	20:49	07:32 (2) 20:25	07:38 (2)	19:47	18:01	17:12
15	06:20	07:06 (2) 06:54	07:16 (2)	07:23	06:51	07:38
	20:49	07:34 (2) 20:24	07:35 (2)	19:46	17:59	17:12
16	06:21	07:06 (2) 06:55	07:20 (2)	07:24	06:52	07:38
	20:48	07:36 (2) 20:23	07:33 (2)	19:44	17:58	17:12
17	06:22	07:06 (2) 06:56		07:25	06:53	07:39
	20:48	07:37 (2) 20:22		19:43	17:57	17:12
18	06:23	07:05 (2) 06:57		07:26	06:54	07:39
	20:48	07:38 (2) 20:20		19:41	17:55	17:12
19	06:24	07:05 (2) 06:58		07:26	06:55	07:39
	20:47	07:39 (2) 20:19		19:39	17:54	17:12
20	06:25	07:04 (2) 07:00		07:27	06:55	07:40
	20:47	07:40 (2) 20:18		19:38	17:53	17:12
21	06:26	07:04 (2) 07:01		07:28	06:56	07:40
	20:46	07:41 (2) 20:17		19:36	17:51	17:13
22	06:27	07:04 (2) 07:02		07:29	06:57	07:40
	20:46	07:41 (2) 20:15		19:35	17:50	17:13
23	06:28	07:03 (2) 07:03		07:30	06:58	07:40
	20:45	07:42 (2) 20:14		19:33	17:49	17:13
24	06:29	07:03 (2) 07:04		07:31	06:59	07:40
	20:44	07:43 (2) 20:13		19:32	17:47	17:13
25	06:30	07:03 (2) 07:05		07:32	07:00	07:41
	20:44	07:43 (2) 20:11		19:30	17:46	17:14
26	06:32	07:03 (2) 07:06		07:33	07:01	07:41
	20:43	07:44 (2) 20:10		19:29	17:45	17:14
27	06:33	07:03 (2) 07:07		07:34	07:02	07:41
	20:42	07:44 (2) 20:09		19:27	17:44	17:14
28	06:34	07:03 (2) 07:08		07:35	07:03	07:41
	20:42	07:45 (2) 20:07		19:26	17:42	17:15
29	06:35	07:03 (2)		07:36	07:04	07:41
	20:41	07:46 (2)		19:24	17:41	17:15
30	06:36	07:03 (2)		07:37	07:04	07:41
	20:40	07:46 (2)		19:23	17:40	17:15
31	06:37	07:04 (2)		07:37		
	20:39	07:46 (2)		19:21		
Potential sun hours	447	378	383	334	314	288
Total, worst case	775	546				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 15
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** L - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (12)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	07:41 17:16	07:25 17:37	06:47 18:03	06:01 18:28	06:18 19:58	06:38 (2) 05:57 07:13 (2) 20:30
2	07:41 17:16	07:24 17:37	06:45 18:03	05:59 18:29	06:17 19:59	06:37 (2) 05:57 07:14 (2) 20:31
3	07:41 17:17	07:23 17:38	06:44 18:04	05:58 18:30	06:16 20:00	06:36 (2) 05:56 07:15 (2) 20:32
4	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:31	06:15 20:01	06:35 (2) 05:56 07:15 (2) 20:33
5	07:40 17:18	07:21 17:40	06:41 18:06	06:55 19:31	06:14 20:02	06:35 (2) 05:56 07:16 (2) 20:34
6	07:40 17:18	07:20 17:41	06:39 18:07	06:53 19:32	06:13 20:03	06:35 (2) 05:56 07:16 (2) 20:35
7	07:40 17:19	07:19 17:42	06:38 18:08	06:52 19:33	06:12 20:04	06:34 (2) 05:56 07:16 (2) 20:36
8	07:40 17:19	07:18 17:42	06:36 18:08	06:50 19:34	06:11 20:05	06:34 (2) 05:56 07:16 (2) 20:36
9	07:39 17:20	07:17 17:43	06:35 18:09	06:49 19:35	06:10 20:07	06:35 (2) 05:56 07:17 (2) 20:37
10	07:39 17:20	07:16 17:44	06:33 18:10	06:47 19:36	06:09 20:08	06:35 (2) 05:56 07:17 (2) 20:38
11	07:39 17:21	07:14 17:45	06:32 18:11	06:46 19:37	06:08 20:09	06:35 (2) 05:56 07:17 (2) 20:39
12	07:38 17:22	07:13 17:46	06:30 18:12	06:44 19:38	06:07 20:10	06:35 (2) 05:56 07:17 (2) 20:40
13	07:38 17:22	07:12 17:47	06:28 18:13	06:43 19:39	06:06 20:11	06:35 (2) 05:57 07:17 (2) 20:40
14	07:37 17:23	07:11 17:47	06:27 18:13	06:41 19:40	06:06 20:12	06:36 (2) 05:57 07:18 (2) 20:41
15	07:37 17:24	07:10 17:48	06:25 18:14	06:40 19:41	06:05 20:13	06:36 (2) 05:57 07:17 (2) 20:42
16	07:36 17:24	07:08 17:49	06:24 18:15	06:38 19:42	06:04 20:14	06:36 (2) 05:57 07:17 (2) 20:43
17	07:36 17:25	07:07 17:50	06:22 18:16	06:37 19:43	06:03 20:15	06:37 (2) 05:58 07:17 (2) 20:43
18	07:35 17:26	07:06 17:51	06:21 18:17	06:36 19:44	06:03 20:16	06:37 (2) 05:58 07:17 (2) 20:44
19	07:35 17:26	07:05 17:52	06:19 18:18	06:34 19:45	06:02 20:17	06:37 (2) 05:58 07:16 (2) 20:44
20	07:34 17:27	07:03 17:52	06:18 18:18	06:33 19:46	06:01 20:19	06:39 (2) 05:59 07:16 (2) 20:45
21	07:34 17:28	07:02 17:53	06:16 18:19	06:32 19:47	06:01 20:20	06:39 (2) 05:59 07:16 (2) 20:46
22	07:33 17:29	07:01 17:54	06:15 18:20	06:30 19:48	06:00 20:21	06:40 (2) 06:00 07:16 (2) 20:46
23	07:32 17:29	06:59 17:55	06:13 18:21	06:29 19:49	06:00 20:22	06:41 (2) 06:00 07:15 (2) 20:47
24	07:32 17:30	06:58 17:56	06:11 18:22	06:28 19:50	05:59 20:23	06:42 (2) 06:01 07:15 (2) 20:47
25	07:31 17:31	06:57 17:57	06:10 18:23	06:26 19:51	05:59 20:24	06:42 (2) 06:01 07:14 (2) 20:48
26	07:30 17:32	06:55 17:58	06:08 18:24	06:25 19:52	05:58 07:03 (2) 20:25	06:44 (2) 06:02 07:14 (2) 20:48
27	07:29 17:33	06:54 17:58	06:07 18:24	06:24 19:53	05:58 07:06 (2) 20:26	06:45 (2) 06:03 07:14 (2) 20:48
28	07:28 17:33	06:52 17:59	06:05 18:25	06:23 19:54	05:58 07:08 (2) 20:27	06:46 (2) 06:03 07:12 (2) 20:49
29	07:28 17:34	06:51 18:00	06:04 18:26	06:22 19:55	05:57 07:09 (2) 20:28	06:48 (2) 06:04 07:12 (2) 20:49
30	07:27 17:35	06:49 18:01	06:02 18:27	06:20 19:56	05:57 07:11 (2) 20:29	06:49 (2) 06:05 07:11 (2) 20:49
31	07:26 17:36	06:48 18:02		06:19 19:57	06:39 (2) 07:12 (2)	06:05 20:49
Potential sun hours	305	331	355	405	424	456
Total, worst case				150	1110	66

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 16
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** M - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (13)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:45	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:46	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
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	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
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	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 17

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km **Shadow receptor:** N - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (14)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:25 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:30
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:24 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:31
3	06:08 20:50	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:32 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:58 18:30	06:16 20:00	05:57 20:31
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 18
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** O - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (15)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
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26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:15	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:04
	20:41	20:07	19:26	17:43	17:16	17:15	17:34	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 19
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** P - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (16)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:02	19:15	17:36	17:14	17:18	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:55	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:49	06:10	05:56
	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:16	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:11	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:11	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:48	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	18:00	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:38	07:36	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:18	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:28	17:53	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:01
	20:45	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:30	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	06:00	06:01
	20:44	20:13	19:32	17:48	17:19	17:14	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
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	20:42	20:08	19:27	17:44	17:17	17:15	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:04
	20:41	20:07	19:26	17:43	17:16	17:15	17:34	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 20
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** Q - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (17)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:55	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:19	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:32	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
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	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
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	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:48	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:25	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:18	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:53	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
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25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
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26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
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29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 21
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** R - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (18)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:01	19:15	17:36	17:14	17:18	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:55	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:49	06:10	05:56
	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:48	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:25	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:18	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:28	17:53	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:01
	20:45	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:30	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	06:00	06:01
	20:44	20:12	19:32	17:48	17:19	17:14	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:50	20:23	20:47
26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:15	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:04
	20:41	20:07	19:26	17:43	17:16	17:15	17:34	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 22
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** S - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (19)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:00	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:36
8	06:12	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:24	06:52	07:18	07:38	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:22	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:02	05:58
	20:48	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:45	20:17	20:45
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:00	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	05:59
	20:46	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:13	17:31	17:57	18:23	19:51	20:24	20:48
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:44	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	448	378	383	334	313	288	304	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 23
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** T - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (20)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March		April		May		June
1	06:06		06:38		20:03 (12)	07:09		07:38	08:00 (15)	07:05	07:31
	20:50		20:38	12	20:15 (12)	20:06		19:20	28	08:28 (15)	17:14
2	06:07		06:39		20:04 (12)	07:10		07:39		08:00 (15)	07:06
	20:50		20:38	10	20:14 (12)	20:04		19:18	28	08:28 (15)	17:38
3	06:08		06:41		20:05 (12)	07:11		07:40		08:00 (15)	07:07
	20:50		20:37	9	20:14 (12)	20:03		19:17	28	08:28 (15)	17:36
4	06:09		06:42		20:07 (12)	07:12		07:41		08:00 (15)	07:08
	20:50		20:36	6	20:13 (12)	20:02		19:15	27	08:27 (15)	17:35
5	06:10		20:04 (12)	06:43		20:09 (12)	07:13	06:42		08:01 (15)	07:09
	20:50	4	20:08 (12)	20:35	3	20:12 (12)	20:00	18:14	25	08:26 (15)	17:34
6	06:11		20:02 (12)	06:44			07:14	06:43		07:02 (15)	07:10
	20:50	9	20:11 (12)	20:34			19:59	18:12	23	07:25 (15)	17:33
7	06:11		20:02 (12)	06:45			07:15	06:44		07:03 (15)	07:11
	20:50	11	20:13 (12)	20:33			19:57	18:11	21	07:24 (15)	17:32
8	06:12		20:01 (12)	06:46			07:16	06:45		07:04 (15)	07:11
	20:50	13	20:14 (12)	20:32			19:56	18:09	18	07:22 (15)	17:31
9	06:13		20:00 (12)	06:47			07:17	06:45		07:05 (15)	07:12
	20:50	16	20:16 (12)	20:31			19:54	18:08	14	07:19 (15)	17:30
10	06:14		19:59 (12)	06:48			07:18	06:46		07:08 (15)	07:13
	20:50	17	20:16 (12)	20:30			19:53	18:06	7	07:15 (15)	17:29
11	06:15		19:59 (12)	06:50			07:19	06:47			07:14
	20:50	19	20:18 (12)	20:29			19:51	18:05			17:28
12	06:16		19:58 (12)	06:51			07:20	06:48			07:15
	20:49	21	20:19 (12)	20:27			19:50	18:04			17:27
13	06:17		19:58 (12)	06:52			07:21	06:49			07:16
	20:49	22	20:20 (12)	20:26			19:48	18:02			17:26
14	06:18		19:58 (12)	06:53			07:22	06:50			07:17
	20:49	23	20:21 (12)	20:25			19:47	18:01			17:26
15	06:19		19:58 (12)	06:54			07:23	06:51			07:18
	20:49	24	20:22 (12)	20:24			19:45	17:59			17:25
16	06:20		19:57 (12)	06:55			07:24	06:52			07:18
	20:48	26	20:23 (12)	20:23			19:44	17:58			17:24
17	06:21		19:57 (12)	06:56			07:24	06:53			07:19
	20:48	26	20:23 (12)	20:22			19:42	17:57			17:23
18	06:23		19:57 (12)	06:57			07:25	06:54			07:20
	20:47	26	20:23 (12)	20:20			19:41	17:55			17:22
19	06:24		19:57 (12)	06:58			07:26	06:54			07:21
	20:47	26	20:23 (12)	20:19			19:39	17:54			17:22
20	06:25		19:58 (12)	06:59			07:27	06:55			07:22
	20:47	25	20:23 (12)	20:18			19:38	17:52			17:21
21	06:26		19:58 (12)	07:00			07:28	06:56			07:22
	20:46	24	20:22 (12)	20:17			19:36	17:51			17:20
22	06:27		19:58 (12)	07:02			07:29	06:57			07:23
	20:45	24	20:22 (12)	20:15			19:35	17:50			17:19
23	06:28		19:58 (12)	07:03			07:30	08:16 (15)	06:58		07:24
	20:45	23	20:21 (12)	20:14			19:33	3	08:19 (15)	17:49	17:19
24	06:29		19:58 (12)	07:04			07:31	08:11 (15)	06:59		07:25
	20:44	23	20:21 (12)	20:13			19:32	13	08:24 (15)	17:47	17:18
25	06:30		19:58 (12)	07:05			07:32	08:08 (15)	07:00		07:26
	20:44	22	20:20 (12)	20:11			19:30	18	08:26 (15)	17:46	17:18
26	06:31		19:58 (12)	07:06			07:33	08:06 (15)	07:01		07:26
	20:43	21	20:19 (12)	20:10			19:29	21	08:27 (15)	17:45	17:17
27	06:33		19:59 (12)	07:07			07:34	08:05 (15)	07:02		07:27
	20:42	20	20:19 (12)	20:09			19:27	23	08:28 (15)	17:44	17:16
28	06:34		19:59 (12)	07:08			07:35	08:04 (15)	07:03		07:28
	20:42	19	20:18 (12)	20:07			19:26	25	08:29 (15)	17:42	17:16
29	06:35		20:00 (12)				07:35	08:03 (15)	07:03		07:28
	20:41	17	20:17 (12)				19:24	26	08:29 (15)	17:41	17:15
30	06:36		20:00 (12)				07:36	08:01 (15)	07:04		07:29
	20:40	16	20:16 (12)				19:23	28	08:29 (15)	17:40	17:15
31	06:37		20:02 (12)				07:37	08:01 (15)			07:30
	20:39	14	20:16 (12)				19:21	28	08:29 (15)		17:15
Potential sun hours	447		378				383		334		288
Total, worst case	531		40				185		219		

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 24
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** T - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (20)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December	
1	07:41	07:25	06:46	06:00	06:18	05:57	19:41 (12)
	17:16	17:36	18:02	18:28	19:58	20:30	20:01 (12)
2	07:41	07:24	06:45	07:07 (15)	05:59	06:17	05:56
	17:16	17:37	18:03	7	07:14 (15)	18:29	19:59 (12)
3	07:40	07:23	06:44	07:03 (15)	05:57	06:16	05:56
	17:17	17:38	18:04	14	07:17 (15)	18:30	20:00
4	07:40	07:22	06:42	07:01 (15)	06:56	06:15	20:32
	17:17	17:39	18:05	18	07:19 (15)	19:30	20:01
5	07:40	07:21	06:41	06:59 (15)	06:54	06:14	05:56
	17:18	17:40	18:06	21	07:20 (15)	19:31	20:02
6	07:40	07:20	06:39	06:58 (15)	06:53	06:13	19:39 (12)
	17:18	17:41	18:07	23	07:21 (15)	19:32	20:03
7	07:40	07:19	06:38	06:56 (15)	06:51	06:12	3
	17:19	17:41	18:07	25	07:21 (15)	19:33	20:04
8	07:40	07:18	06:36	06:55 (15)	06:50	06:11	6
	17:19	17:42	18:08	27	07:22 (15)	19:34	20:05
9	07:39	07:17	06:34	06:54 (15)	06:48	06:10	9
	17:20	17:43	18:09	28	07:22 (15)	19:35	20:06
10	07:39	07:15	06:33	06:53 (15)	06:47	06:09	11
	17:20	17:44	18:10	28	07:21 (15)	19:36	20:08
11	07:39	07:14	06:31	06:53 (15)	06:45	06:08	13
	17:21	17:45	18:11	28	07:21 (15)	19:37	20:09
12	07:38	07:13	06:30	06:52 (15)	06:44	06:07	14
	17:22	17:46	18:12	28	07:20 (15)	19:38	20:10
13	07:38	07:12	06:28	06:53 (15)	06:43	06:06	16
	17:22	17:46	18:12	27	07:20 (15)	19:39	20:11
14	07:37	07:11	06:27	06:52 (15)	06:41	06:05	17
	17:23	17:47	18:13	27	07:19 (15)	19:40	20:12
15	07:37	07:10	06:25	06:53 (15)	06:40	06:05	19
	17:24	17:48	18:14	26	07:19 (15)	19:41	20:13
16	07:36	07:08	06:24	06:53 (15)	06:38	06:04	20
	17:24	17:49	18:15	24	07:17 (15)	19:42	20:14
17	07:36	07:07	06:22	06:54 (15)	06:37	06:03	21
	17:25	17:50	18:16	21	07:15 (15)	19:43	20:15
18	07:35	07:06	06:21	06:55 (15)	06:36	06:03	22
	17:26	17:51	18:17	19	07:14 (15)	19:44	20:16
19	07:35	07:04	06:19	06:57 (15)	06:34	06:02	23
	17:26	17:51	18:17	14	07:11 (15)	19:45	20:17
20	07:34	07:03	06:17	07:00 (15)	06:33	06:01	23
	17:27	17:52	18:18	8	07:08 (15)	19:46	20:18
21	07:34	07:02	06:16	06:32	06:01	05:59	24
	17:28	17:53	18:19	19:46	20:19	20:46	24
22	07:33	07:00	06:14	06:30	06:00	05:57	25
	17:29	17:54	18:20	19:48	20:21	20:46	25
23	07:32	06:59	06:13	06:29	06:00	05:58	26
	17:29	17:55	18:21	19:49	20:22	20:47	26
24	07:31	06:58	06:11	06:28	05:59	05:57	27
	17:30	17:56	18:22	19:50	20:23	20:47	27
25	07:31	06:56	06:10	06:26	05:59	05:56	28
	17:31	17:57	18:23	19:51	20:24	20:47	28
26	07:30	06:55	06:08	06:25	05:58	05:54	29
	17:32	17:57	18:23	19:52	20:25	20:48	29
27	07:29	06:54	06:07	06:24	05:58	05:54	30
	17:32	17:58	18:24	19:53	20:26	20:48	30
28	07:28	06:52	06:05	06:23	05:57	05:53	31
	17:33	17:59	18:25	19:54	20:27	20:49	31
29	07:27	06:51	06:04	06:21	05:57	05:53	
	17:34	18:00	18:26	19:55	20:28	20:49	
30	07:27	06:49	06:02	06:20	05:57	05:53	
	17:35	18:01	18:27	19:56	20:29	20:49	
31	07:26	06:48		06:19		06:05	
	17:36	18:02		19:57		20:49	
Potential sun hours	305	331	355	405	424	456	91
Total, worst case			413		484		

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 25

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** U - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (21)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:25 17:37	06:46 18:02	06:01 18:28	06:18 19:58	05:57 20:30
2	06:07 20:50	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:24 17:37	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:31
3	06:08 20:50	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:32 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:32
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:36	07:32 17:13	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:50	06:43 20:35	07:13 20:00	07:42 18:14	07:09 17:34	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:50	06:44 20:34	07:14 19:59	07:43 18:12	07:10 17:33	07:33 17:13	07:40 17:18	07:20 17:41	06:39 18:07	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:50	06:45 20:33	07:15 19:57	07:44 18:11	07:10 17:32	07:34 17:13	07:40 17:19	07:19 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:50	06:46 20:32	07:16 19:56	07:45 18:09	07:11 17:31	07:35 17:13	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:50	06:47 20:31	07:17 19:54	07:46 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:15 20:49	06:49 20:29	07:18 19:53	07:46 18:06	07:13 17:29	07:36 17:12	07:39 17:21	07:15 17:44	06:33 18:10	06:47 19:36	06:09 20:07	05:56 20:38
11	06:16 20:49	06:50 20:28	07:19 19:51	07:47 18:05	07:14 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:46 19:37	06:08 20:08	05:56 20:39
12	06:17 20:49	06:51 20:27	07:20 19:50	07:48 18:04	07:15 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:12	06:44 19:38	06:07 20:10	05:56 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:49 18:02	07:16 17:27	07:37 17:12	07:38 17:22	07:12 17:47	06:28 18:12	06:43 19:39	06:06 20:11	05:57 20:40
14	06:19 20:49	06:53 20:25	07:22 19:47	07:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:11 17:47	06:27 18:13	06:41 19:40	06:06 20:12	05:57 20:41
15	06:20 20:48	06:54 20:24	07:23 19:45	07:51 17:59	07:17 17:25	07:38 17:12	07:37 17:24	07:09 17:48	06:25 18:14	06:40 19:41	06:05 20:13	05:57 20:42
16	06:21 20:48	06:55 20:23	07:24 19:44	07:52 17:58	07:18 17:24	07:38 17:12	07:36 17:24	07:08 17:49	06:24 18:15	06:38 19:42	06:04 20:14	05:57 20:42
17	06:22 20:48	06:56 20:21	07:24 19:42	07:53 17:57	07:19 17:23	07:38 17:12	07:36 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	07:54 17:55	07:20 17:22	07:39 17:12	07:35 17:26	07:06 17:51	06:21 18:17	06:36 19:43	06:03 20:16	05:58 20:44
19	06:24 20:47	06:58 20:19	07:26 19:39	07:54 17:54	07:21 17:22	07:39 17:12	07:35 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	07:00 20:18	07:27 19:38	07:55 17:53	07:21 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:01 20:18	05:59 20:45
21	06:26 20:46	07:01 20:16	07:28 19:36	07:56 17:51	07:22 17:20	07:40 17:13	07:33 17:28	07:02 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	07:57 17:50	07:23 17:20	07:40 17:13	07:33 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:46
23	06:28 20:45	07:03 20:14	07:30 19:33	07:58 17:49	07:24 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:00 20:46
24	06:29 20:44	07:04 20:13	07:31 19:32	07:59 17:47	07:25 17:18	07:40 17:13	07:31 17:30	06:58 17:56	06:11 18:22	06:28 19:49	05:59 20:22	06:01 20:47
25	06:30 20:43	07:05 20:11	07:32 19:30	08:00 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:23	06:26 19:50	05:59 20:24	06:01 20:47
26	06:32 20:43	07:06 20:10	07:33 19:29	08:01 17:45	07:26 17:17	07:40 17:14	07:30 17:32	06:55 17:57	06:08 18:23	06:25 19:51	05:58 20:25	06:02 20:48
27	06:33 20:42	07:07 20:09	07:34 19:27	08:01 17:44	07:27 17:17	07:40 17:14	07:29 17:33	06:54 17:58	06:07 18:24	06:24 19:52	05:58 20:26	06:03 20:48
28	06:34 20:41	07:08 20:07	07:35 19:26	08:02 17:42	07:28 17:16	07:40 17:15	07:28 17:33	06:52 17:59	06:05 18:25	06:23 19:54	05:58 20:27	06:03 20:48
29	06:35 20:41		07:35 19:24	08:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	06:22 19:55	05:57 20:28	06:04 20:49
30	06:36 20:40		07:36 19:23	08:04 17:40	07:29 17:15	07:40 17:15	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:56	05:57 20:29	06:05 20:49
31	06:37 20:39		07:37 19:21		07:30 17:15		07:25 17:36	06:48 18:02		06:19 19:57		06:05 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 26

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** V - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (22)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:25 17:37	06:46 18:02	06:01 18:28	06:18 19:58	05:57 20:30
2	06:07 20:50	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:24 17:37	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:31
3	06:08 20:50	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:32 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:57 18:30	06:16 20:00	05:56 20:32
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:36	07:32 17:13	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:50	06:43 20:35	07:13 20:00	07:42 18:14	07:09 17:34	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:50	06:44 20:34	07:14 19:59	07:43 18:12	07:10 17:33	07:33 17:13	07:40 17:18	07:20 17:41	06:39 18:07	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:50	06:45 20:33	07:15 19:57	07:44 18:11	07:10 17:32	07:34 17:13	07:40 17:19	07:19 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:50	06:46 20:32	07:16 19:56	07:44 18:09	07:11 17:31	07:35 17:13	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:50	06:47 20:31	07:17 19:54	07:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:15 20:49	06:49 20:30	07:18 19:53	07:46 18:06	07:13 17:29	07:36 17:12	07:39 17:21	07:15 17:44	06:33 18:10	06:47 19:36	06:09 20:07	05:56 20:38
11	06:16 20:49	06:50 20:28	07:19 19:51	07:47 18:05	07:14 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:46 19:37	06:08 20:08	05:56 20:39
12	06:17 20:49	06:51 20:27	07:20 19:50	07:48 18:04	07:15 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:12	06:44 19:38	06:07 20:10	05:56 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:49 18:02	07:16 17:27	07:37 17:12	07:38 17:22	07:12 17:47	06:28 18:12	06:43 19:39	06:06 20:11	05:57 20:40
14	06:19 20:49	06:53 20:25	07:22 19:47	07:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:11 17:47	06:27 18:13	06:41 19:40	06:06 20:12	05:57 20:41
15	06:20 20:48	06:54 20:24	07:23 19:45	07:51 17:59	07:17 17:25	07:38 17:12	07:37 17:24	07:09 17:48	06:25 18:14	06:40 19:41	06:05 20:13	05:57 20:42
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** W - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (23)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:29
2	06:08 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:17	07:23 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:58 18:29	06:16 20:00	05:57 20:31
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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Licensed user:

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145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** X - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (24)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:29
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Total, worst case												

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Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** Y - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (25)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:19	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:32	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:49	06:10	05:56
	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:48	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:53	18:18	19:45	20:18	20:44
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:01
	20:44	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:30	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:19	17:14	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:15	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:04
	20:41	20:07	19:26	17:43	17:16	17:15	17:34	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 30

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** Z - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (26)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:46	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:22	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:47	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:31	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:51	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 31
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AA - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (27)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	06:07	06:27 (25)	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	25	06:52 (25)	06:38	07:06	19:20	17:39	17:15	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:28 (25)	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	24	06:52 (25)	06:37	07:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:29 (25)	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:57
	24	06:53 (25)	06:36	07:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:30 (25)	06:42	07:12	07:41	07:08	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	23	06:53 (25)	06:35	07:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:30 (25)	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	23	06:53 (25)	06:34	07:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:31 (25)	06:44	07:14	06:43	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	22	06:53 (25)	06:33	07:13	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:32 (25)	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	21	06:53 (25)	06:32	07:15	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:33 (25)	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20	06:53 (25)	06:31	07:16	18:09	17:31	17:13	17:20	17:42	18:08	19:34	20:05	20:36
9	06:14	06:34 (25)	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	19	06:53 (25)	06:30	07:18	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:35 (25)	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	18	06:53 (25)	06:29	07:19	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:16	06:36 (25)	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:56
	17	06:53 (25)	06:28	07:20	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:37 (25)	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	15	06:52 (25)	06:27	07:21	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:38 (25)	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	14	06:52 (25)	06:26	07:22	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:39 (25)	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	12	06:51 (25)	06:25	07:23	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:41
15	06:20	06:40 (25)	06:54	07:23	06:51	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	10	06:50 (25)	06:24	07:24	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:41 (25)	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	7	06:48 (25)	06:23	07:24	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20	06:57	07:25	07:25	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	07:25	06:53	07:20	07:38	07:35	07:05	06:21	06:36	06:03	05:58
	19	06:58	07:26	07:26	17:54	17:22	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:58	07:26	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	18	06:59	07:27	07:27	17:55	17:23	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	17	06:59	07:28	07:28	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:01	07:28	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	16	06:59	07:29	07:29	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	15	06:59	07:30	07:30	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	14	06:59	07:31	07:31	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	13	06:59	07:32	07:32	17:47	17:18	17:14	17:30	17:56	18:22	19:49	20:22	20:46
25	06:30	07:05	07:32	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:02
	12	06:59	07:33	07:33	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
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	11	06:59	07:34	07:34	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:32	07:07	07:34	07:34	07:02	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	10	06:59	07:35	07:35	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:47
28	06:33	07:08	07:34	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	9	06:59	07:36	07:36	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:34	07:09	07:35	07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:57	06:04
	8	06:59	07:37	07:37	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:35	07:10	07:36	07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	7	06:59	07:38	07:38	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:36	07:11	07:37	07:37	07:05	07:29	07:40	07:25	06:48	06:03	06:21	05:58	06:06
	6	06:59	07:39	07:39	17:39	17:15	17:17	17:36	18:02	18:28	19:56	20:29	20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456	765
Total, worst case	294										56		

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 32

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AB - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (28)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:58	05:57 20:29
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:57 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	06:42 18:14	07:08 17:35	07:33 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:59	06:43 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:07	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	06:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:49	06:46 20:31	07:16 19:56	06:44 18:09	07:11 17:31	07:34 17:13	07:39 17:20	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:49	06:48 20:30	07:17 19:54	06:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
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13	06:18 20:49	06:52 20:26	07:21 19:48	06:49 18:02	07:15 17:27	07:37 17:12	07:37 17:23	07:12 17:47	06:28 18:12	06:43 19:39	06:07 20:10	05:57 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	06:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	06:41 19:39	06:06 20:11	05:57 20:41
15	06:20 20:48	06:54 20:24	07:23 19:45	06:51 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:13	05:57 20:41
16	06:21 20:48	06:55 20:23	07:23 19:44	06:51 17:58	07:18 17:24	07:38 17:12	07:36 17:25	07:08 17:49	06:24 18:15	06:38 19:41	06:04 20:14	05:58 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	06:52 17:57	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	06:53 17:55	07:20 17:23	07:38 17:12	07:35 17:26	07:05 17:51	06:21 18:17	06:36 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	06:54 17:54	07:20 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:59 20:44
20	06:25 20:46	07:00 20:18	07:27 19:38	06:55 17:53	07:21 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:02 20:18	05:59 20:44
21	06:26 20:46	07:01 20:16	07:28 19:36	06:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:02 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	06:57 17:50	07:23 17:20	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:46
23	06:28 20:44	07:03 20:14	07:30 19:33	06:58 17:49	07:24 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:00 20:46
24	06:29 20:44	07:04 20:12	07:31 19:32	06:59 17:47	07:24 17:18	07:40 17:14	07:31 17:30	06:58 17:56	06:11 18:22	06:28 19:49	05:59 20:22	06:01 20:46
25	06:31 20:43	07:05 20:11	07:32 19:30	07:00 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	06:26 19:50	05:59 20:23	06:02 20:47
26	06:32 20:43	07:06 20:10	07:33 19:29	07:00 17:45	07:26 17:17	07:40 17:14	07:29 17:32	06:55 17:57	06:08 18:23	06:25 19:51	05:59 20:24	06:02 20:47
27	06:33 20:42	07:07 20:08	07:34 19:27	07:01 17:44	07:27 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	06:24 19:52	05:58 20:25	06:03 20:48
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29	06:35 20:40		07:35 19:24	07:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	06:22 19:54	05:57 20:27	06:04 20:48
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:56		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 33
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AC - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (29)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
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	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
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18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
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20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
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	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 34

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AD - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (30)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
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29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
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30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 35

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AE - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (31)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
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12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 36
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AF - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (32)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
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11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
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12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 37
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AG - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (33)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
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26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
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27	06:32	07:07	07:34	07:01	07:27	07:41	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 38
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AH - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (34)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
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	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
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31	06:37		07:37		07:30		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 39

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AI - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (35)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
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8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
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	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
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	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 40
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AJ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (36)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:38	06:45 18:03	05:59 18:28	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:57 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:42 18:14	07:08 17:35	07:33 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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13	06:18 20:49	06:52 20:26	07:21 19:48	07:49 18:02	07:15 17:27	07:37 17:12	07:37 17:23	07:12 17:47	06:28 18:12	06:43 19:38	06:07 20:10	05:57 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	07:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	06:41 19:39	06:06 20:11	05:57 20:41
15	06:20 20:48	06:54 20:24	07:23 19:45	07:51 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:13	05:57 20:41
16	06:21 20:48	06:55 20:22	07:23 19:44	07:51 17:58	07:18 17:24	07:38 17:12	07:36 17:25	07:08 17:49	06:24 18:15	06:38 19:41	06:04 20:14	05:58 20:42
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24	06:29 20:44	07:04 20:12	07:31 19:32	07:59 17:47	07:24 17:18	07:40 17:14	07:31 17:30	06:57 17:56	06:11 18:22	06:28 19:49	05:59 20:22	06:01 20:46
25	06:31 20:43	07:05 20:11	07:32 19:30	08:00 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	06:26 19:50	05:59 20:23	06:02 20:47
26	06:32 20:43	07:06 20:10	07:33 19:29	08:00 17:45	07:26 17:17	07:40 17:14	07:29 17:32	06:55 17:57	06:08 18:23	06:25 19:51	05:59 20:24	06:02 20:47
27	06:33 20:42	07:07 20:08	07:34 19:27	08:01 17:44	07:27 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	06:24 19:52	05:58 20:25	06:03 20:48
28	06:34 20:41	07:08 20:07	07:34 19:26	08:02 17:42	07:27 17:16	07:40 17:15	07:28 17:34	06:52 17:59	06:05 18:25	06:23 19:53	05:58 20:26	06:03 20:48
29	06:35 20:40		07:35 19:24	08:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	06:22 19:54	05:57 20:27	06:04 20:48
30	06:36 20:40		07:36 19:23	08:04 17:40	07:29 17:15	07:40 17:16	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:55	05:57 20:28	06:05 20:49
31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:56		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 41

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AK - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (37)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 42

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AL - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (38)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 43
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AM - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (39)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:21	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
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	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:22	05:57	06:03
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29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 44
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AN - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (40)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:28	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:40	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:43	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:02
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	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:27	20:48
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	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 45
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AO - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (41)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
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	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:41	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 46
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AP - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (42)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:46	18:11	19:38	20:10	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:21	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:40	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 47
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AQ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (43)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
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16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 48

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AR - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (44)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:19	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:10	20:40
14	06:18	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:12	20:41
15	06:20	06:54	07:22	06:51	07:17	07:38	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 49
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AS - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (45)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:36	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:42 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:58	07:42 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:07	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	07:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:49	06:46 20:31	07:16 19:56	07:44 18:09	07:11 17:31	07:34 17:13	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:49	06:47 20:30	07:17 19:54	07:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:15 20:49	06:49 20:29	07:18 19:53	07:46 18:06	07:13 17:29	07:35 17:12	07:38 17:21	07:15 17:44	06:33 18:10	06:47 19:36	06:09 20:07	05:56 20:37
11	06:16 20:49	06:50 20:28	07:19 19:51	07:47 18:05	07:14 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:45 19:37	06:08 20:08	05:56 20:38
12	06:17 20:49	06:51 20:27	07:20 19:50	07:48 18:04	07:14 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:11	06:44 19:37	06:07 20:09	05:57 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:49 18:02	07:15 17:27	07:37 17:12	07:37 17:22	07:12 17:47	06:28 18:12	06:43 19:38	06:06 20:10	05:57 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	07:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	06:41 19:39	06:06 20:11	05:57 20:40
15	06:20 20:48	06:54 20:24	07:22 19:45	07:51 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:12	05:57 20:41
16	06:21 20:48	06:55 20:22	07:23 19:44	07:51 17:58	07:18 17:24	07:38 17:12	07:36 17:24	07:08 17:49	06:24 18:15	06:38 19:41	06:04 20:14	05:57 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	07:52 17:57	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	07:53 17:55	07:19 17:22	07:38 17:12	07:35 17:26	07:05 17:51	06:20 18:16	06:36 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	07:54 17:54	07:20 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:18	07:27 19:38	07:55 17:53	07:21 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:01 20:18	05:59 20:44
21	06:26 20:45	07:01 20:16	07:28 19:36	07:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:01 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	07:57 17:50	07:23 17:20	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:45
23	06:28 20:44	07:03 20:14	07:30 19:33	07:58 17:49	07:23 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:00 20:46
24	06:29 20:44	07:04 20:12	07:31 19:32	07:59 17:47	07:24 17:18	07:40 17:13	07:31 17:30	06:57 17:56	06:11 18:21	06:28 19:49	05:59 20:22	06:01 20:46
25	06:31 20:43	07:05 20:11	07:32 19:30	08:00 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	06:26 19:50	05:59 20:23	06:01 20:47
26	06:32 20:42	07:06 20:10	07:33 19:29	08:01 17:45	07:26 17:17	07:40 17:14	07:29 17:32	06:55 17:57	06:08 18:23	06:25 19:51	05:58 20:24	06:02 20:47
27	06:33 20:42	07:07 20:08	07:33 19:27	08:01 17:44	07:26 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	06:24 19:52	05:58 20:25	06:03 20:48
28	06:34 20:41	07:08 20:07	07:34 19:26	08:02 17:42	07:27 17:16	07:40 17:15	07:28 17:33	06:52 17:59	06:05 18:25	06:23 19:53	05:58 20:26	06:03 20:48
29	06:35 20:40		07:35 19:24	08:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:50 18:00	06:03 18:26	06:22 19:54	05:57 20:27	06:04 20:48
30	06:36 20:40		07:36 19:23	08:04 17:40	07:29 17:15	07:40 17:16	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:55	05:57 20:28	06:05 20:48
31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:56		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 50

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AT - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (46)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:41	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:12	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:40	07:19	06:37	06:51	06:11	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
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	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 51

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AU - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (47)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	06:42 18:14	07:08 17:34	07:33 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 52
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AV - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (48)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
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18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 53
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AW - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (49)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 54
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AX - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (50)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
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	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
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	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 55
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AY - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (51)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 56
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AZ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (52)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
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	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 57
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BA - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (53)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	06:42 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 58

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BB - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (54)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:05	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 59
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BC - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (55)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
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23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:27	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 60
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BD - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (56)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
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29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 61
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BE - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (57)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	19:59	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:10	19:36	20:08	20:38
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	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
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	20:44	20:12	19:31	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
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26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
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31	06:37		07:37		07:29		07:25	06:47		06:19		06:05
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 62
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BF - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (58)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:10	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:27	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
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	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
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30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 63
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BG - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (59)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
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	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 64
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BH - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (60)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
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	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
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12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
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	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 65

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BI - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (61)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06 20:49	06:38 20:38	07:09 20:05	07:38 19:19	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:36	06:46 18:02	06:00 18:27	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:56 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:16	07:07 17:36	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 19:59	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:41 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:01		06:19 19:56		06:05 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 66
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BJ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (62)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
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25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 67
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BK - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (63)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	19:59	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 68
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BL - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (64)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
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	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 69
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BM - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (65)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
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	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
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	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
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	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
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	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:45	20:17	20:44
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	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:47
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
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	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 70

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BN - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (66)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:32	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:04	20:36
8	06:13	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:36
9	06:13	06:48	07:17	06:46	07:13	07:35	07:39	07:17	06:35	06:49	06:10	05:56
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	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
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13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:57
	20:49	20:27	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
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	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:39	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:36	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:59	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:27	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:56	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:53	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:37	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:27	05:59	06:01
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
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	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
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	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 71

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BO - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (68)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
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	20:50	20:30	19:53	18:07	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
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	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:56
	20:49	20:26	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 72

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BP - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (69)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
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13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
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14	06:18	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
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15	06:20	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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



15 October 2015

To Stephen Crowe

Copy to

From Julien Gaschignard

Tel 8687 8810

Subject Lal Lal Wind Farm Shadow Flicker Assessment

Job no. 31/32671

1 Scope of Work

Undertake a shadow-flicker assessment for WestWind Energy Pty Ltd for the proposed wind farm at Lal Lal in Western Victoria using the worst case scenario parameters. The results of the assessment are provided in this brief report.

2 Methodology

The following methodology was used:

1. Request for information, including:
 - Turbine layout (turbine designations and coordinates) details
 - Turbine model including hub height and rotor diameter details
 - Digital contour information for an area at least 5 km from the site boundary
 - Residence (sensitive receivers) designations and coordinates
2. Input of base information into WindPRO (v2.9) wind modelling software
3. Selection of shadow flicker calculation parameters
4. Reporting

3 Lal Lal Wind Farm

Lal Lal Wind Farm is a 60 turbine project split into two areas, located approximately 90km west of Melbourne and approximately 15km from Ballarat.

Figure 1 shows the site layout of the wind and surrounding dwellings as provided by WestWind Energy Pty Ltd.

4 Standards

The Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria outlines that shadow flicker needs to be considered in the development of a wind farm “where this is more likely to be an issue for turbines located to the east or west of a dwelling”. This document refers to the draft Australian National Wind Farm Development Guidelines (July, 2010) for specific guidelines. These guidelines set strict limits on the levels of acceptable shadow flicker effect, using two methods:

- An astronomic worst case scenario limited to a maximum of 30 hours per year; and
- A realistic scenario including meteorological parameters limited to a maximum of 10 hours per year. “

The standard practice for shadow flicker simulation is to model the worst case potential scenario in the first instance. This means that limits of 30 hours per year apply to the results of our simulations. This assessment for the worst case scenario is the basis for this report. Once the results of the worst case scenario are analysed, further assessment may be required to model the more realistic scenario.

Based on these guidelines, we have adopted the following parameters:

Parameter	Limit/Description
Shadow flicker limit	30 hr/yr at the receptor
Receptor height	1.5m
Zone of influence of shadows	Either 20% of sun covered by blade with a distance limit of 265 x Max Blade Chord (m)
Maximum angle to the Sun	3 degrees

5 Inputs

The shadow flicker assessment was based on the following inputs:

- Turbine characteristics;
- Turbine layout locations **in GIS format;**
- 10m digital contour information in GIS format (1m contours were provided the individual sites but didn't extend as far as all dwellings so for consistency 10m contours were used for both sites);
- Residential dwellings in GIS format;
- **GIS data was provided in coordinate system GDA 1994, MGA Zone 55.**

6 Assumptions

Key assumptions used in model:

Parameter	Limit/Description
Turbine model	The configuration of the Alstom 122 was used as specified by the WestWind Energy Pty Ltd as similar turbine to what is proposed.
Turbine Tower Height	100m (as specified by WestWind Energy Pty Ltd)
Max Chord Length	4m
Turbine orientation and rotation	Worst case (turbines are always perpendicular to the incident direction of the sunlight and always rotating.) Distances between the rotor plane and the tower axis are negligible.
Maximum Distance of Influence	256 x Max Chord Length (4). Therefore 1024m.
Receptor mode	Greenhouse mode' for receivers (i.e. that the receptors do not face any particular direction, but instead will face all directions. This is most appropriate as the actual properties of the receptors – e.g. location and positioning of windows - are unknown); Existing screening is not included in model using WindPRO.

7 Results

7.1 Worst Case Scenario Results

A table showing the results of the modelled shadow flicker for the Worst Case Scenario for each dwelling (receptor) are shown for the in Appendix A. A summary of these results is shown in Table 1 below where exceedances are indicated in red. Figure 2 shows the locations of the dwellings with exceedances.

Table 1 Hours of Shadow Flicker for Worst Case

Shadow flicker hours per year	Number of dwellings
0 hrs/yr	60
0-30 hrs/yr (Shadow flicker limit)	2
30-50 hours	4
More than 50 hours	2
Total Number of Dwellings Assessed	68

Appendix B contains the Main Results detailed output from the WindPRO software. Appendix C shows the Calendar Results output from WindPRO where for each day of the year the turbine(s) that have contributed to the shadow flicker hours experienced at the receptor.

After initial simulations, the 'worst-case' results from WindPRO indicate that the total shadow flicker exceeds the maximum allowable limit of 30 hours per year at six receptors. Of these, four receptors are host participants and have entered into an agreement with the wind farm. No further mitigation is required at these host landholders. The remaining two locations H18aa and J17ab have shadow flicker of 44.1 hours and 32.7 hours per year respectively.

7.2 Breakdown of Shadow Flicker at H18aa and J17ab

Receptor H18aa experiences shadow flicker from turbine 2 (ESWT02) which is approximately 680m away in a South-East direction (see Figure 1). The shadow flicker from this turbine is experienced in the months of January and February between 7am and 8am; and in October, November and early December between 6.30am and 7.30am. These results are detailed in the Calendar Results on pages 14-15 in Appendix C.

Receptor J17ab experiences shadow flicker from turbines 13 (ESWT13) and 16 (EWST16). Turbine 13 is located approximate 1km away in a South-West direction and contributes to the 19.1hrs of the total shadow flicker between 7.30pm and 8.30pm from November to February. Turbine 16 is located approximate 1km away in an East direction and contributes to the 13.6hrs of the total shadow flicker between 7.30am and 8.30am from March to April and 6.45am to 7.30am in September. These results are detailed in the Calendar results on page 23-24 in Appendix C (please note the WindPRO names turbines sequentially from 1 onwards hence why the turbine numbers do not coincide for these two turbines).

7.3 Limitations of Results

The results presented in this report are presented for the Worst Case Scenario only.

All host dwellings which have been modelled for shadow flicker in this report have been assumed to be exempt from meeting Planning Permit conditions of 30 hours/year limit.

A specific turbine model with turbine parameters was not specified but instead parameters of similar turbine models and specific turbine height and blade width were provided by WestWind Energy Pty Ltd. Any changes to the turbine hub height, blade length or max chord length from those stated in this report would change the position of the sun in relation to the blades of the wind turbine and thus would change the results.

Another limitation as stated in the Inputs section was that 10m contours were used in the model for consistency reasons as the 1m contours didn't extend to all receptor locations. If 1m contours were extended to encompass all receptors, the heights of turbines and receptors would be adjusted to be more accurate and as a result would likely slightly alter the modelled results.

8 Conclusion

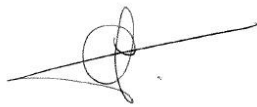
From the 68 dwellings surrounding the wind farm only six dwellings are above the maximum allowable limit of 30 hours per year. The planning permit conditions exempt host landholders from this requirement.

Two dwellings (H18aa and J17ab) have shadow flicker of 44.1 hours and 32.7 hours per year respectively, those dwellings are owned and inhabited by neighbouring non-participant landowners.

A number of mitigation measures can be implemented to meet the planning permit conditions:

- Assess a real case (actual) scenario to take into account modelling for meteorological conditions including cloud cover and wind speed and direction as well as landscape considerations as per the “National Wind Farm Guidelines – Draft July 2010”,
- Assess the actual view of the turbines from the properties for blocked views from wind breaks for example and offer additional screening if required,
- Install and operate a shadow flicker detection system on the relevant wind turbines to shut down their operation at the critical time to reduce shadow flicker effects at those two properties, see example from one wind turbine manufacturer here
- <http://nozebra.ipapercms.dk/Vestas/Communication/Productbrochure/TurbineOptions/VestasShadowDetectionSystem/>

Regards



Julien Gaschignard

Principal Renewable Energy Engineer

Figures

Figure 1 – Site Layout

Figure 2 – Shadow Flicker Exceedances

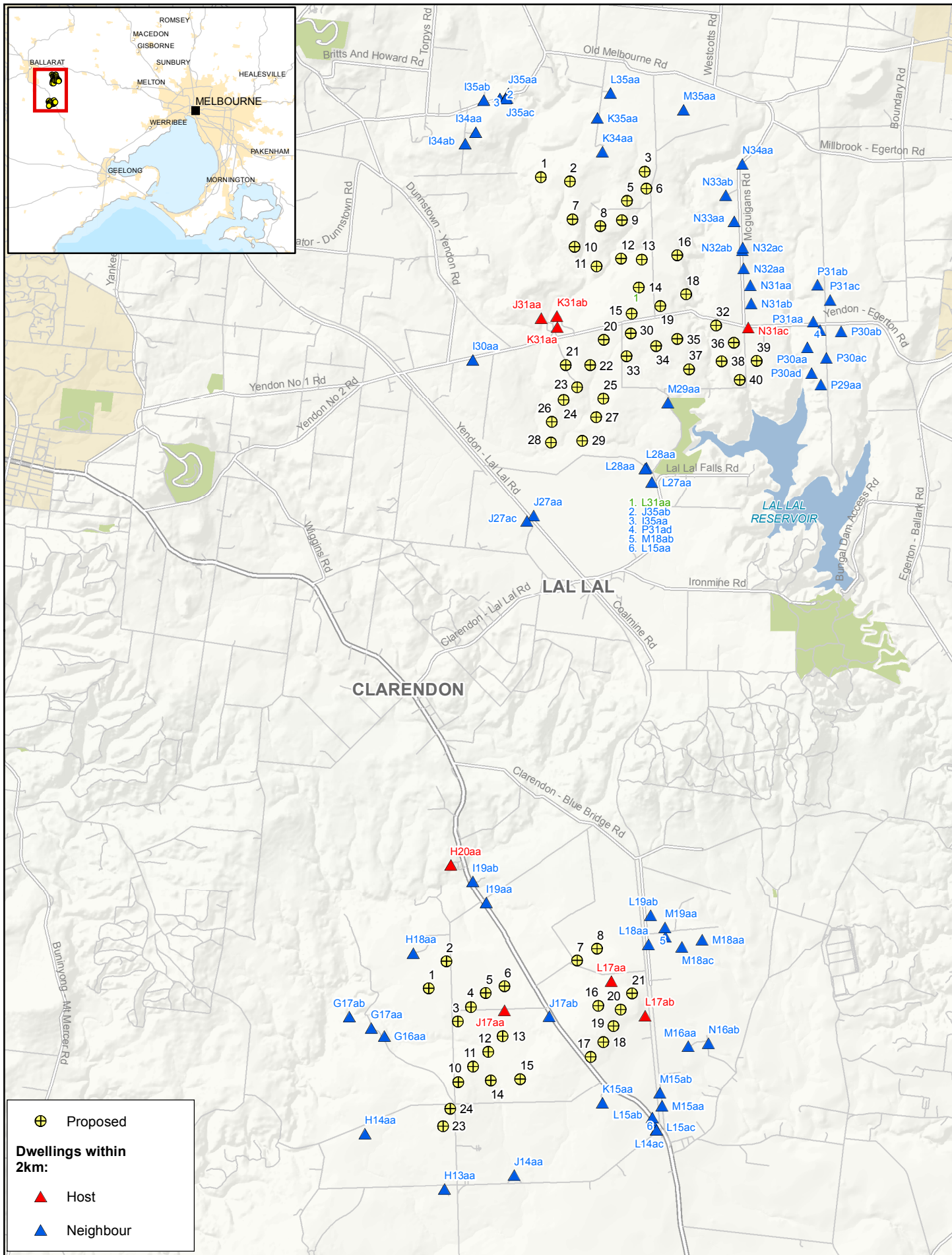
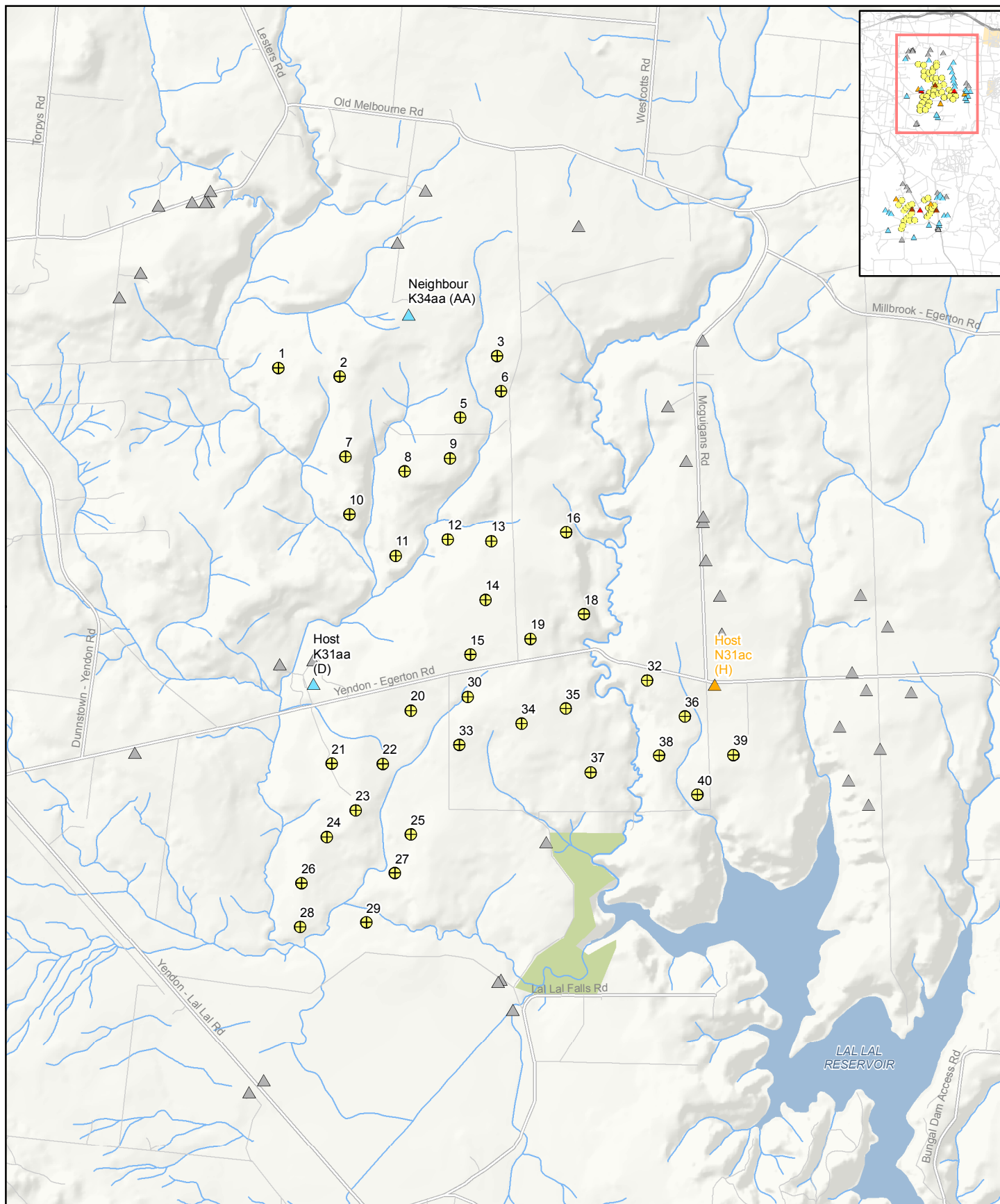


Figure 1

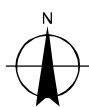
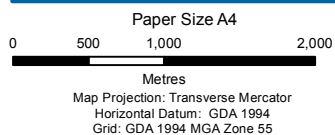


Modelled Shadow Flicker hours/year

- ▲ 0 hrs/yr
- ▲ 0 - 30 hrs/yr
- ▲ 30 - 50 hrs/yr

⊕ Proposed Turbines

Please refer to Appendix A for more detailed results of exceedances from WindPRO modelling software



WestWind Energy Pty Ltd
Lal Lal Wind Farm Shadow Flicker Assessment

North Site
Shadow Flicker Exceedances - Worst Case Scenario

Job Number 31-32671
Revision C
Date 14 Apr 2015

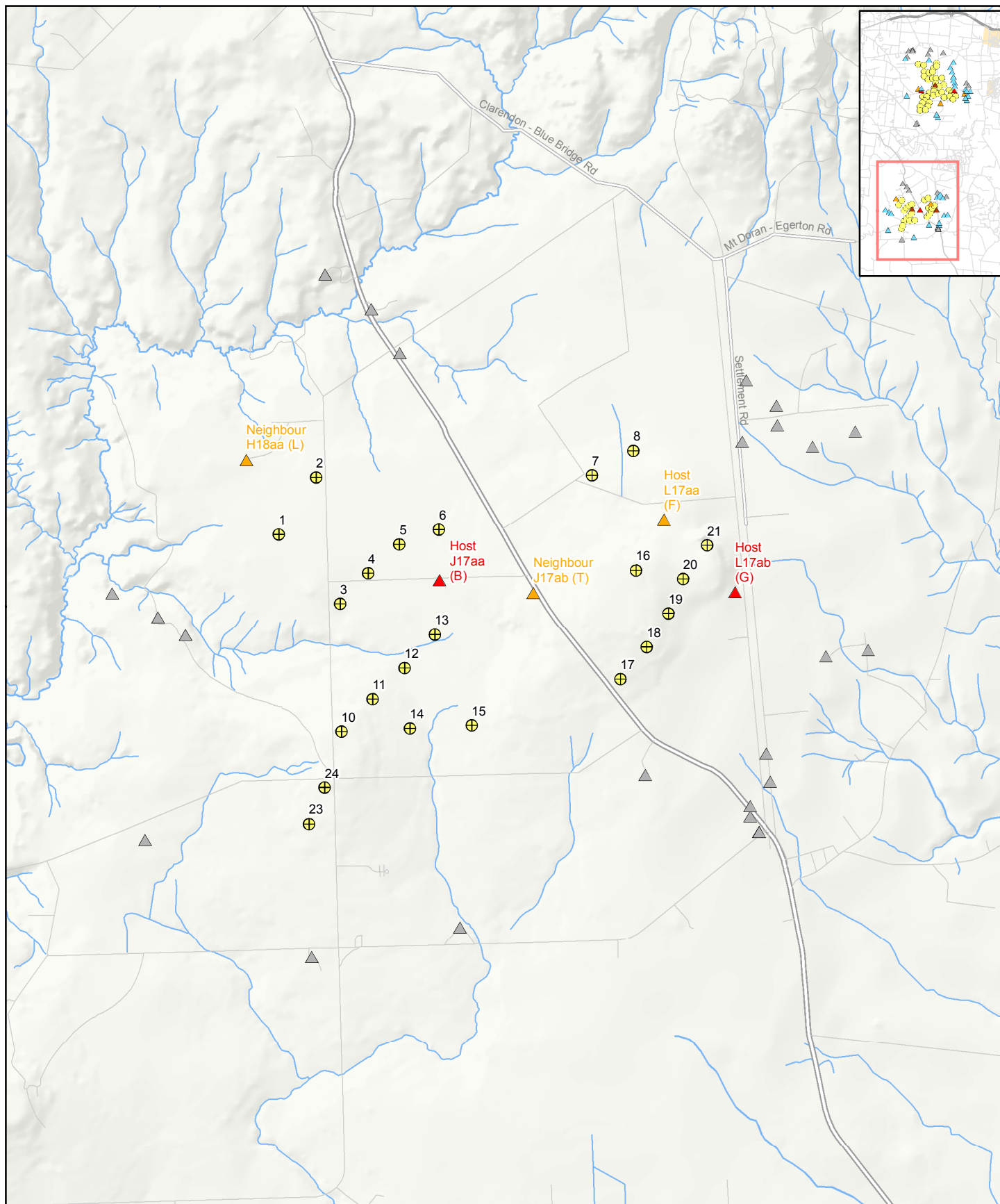
Figure 2

180 Lonsdale Street Melbourne VIC 3000 Australia T 61 3 8687 8000 F 61 3 8687 8111 E melmail@ghd.com W www.ghd.com

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Data source: Turbines and Dwellings supplied by client, base data supplied from DSE (Jan 2015). Created by:cillingworth

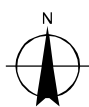
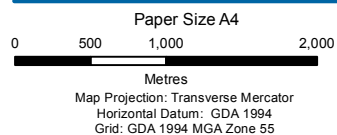


Modelled Shadow Flicker hours/year

- 0 hrs/yr
- 30 - 50 hrs/yr
- > 50 hrs/yr

Proposed Turbines

Please refer to Appendix A for more detailed results of exceedances from WindPRO modelling software



WestWind Energy Pty Ltd
Lal Lal Wind Farm Shadow Flicker Assessment

Job Number 31-32671
Revision C
Date 14 Apr 2015

South Site
Shadow Flicker Exceedances - Worst Case Scenario

Figure 2

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Data source: Turbines and Dwellings supplied by client, base data supplied from DSE (Jan 2015). Created by:cillingworth

Appendix A – Total Shadow Flicker hours per year for all Receptors

(Blue highlighting indicates where dwelling has exceeded shadow flicker limit of 30hrs/year)

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
H20aa	A	Host	0.0
J17aa	B	Host	102.1
J31aa	C	Host	0.0
K31aa	D	Host	22.5
K31ab	E	Host	0.0
L17aa	F	Host	46.6
L17ab	G	Host	112.9
N31ac	H	Host	31.6
G17aa	I	Neighbour	0.0
H13aa	J	Neighbour	0.0
H14aa	K	Neighbour	0.0
H18aa	L	Neighbour	44.1
I19aa	M	Neighbour	0.0
I30aa	N	Neighbour	0.0
I34aa	O	Neighbour	0.0
I34ab	P	Neighbour	0.0
I35aa	Q	Neighbour	0.0
I35ab	R	Neighbour	0.0
J14aa	S	Neighbour	0.0
J17ab	T	Neighbour	32.7
J27aa	U	Neighbour	0.0
J27ac	V	Neighbour	0.0
J35aa	W	Neighbour	0.0
J35ab	X	Neighbour	0.0
J35ac	Y	Neighbour	0.0
K15aa	Z	Neighbour	0.0
K34aa	AA	Neighbour	18.6

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
K35aa	AB	Neighbour	0.0
L14ac	AC	Neighbour	0.0
L15aa	AD	Neighbour	0.0
L15ab	AE	Neighbour	0.0
L18aa	AF	Neighbour	0.0
L19ab	AG	Neighbour	0.0
L27aa	AH	Neighbour	0.0
L28aa	AI	Neighbour	0.0
L35aa	AJ	Neighbour	0.0
M15aa	AK	Neighbour	0.0
M15ab	AL	Neighbour	0.0
M16aa	AM	Neighbour	0.0
M18aa	AN	Neighbour	0.0
M18ab	AO	Neighbour	0.0
M18ac	AP	Neighbour	0.0
M19aa	AQ	Neighbour	0.0
M29aa	AR	Neighbour	0.0
M35aa	AS	Neighbour	0.0
N16ab	AT	Neighbour	0.0
N31aa	AU	Neighbour	0.0
N31ab	AV	Neighbour	0.0
N32aa	AW	Neighbour	0.0
N32ab	AX	Neighbour	0.0
N32ac	AY	Neighbour	0.0
N33aa	AZ	Neighbour	0.0
N33ab	BA	Neighbour	0.0
N34aa	BB	Neighbour	0.0
P29aa	BC	Neighbour	0.0
P30aa	BD	Neighbour	0.0
P30ab	BE	Neighbour	0.0
P30ac	BF	Neighbour	0.0
P30ad	BG	Neighbour	0.0

Property Name (WindEnergy Pty Ltd)	Windpro ID	Status	Modelled Shadow Flicker hours/year
P31aa	BH	Neighbour	0.0
P31ab	BI	Neighbour	0.0
P31ac	BJ	Neighbour	0.0
P31ad	BK	Neighbour	0.0
L15ac	BL	Neighbour	0.0
I19ab	BM	Neighbour	0.0
G17ab	BN	Neighbour	0.0
G16aa	BO	Neighbour	0.0
L28aa	BP	Neighbour	0.0

Appendix B – Main Results Output from WindPRO

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:22 PM / 1

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145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km**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

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values.

A WTG will be visible if it is visible from any part of the receiver window. The

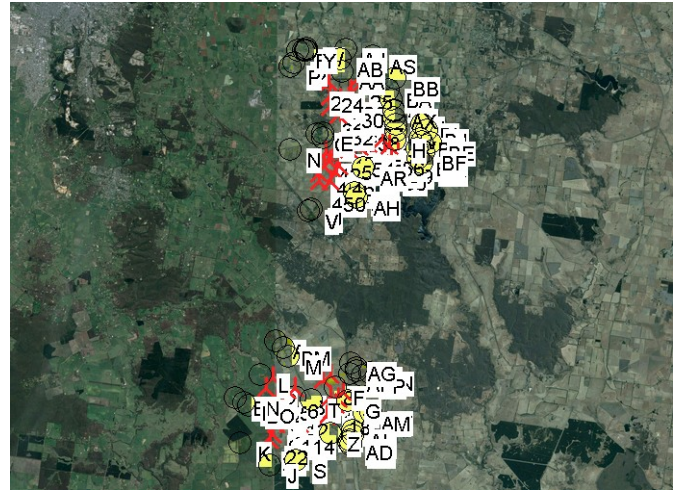
ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: elevation_10m.wpo (5)

Obstacles not used in calculation

Eye height: 1.5 m

Grid resolution: 5.0 m



Scale 1:400,000

New WTG

Shadow receptor

WTGs

UTM (south)-WGS84 Zone: 55				WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
East	North	Z	Row data/Description	Valid	Manufact.					Calculation distance [m]	RPM [RPM]
		[m]									
1	233,500	5,817,822	392.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
2	233,855	5,818,367	390.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
3	234,084	5,817,161	390.9 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
4	234,351	5,817,454	395.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
5	234,648	5,817,731	398.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
6	235,025	5,817,868	399.9 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
7	236,483	5,818,385	407.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
8	236,876	5,818,621	404.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
9	234,095	5,815,947	410.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
10	234,393	5,816,255	398.2 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
11	234,695	5,816,555	393.4 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
12	234,986	5,816,872	397.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
13	234,746	5,815,979	393.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
14	235,337	5,816,007	397.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
15	236,903	5,817,482	430.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
16	236,754	5,816,449	418.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
17	237,003	5,816,752	424.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
18	237,212	5,817,071	420.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
19	237,353	5,817,401	420.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
20	237,579	5,817,722	420.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
21	233,785	5,815,068	397.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
22	233,936	5,815,414	407.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
23	235,749	5,834,082	520.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
24	236,335	5,834,001	532.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
25	237,834	5,834,197	540.5 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
26	237,479	5,833,611	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
27	237,872	5,833,859	527.1 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
28	236,389	5,833,239	526.5 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
29	236,950	5,833,099	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
30	237,383	5,833,222	530.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
31	236,427	5,832,689	510.0 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
32	236,867	5,832,295	501.8 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
33	237,362	5,832,449	511.1 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
34	237,778	5,832,435	518.6 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
35	237,722	5,831,876	516.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
36	237,577	5,831,353	509.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
37	238,492	5,832,517	516.3 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0
38	238,291	5,832,052	515.7 Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0

To be continued on next page...

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:22 PM / 2
		Licensed user:
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		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

UTM (south)-WGS84 Zone: 55				WTG type								Shadow data	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM	
			[m]									[RPM]	
39	238,663	5,831,739	510.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
40	238,151	5,831,503	510.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
41	237,011	5,830,822	493.5	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
42	236,257	5,830,315	483.3	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
43	236,743	5,830,314	484.1	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
44	236,485	5,829,872	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
45	236,209	5,829,620	480.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
46	237,009	5,829,643	480.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
47	235,970	5,829,179	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
48	236,860	5,829,275	475.4	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
49	235,956	5,828,763	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
50	236,585	5,828,803	470.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
51	237,553	5,830,953	500.7	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
52	239,265	5,831,110	510.8	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
53	237,473	5,830,494	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
54	238,063	5,830,698	506.4	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
55	238,489	5,830,840	505.7	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
56	239,624	5,830,764	503.8	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
57	238,726	5,830,234	490.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
58	239,378	5,830,392	492.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
59	240,083	5,830,399	500.0	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	
60	239,743	5,830,020	490.1	Alstom Wind ECO 122 ...	Yes	Alstom Wind	ECO 122 modified-2,700	2,700	122.0	100.0	1,024	7.0	

Shadow receptor-Input

UTM (south)-WGS84 Zone: 55									
No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	233,938	5,820,296	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
B	235,026	5,817,386	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
C	235,760	5,831,259	480.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
D	236,084	5,831,076	480.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
E	236,079	5,831,300	480.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
F	237,170	5,817,965	414.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
G	237,848	5,817,275	404.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
H	239,908	5,831,068	509.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
I	232,345	5,817,030	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
J	233,813	5,813,799	378.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
K	232,224	5,814,915	377.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
L	233,189	5,818,529	390.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
M	234,649	5,819,546	386.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
N	234,381	5,830,418	500.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
O	234,437	5,834,986	542.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
P	234,231	5,834,755	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Q	234,926	5,835,662	539.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
R	234,605	5,835,628	538.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
S	235,221	5,814,079	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
T	235,924	5,817,263	415.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
U	235,611	5,827,300	470.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
V	235,470	5,827,188	470.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
W	235,101	5,835,765	534.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
X	235,080	5,835,665	538.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Y	235,054	5,835,659	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
Z	236,990	5,815,534	401.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AA	236,991	5,834,590	544.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AB	236,884	5,835,273	547.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AC	238,074	5,814,991	388.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AD	237,993	5,815,139	389.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AE	237,993	5,815,237	390.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"

To be continued on next page...

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

UTM (south)-WGS84 Zone: 55

No.	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
AF	237,913	5,818,705	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AG	237,955	5,819,290	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AH	237,982	5,827,972	460.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AI	237,867	5,828,259	460.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AJ	237,151	5,835,770	552.4	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AK	238,182	5,815,469	390.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AL	238,142	5,815,735	393.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AM	238,711	5,816,662	390.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AN	238,991	5,818,801	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AO	238,248	5,818,860	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AP	238,584	5,818,659	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AQ	238,239	5,819,045	400.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AR	238,304	5,829,565	480.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AS	238,613	5,835,432	560.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AT	239,115	5,816,724	386.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AU	239,957	5,831,913	519.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AV	239,974	5,831,555	515.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AW	239,820	5,832,252	521.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AX	239,795	5,832,616	529.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AY	239,798	5,832,667	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
AZ	239,635	5,833,198	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BA	239,461	5,833,716	530.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BB	239,792	5,834,345	540.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BC	241,371	5,829,923	491.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BD	241,097	5,830,670	502.1	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BE	241,778	5,830,993	510.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BF	241,481	5,830,456	504.8	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BG	241,181	5,830,156	492.7	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BH	241,214	5,831,184	504.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BI	241,297	5,831,922	512.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BJ	241,554	5,831,622	509.9	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BK	241,352	5,831,017	507.3	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BL	238,074	5,814,990	388.5	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BM	234,381	5,819,964	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BN	231,912	5,817,260	370.3	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BO	232,610	5,816,865	380.0	2.0	1.5	1.0	0.0	90.0	"Green house mode"
BP	237,842	5,828,237	460.6	2.0	1.5	1.0	0.0	90.0	"Green house mode"

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	0:00	0	0:00
B	102:04	173	0:57
C	0:00	0	0:00
D	22:29	56	0:31
E	0:00	0	0:00
F	46:36	90	0:38
G	112:51	180	1:02
H	31:34	56	0:44
I	0:00	0	0:00
J	0:00	0	0:00
K	0:00	0	0:00
L	44:07	82	0:43
M	0:00	0	0:00
N	0:00	0	0:00

To be continued on next page...

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:22 PM / 4

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

...continued from previous page

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
O	0:00	0	0:00
P	0:00	0	0:00
Q	0:00	0	0:00
R	0:00	0	0:00
S	0:00	0	0:00
T	32:43	102	0:28
U	0:00	0	0:00
V	0:00	0	0:00
W	0:00	0	0:00
X	0:00	0	0:00
Y	0:00	0	0:00
Z	0:00	0	0:00
AA	18:35	52	0:27
AB	0:00	0	0:00
AC	0:00	0	0:00
AD	0:00	0	0:00
AE	0:00	0	0:00
AF	0:00	0	0:00
AG	0:00	0	0:00
AH	0:00	0	0:00
AI	0:00	0	0:00
AJ	0:00	0	0:00
AK	0:00	0	0:00
AL	0:00	0	0:00
AM	0:00	0	0:00
AN	0:00	0	0:00
AO	0:00	0	0:00
AP	0:00	0	0:00
AQ	0:00	0	0:00
AR	0:00	0	0:00
AS	0:00	0	0:00
AT	0:00	0	0:00
AU	0:00	0	0:00
AV	0:00	0	0:00
AW	0:00	0	0:00
AX	0:00	0	0:00
AY	0:00	0	0:00
AZ	0:00	0	0:00
BA	0:00	0	0:00
BB	0:00	0	0:00
BC	0:00	0	0:00
BD	0:00	0	0:00
BE	0:00	0	0:00
BF	0:00	0	0:00
BG	0:00	0	0:00
BH	0:00	0	0:00
BI	0:00	0	0:00
BJ	0:00	0	0:00
BK	0:00	0	0:00
BL	0:00	0	0:00
BM	0:00	0	0:00
BN	0:00	0	0:00
BO	0:00	0	0:00
BP	0:00	0	0:00

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:22 PM / 5
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Main Result**Calculation:** Scenario 2 - fixed distance 1km

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (183)	0:00	
2	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (184)	44:07	
3	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (185)	14:25	
4	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (186)	28:17	
5	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (187)	59:22	
6	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (188)	0:00	
7	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (189)	46:36	
8	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (190)	0:00	
9	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (191)	0:00	
10	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (192)	0:00	
11	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (193)	0:00	
12	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (194)	19:06	
13	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (195)	0:00	
14	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (196)	0:00	
15	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (197)	28:30	
16	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (198)	0:00	
17	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (199)	0:00	
18	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (200)	57:12	
19	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (201)	50:17	
20	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (202)	0:00	
21	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (203)	0:00	
22	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (204)	0:00	
23	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (205)	0:00	
24	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (206)	0:00	
25	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (207)	18:35	
26	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (208)	0:00	
27	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (209)	0:00	
28	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (210)	0:00	
29	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (211)	0:00	
30	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (212)	0:00	
31	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (213)	0:00	
32	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (214)	0:00	
33	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (215)	0:00	
34	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (216)	0:00	
35	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (217)	0:00	
36	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (218)	0:00	
37	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (219)	0:00	
38	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (220)	0:00	
39	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (221)	0:00	
40	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (222)	0:00	
41	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (223)	22:29	
42	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (224)	0:00	
43	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (225)	0:00	
44	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (226)	0:00	
45	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (227)	0:00	
46	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (228)	0:00	
47	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (229)	0:00	
48	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (230)	0:00	
49	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (231)	0:00	
50	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (232)	0:00	
51	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (233)	0:00	
52	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (234)	31:34	
53	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (235)	0:00	
54	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (236)	0:00	
55	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (237)	0:00	
56	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (238)	0:00	
57	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (239)	0:00	
58	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (240)	0:00	
59	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (241)	0:00	
60	Alstom Wind ECO 122 modified 2700 122.0 !O! hub: 100.0 m (TOT: 161.0 m) (242)	0:00	

Appendix C – Calendar Results Output from WindPRO

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 1
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** A - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (1)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:45	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:45	20:17	20:44
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:47
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:03	07:29	07:41	07:27	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 2
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** B - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (2)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	06:38	07:09	07:38	18:29 (4)	07:05
	20:50	20:38	20:06	19:20	18:58 (4)	17:39
2	06:07	06:39	07:10	07:39	18:30 (4)	07:06
	20:50	20:38	20:04	19:18	18:56 (4)	17:38
3	06:08	06:41	07:11	07:40	18:31 (4)	07:07
	20:50	20:37	20:03	19:17	18:55 (4)	17:37
4	06:09	06:42	07:12	07:41	18:33 (4)	07:08
	20:50	20:36	20:02	19:15	18:53 (4)	17:35
5	06:10	06:43	19:46 (3)	07:13	06:42	17:37 (4)
	20:50	20:35	19:52 (3)	20:00	18:14	17:34
6	06:11	06:44	19:42 (3)	07:14	06:43	07:10
	20:50	20:34	19:56 (3)	19:59	18:12	17:33
7	06:11	06:45	19:40 (3)	07:15	06:44	07:11
	20:50	20:33	19:58 (3)	19:57	18:11	17:32
8	06:12	06:46	19:40 (3)	07:16	06:45	07:11
	20:50	20:32	20:00 (3)	19:56	18:09	17:31
9	06:13	06:47	19:38 (3)	07:17	06:45	07:12
	20:50	20:31	20:01 (3)	19:54	18:08	17:30
10	06:14	06:48	19:37 (3)	07:18	06:46	07:13
	20:50	20:30	20:02 (3)	19:53	18:06	17:29
11	06:15	06:50	19:36 (3)	07:19	18:45 (4)	06:47
	20:50	20:29	20:03 (3)	19:51	18:58 (4)	18:05
12	06:16	06:51	19:36 (3)	07:20	18:41 (4)	06:48
	20:49	20:27	20:03 (3)	19:50	19:01 (4)	18:04
13	06:17	06:52	19:35 (3)	07:21	18:39 (4)	06:49
	20:49	20:26	20:04 (3)	19:48	19:03 (4)	18:02
14	06:18	06:53	19:35 (3)	07:22	18:37 (4)	06:50
	20:49	20:25	20:03 (3)	19:47	19:05 (4)	18:01
15	06:19	06:54	19:34 (3)	07:23	18:35 (4)	06:51
	20:49	20:24	20:01 (3)	19:45	19:06 (4)	17:59
16	06:20	06:55	19:34 (3)	07:24	18:33 (4)	06:52
	20:48	20:23	20:00 (3)	19:44	19:07 (4)	17:58
17	06:22	06:56	19:35 (3)	07:24	18:32 (4)	06:53
	20:48	20:22	20:00 (3)	19:42	19:08 (4)	17:57
18	06:23	06:57	19:35 (3)	07:25	18:31 (4)	06:54
	20:47	20:20	19:59 (3)	19:41	19:09 (4)	17:55
19	06:24	06:58	19:35 (3)	07:26	18:29 (4)	06:54
	20:47	20:19	19:57 (3)	19:39	19:08 (4)	17:54
20	06:25	06:59	19:36 (3)	07:27	18:28 (4)	06:55
	20:47	20:18	19:56 (3)	19:38	19:08 (4)	17:53
21	06:26	07:01	19:36 (3)	07:28	18:28 (4)	06:56
	20:46	20:17	19:55 (3)	19:36	19:08 (4)	17:51
22	06:27	07:02	19:37 (3)	07:29	18:27 (4)	06:57
	20:45	20:15	19:54 (3)	19:35	19:08 (4)	17:50
23	06:28	07:03	19:38 (3)	07:30	18:27 (4)	06:58
	20:45	20:14	19:52 (3)	19:33	19:08 (4)	17:49
24	06:29	07:04	19:40 (3)	07:31	18:27 (4)	06:59
	20:44	20:13	19:51 (3)	19:32	19:08 (4)	17:47
25	06:30	07:05	19:42 (3)	07:32	18:26 (4)	07:00
	20:44	20:11	19:50 (3)	19:30	19:08 (4)	17:46
26	06:31	07:06	19:47 (3)	07:33	18:26 (4)	07:01
	20:43	20:10	19:48 (3)	19:29	19:07 (4)	17:45
27	06:33	07:07		07:34	18:27 (4)	07:02
	20:42	20:09		19:27	19:06 (4)	17:44
28	06:34	07:08		07:35	18:27 (4)	07:03
	20:42	20:07		19:26	19:05 (4)	17:42
29	06:35			07:36	18:27 (4)	07:03
	20:41			19:24	19:03 (4)	17:41
30	06:36			07:36	18:27 (4)	07:04
	20:40			19:23	19:01 (4)	17:40
31	06:37			07:37	18:28 (4)	
	20:39			19:21	18:59 (4)	
Potential sun hours	447	378	383	334	314	288
Total, worst case		431	727	112	636	1667

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 3
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** B - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (2)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

July		August		September		October		November		December			
1	07:41 17:16	55	15:25 (5) 16:20 (5)	07:25 17:36	06:46 18:02		06:01 18:28	22	17:19 (4) 17:41 (4)	06:18 19:58	24	19:07 (3) 19:31 (3)	05:57 20:30
2	07:41 17:16	56	15:25 (5) 16:21 (5)	07:24 17:37	06:45 18:03		05:59 18:29	16	17:22 (4) 17:38 (4)	06:17 19:59	22	19:08 (3) 19:30 (3)	05:56 20:31
3	07:41 17:17	56	15:25 (5) 16:21 (5)	07:23 17:38	06:44 18:04		05:57 18:30	7	17:26 (4) 17:33 (4)	06:16 20:00	20	19:09 (3) 19:29 (3)	05:56 20:32
4	07:40 17:17	55	15:26 (5) 16:21 (5)	07:22 17:39	06:42 18:05		06:56 19:30			06:15 20:01	17	19:11 (3) 19:28 (3)	05:56 20:33
5	07:40 17:18	54	15:26 (5) 16:20 (5)	07:21 17:40	06:41 18:06		06:54 19:31			06:14 20:02	12	19:13 (3) 19:25 (3)	05:56 20:34
6	07:40 17:18	54	15:26 (5) 16:20 (5)	07:20 17:41	06:39 18:07		06:53 19:32			06:13 20:03	6	19:16 (3) 19:22 (3)	05:56 20:35
7	07:40 17:19	54	15:27 (5) 16:21 (5)	07:19 17:41	06:38 18:07	13	17:32 (4) 17:45 (4)		06:51 19:33	06:12 20:04			05:56 20:35
8	07:40 17:19	53	15:28 (5) 16:21 (5)	07:18 17:42	06:36 18:08	19	17:29 (4) 17:48 (4)		06:50 19:34	06:11 20:05			05:56 20:36
9	07:39 17:20	53	15:27 (5) 16:20 (5)	07:17 17:43	06:35 18:09	24	17:25 (4) 17:49 (4)		06:48 19:35	06:10 20:07			05:56 20:37
10	07:39 17:20	52	15:28 (5) 16:20 (5)	07:15 17:44	06:33 18:10	26	17:24 (4) 17:50 (4)		06:47 19:36	06:09 20:08			05:56 20:38
11	07:39 17:21	51	15:29 (5) 16:20 (5)	07:14 17:45	06:31 18:11	29	17:22 (4) 17:51 (4)		06:46 19:37	06:08 20:09			05:56 20:39
12	07:38 17:22	51	15:29 (5) 16:20 (5)	07:13 17:46	06:30 18:12	31	17:20 (4) 17:51 (4)		06:44 19:38	06:07 20:10			05:56 20:40
13	07:38 17:22	50	15:30 (5) 16:20 (5)	07:12 17:46	06:28 18:12	33	17:19 (4) 17:52 (4)		06:43 19:39	06:06 20:11			05:56 20:40
14	07:37 17:23	49	15:30 (5) 16:19 (5)	07:11 17:47	06:27 18:13	36	17:17 (4) 17:53 (4)		06:41 19:40	06:05 20:12			05:57 20:41
15	07:37 17:24	48	15:31 (5) 16:19 (5)	07:10 17:48	06:25 18:14	37	17:17 (4) 17:54 (4)		06:40 19:41	06:05 20:13			05:57 20:42
16	07:36 17:24	46	15:32 (5) 16:18 (5)	07:08 17:49	06:24 18:15	40	17:15 (4) 17:55 (4)	4	06:38 19:42	06:04 20:14			05:57 20:43
17	07:36 17:25	45	15:33 (5) 16:18 (5)	07:07 17:50	06:22 18:16	41	17:14 (4) 17:55 (4)	8	06:37 19:43	06:03 20:15			05:57 20:43
18	07:35 17:26	44	15:33 (5) 16:17 (5)	07:06 17:51	06:21 18:17	41	17:14 (4) 17:55 (4)	12	06:36 19:44	06:03 20:16			05:58 20:44
19	07:35 17:26	42	15:35 (5) 16:17 (5)	07:04 17:52	06:19 18:17	42	17:13 (4) 17:55 (4)	15	06:34 19:45	06:02 20:17			05:58 20:44
20	07:34 17:27	41	15:35 (5) 16:16 (5)	07:03 17:52	06:18 18:18	42	17:13 (4) 17:55 (4)	17	06:33 19:46	06:01 20:18			05:59 20:45
21	07:34 17:28	39	15:36 (5) 16:15 (5)	07:02 17:53	06:16 18:19	41	17:13 (4) 17:54 (4)	19	06:32 19:47	06:01 20:20			05:59 20:46
22	07:33 17:29	37	15:38 (5) 16:15 (5)	07:01 17:54	06:14 18:20	41	17:13 (4) 17:54 (4)	21	06:30 19:48	06:00 20:21			06:00 20:46
23	07:32 17:29	35	15:39 (5) 16:14 (5)	06:59 17:55	06:13 18:21	40	17:13 (4) 17:53 (4)	22	06:29 19:49	06:00 20:22			06:00 20:47
24	07:31 17:30	33	15:40 (5) 16:13 (5)	06:58 17:56	06:11 18:22	39	17:13 (4) 17:52 (4)	24	06:28 19:50	05:59 20:23			06:01 20:47
25	07:31 17:31	30	15:41 (5) 16:11 (5)	06:56 17:57	06:10 18:23	38	17:13 (4) 17:51 (4)	26	06:26 19:51	05:59 20:24			06:01 20:47
26	07:30 17:32	26	15:43 (5) 16:09 (5)	06:55 17:57	06:08 18:23	37	17:13 (4) 17:50 (4)	27	06:25 19:52	05:58 20:25			06:02 20:48
27	07:29 17:32	22	15:46 (5) 16:08 (5)	06:54 17:58	06:07 18:24	34	17:15 (4) 17:49 (4)	27	06:24 19:53	05:58 20:26			06:02 20:48
28	07:28 17:33	18	15:48 (5) 16:06 (5)	06:52 17:59	06:05 18:25	32	17:15 (4) 17:47 (4)	28	06:23 19:54	05:57 20:27			06:03 20:49
29	07:27 17:34	10	15:52 (5) 16:02 (5)	06:51 18:00	06:04 18:26	30	17:16 (4) 17:46 (4)	29	06:21 19:55	05:57 20:28			06:04 20:49
30	07:27 17:35			06:49 18:01	06:02 18:27	27	17:17 (4) 17:44 (4)	28	06:20 19:56	05:57 20:29			06:05 20:49
31	07:26 17:36			06:48 18:02			06:19 19:57	26	06:19 19:32 (3)				06:05 20:49
Potential sun hours	305		331	355		405		424		456			
Total, worst case	1259			813		378		101					

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 4
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** C - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (3)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:57
	20:50	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:13	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:56
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:16	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:11	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 5
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km**Shadow receptor:** D - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (4)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:00 (41) 20:06	07:09 19:20	07:38 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:58	06:38 (41) 20:29
2	06:07 20:49	06:40 20:37	07:01 (41) 20:04	07:10 19:18	07:39 17:38	07:31 17:14	07:40 17:16	07:24 17:38	06:45 18:03	05:59 18:29	06:17 19:59	06:36 (41) 20:30
3	06:08 20:49	06:41 20:36	07:01 (41) 20:11	07:11 19:17	07:40 17:37	07:31 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:57 18:29	06:16 20:00	06:35 (41) 20:31
4	06:09 20:50	06:42 20:35	07:01 (41) 20:12	07:12 19:15	07:41 17:36	07:32 17:13	07:40 17:17	07:22 17:39	06:42 18:05	05:56 19:30	06:15 20:01	06:34 (41) 20:32
5	06:10 20:50	06:43 20:34	07:02 (41) 20:13	07:13 19:14	07:42 17:35	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	05:54 19:31	06:14 20:02	06:33 (41) 20:33
6	06:11 20:50	06:44 20:34	07:04 (41) 19:59	07:14 18:12	07:43 17:33	07:33 17:13	07:40 17:18	07:20 17:41	06:39 18:07	05:53 19:32	06:13 20:03	06:32 (41) 20:34
7	06:12 20:50	06:45 20:33	07:05 (41) 19:57	07:15 18:11	07:44 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	05:51 19:33	06:12 20:04	06:31 (41) 20:35
8	06:13 20:50	06:46 20:32	07:06 (41) 19:56	07:16 18:09	07:44 17:31	07:34 17:13	07:39 17:19	07:17 17:42	06:36 18:08	05:50 19:34	06:11 20:05	06:31 (41) 20:36
9	06:14 20:49	06:48 20:30	07:07 (41) 19:54	07:17 18:08	07:45 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	05:48 19:35	06:10 20:06	06:32 (41) 20:37
10	06:15 20:49	06:49 20:29	07:09 (41) 19:53	07:18 18:06	07:46 17:29	07:35 17:12	07:39 17:21	07:15 17:44	06:33 18:10	05:47 19:36	06:09 20:07	06:31 (41) 20:38
11	06:16 20:49	06:50 20:28	07:13 (41) 19:51	07:19 18:05	07:47 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	05:46 19:37	06:08 20:08	06:31 (41) 20:38
12	06:17 20:49	06:51 20:27	07:21 (41) 19:50	07:20 18:04	07:48 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:12	05:44 19:38	06:07 20:09	06:31 (41) 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:21 18:02	07:49 17:27	07:37 17:12	07:37 17:23	07:12 17:47	06:28 18:12	05:43 19:39	06:06 20:11	06:31 (41) 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	07:22 18:01	07:50 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	05:41 19:40	06:06 20:12	06:32 (41) 20:41
15	06:20 20:48	07:07 (41) 20:24	07:23 19:45	07:23 17:59	07:51 17:25	07:38 17:12	07:37 17:24	07:09 17:48	06:25 18:14	05:40 19:40	06:05 20:13	06:32 (41) 20:41
16	06:21 20:48	07:05 (41) 20:23	07:24 19:44	07:24 17:58	07:52 17:24	07:38 17:12	07:36 17:25	07:08 17:49	06:24 18:15	05:38 19:41	06:04 20:14	06:32 (41) 20:42
17	06:22 20:47	07:04 (41) 20:21	07:24 19:42	07:24 17:57	07:53 17:23	07:38 17:12	07:36 17:25	07:07 17:50	06:22 18:16	05:37 19:42	06:03 20:15	06:34 (41) 20:43
18	06:23 20:47	07:03 (41) 20:20	07:25 19:41	07:25 17:55	07:54 17:23	07:39 17:12	07:35 17:26	07:06 17:51	06:21 18:17	05:36 19:43	06:03 20:16	06:34 (41) 20:43
19	06:24 20:47	07:02 (41) 20:19	07:26 19:39	07:26 17:54	07:54 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	05:34 19:44	06:02 20:17	06:34 (41) 20:44
20	06:25 20:46	07:02 (41) 20:18	07:27 19:38	07:27 17:53	07:55 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	05:33 19:45	06:01 20:18	06:36 (41) 20:45
21	06:26 20:46	07:01 (41) 20:16	07:28 19:36	07:28 17:51	07:56 17:20	07:39 17:13	07:33 17:28	07:02 17:53	06:16 18:19	05:32 19:46	06:01 20:19	06:36 (41) 20:45
22	06:27 20:45	07:01 (41) 20:15	07:29 19:35	07:29 17:50	07:57 17:20	07:40 17:13	07:33 17:29	07:00 17:54	06:14 18:20	05:30 19:47	06:00 20:20	06:38 (41) 20:46
23	06:28 20:45	07:00 (41) 20:14	07:30 19:33	07:30 17:49	07:58 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	05:29 19:48	06:00 20:21	06:38 (41) 20:46
24	06:29 20:44	07:00 (41) 20:12	07:31 19:32	07:31 17:47	07:59 17:18	07:40 17:13	07:31 17:30	06:58 17:56	06:11 18:22	05:28 19:49	05:59 20:22	06:40 (41) 20:47
25	06:31 20:43	07:00 (41) 20:11	07:32 19:30	07:32 17:46	08:00 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	05:26 19:50	05:59 20:23	06:42 (41) 20:47
26	06:32 20:43	06:59 (41) 20:10	07:33 19:29	07:33 17:45	08:01 17:17	07:40 17:14	07:30 17:32	06:55 17:57	06:08 18:23	05:25 19:51	05:58 20:24	06:43 (41) 20:47
27	06:33 20:42	06:59 (41) 20:08	07:34 19:27	07:34 17:44	08:02 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	05:24 19:52	05:58 20:25	06:46 (41) 20:48
28	06:34 20:41	06:59 (41) 20:07	07:35 19:26	07:35 17:42	08:03 17:16	07:40 17:15	07:28 17:33	06:52 17:59	06:05 18:25	05:23 19:53	05:58 20:26	06:46 (41) 20:48
29	06:35 20:40	07:00 (41) 20:06	07:36 19:24	07:36 17:41	08:04 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	05:22 19:54	05:57 20:27	06:47 (41) 20:48
30	06:36 20:40	07:00 (41) 20:05	07:37 19:23	07:37 17:40	08:05 17:15	07:40 17:16	07:26 17:35	06:49 18:01	06:02 18:27	05:20 19:56	05:57 20:28	06:48 (41) 20:49
31	06:37 20:39	07:01 (41) 20:04	07:38 19:21	07:38 17:39	08:06 17:15	07:40 17:16	07:25 17:36	06:48 18:02	06:19 19:57	05:19 19:57	06:41 (41) 20:49	06:49 (41) 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case	412	260	383	334	314	288	305	332	355	404	424	456

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 6
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** E - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (5)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:36	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:13	17:19	17:42	18:08	19:34	20:05	20:36
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	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
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	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:56	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 7
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** F - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (6)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06 20:50	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	16:14 (7) 17:16	16:22 (7) 17:25	16:30 (7) 18:02	06:46 18:28	06:00 19:58	05:57 20:30
2	06:07 20:50	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	16:15 (7) 17:16	16:22 (7) 17:23	16:31 (7) 18:03	06:45 18:29	05:59 19:59	05:56 20:31
3	06:08 20:50	06:40 20:37	07:11 20:03	07:40 19:17	07:07 17:36	07:32 17:13	16:15 (7) 17:16	16:22 (7) 17:22	16:33 (7) 18:04	06:43 18:29	05:57 20:00	05:56 20:32
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:35	07:32 17:13	16:15 (7) 17:17	16:22 (7) 17:21	16:35 (7) 18:05	06:42 19:30	05:56 20:01	05:56 20:33
5	06:10 20:50	06:43 20:35	07:13 20:00	07:42 18:14	07:09 17:34	07:33 17:13	16:16 (7) 17:17	16:22 (7) 17:20	16:38 (7) 18:06	06:40 19:31	05:54 20:02	05:56 20:34
6	06:10 20:50	06:44 20:34	07:14 19:59	07:43 18:12	07:10 17:33	07:34 17:13	16:16 (7) 17:18	16:22 (7) 17:21	16:39 (7) 18:06	06:53 19:32	06:13 20:03	05:56 20:34
7	06:11 20:50	06:45 20:33	07:15 19:57	07:44 18:11	07:11 17:32	07:34 17:12	16:16 (7) 17:19	16:22 (7) 17:21	16:37 (7) 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:12 20:50	06:46 20:32	07:16 19:56	07:45 18:09	07:11 17:31	07:35 17:12	16:17 (7) 17:19	16:23 (7) 17:22	16:36 (7) 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:13 20:50	06:47 20:31	07:17 19:54	07:46 18:08	07:12 17:30	07:35 17:12	16:17 (7) 17:20	16:22 (7) 17:23	16:34 (7) 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:14 20:50	06:48 20:30	07:18 19:53	07:47 18:06	07:13 17:29	07:36 17:12	16:17 (7) 17:20	16:22 (7) 17:24	16:33 (7) 18:10	06:47 19:36	06:09 20:07	05:56 20:38
11	06:15 20:49	06:50 20:29	07:19 19:51	07:48 18:05	07:14 17:28	07:36 17:12	16:17 (7) 17:21	16:22 (7) 17:25	16:31 (7) 18:11	06:45 19:37	06:08 20:09	05:56 20:39
12	06:16 20:49	06:51 20:27	07:20 19:50	07:49 18:03	07:15 17:27	07:37 17:12	16:18 (7) 17:22	16:22 (7) 17:26	16:32 (7) 18:11	06:44 19:38	06:07 20:10	05:56 20:40
13	06:17 20:49	06:52 20:26	07:21 19:48	07:50 18:02	07:16 17:26	07:37 17:12	16:18 (7) 17:22	16:23 (7) 17:26	16:33 (7) 18:12	06:43 19:39	06:06 20:11	05:56 20:40
14	06:18 20:49	06:53 20:25	07:22 19:47	07:51 18:01	07:17 17:25	07:38 17:12	16:19 (7) 17:23	16:22 (7) 17:27	16:34 (7) 18:13	06:41 19:40	06:05 20:12	05:57 20:41
15	06:19 20:48	06:54 20:24	07:23 19:45	07:52 17:59	07:17 17:25	07:38 17:12	16:19 (7) 17:23	16:23 (7) 17:27	16:35 (7) 18:14	06:40 19:41	06:05 20:13	05:57 20:42
16	06:20 20:48	06:55 20:23	07:23 19:44	07:53 17:58	07:18 17:24	07:38 17:12	16:20 (7) 17:24	16:23 (7) 17:28	16:36 (7) 18:15	06:38 19:42	06:04 20:14	05:57 20:42
17	06:21 20:48	06:56 20:22	07:24 19:42	07:54 17:56	07:19 17:23	07:39 17:12	16:20 (7) 17:25	16:23 (7) 17:29	16:37 (7) 18:16	06:37 19:42	06:03 20:15	05:57 20:43
18	06:22 20:47	06:57 20:20	07:25 19:41	07:55 17:55	07:20 17:22	07:39 17:12	16:20 (7) 17:26	16:23 (7) 17:30	16:38 (7) 18:17	06:36 19:43	06:02 20:16	05:58 20:44
19	06:24 20:47	06:58 20:19	07:26 19:39	07:56 17:54	07:21 17:21	07:39 17:12	16:21 (7) 17:26	16:23 (7) 17:30	16:39 (7) 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:18	07:27 19:38	07:57 17:52	07:22 17:21	07:39 17:12	16:20 (7) 17:27	16:23 (7) 17:31	16:40 (7) 18:18	06:33 19:45	06:01 20:18	05:59 20:45
21	06:26 20:46	07:00 20:17	07:28 19:36	07:58 17:51	07:22 17:20	07:40 17:12	16:20 (7) 17:28	16:23 (7) 17:32	16:41 (7) 18:19	06:31 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:01 20:15	07:29 19:35	07:59 17:50	07:23 17:19	07:40 17:13	16:20 (7) 17:29	16:23 (7) 17:33	16:42 (7) 18:20	06:30 19:47	06:00 20:20	05:59 20:46
23	06:28 20:45	07:03 20:14	07:30 19:33	07:58 17:48	07:24 17:19	07:40 17:13	16:21 (7) 17:29	16:23 (7) 17:33	16:43 (7) 18:21	06:29 19:48	06:00 20:22	05:59 20:46
24	06:29 20:44	07:04 20:13	07:31 19:32	07:59 17:47	07:25 17:18	07:40 17:13	16:22 (7) 17:30	16:23 (7) 17:34	16:44 (7) 18:22	06:28 19:49	06:01 20:23	05:59 20:47
25	06:30 20:44	07:05 20:11	07:32 19:30	07:59 17:46	07:25 17:17	07:40 17:13	16:22 (7) 17:31	16:23 (7) 17:35	16:45 (7) 18:23	06:26 19:50	06:01 20:24	05:59 20:47
26	06:31 20:43	07:06 20:10	07:33 19:29	07:59 17:45	07:26 17:17	07:40 17:14	16:22 (7) 17:32	16:23 (7) 17:36	16:46 (7) 18:24	06:25 19:52	06:01 20:25	05:59 20:48
27	06:32 20:42	07:07 20:09	07:34 19:27	07:59 17:43	07:27 17:16	07:41 17:14	16:22 (7) 17:32	16:23 (7) 17:36	16:47 (7) 18:25	06:24 19:53	06:01 20:26	05:59 20:48
28	06:34 20:41	07:08 20:07	07:35 19:26	07:59 17:42	07:28 17:16	07:41 17:14	16:22 (7) 17:33	16:23 (7) 17:37	16:48 (7) 18:26	06:23 19:54	06:01 20:27	05:59 20:48
29	06:35 20:41	07:09 20:06	07:36 19:25	07:59 17:41	07:28 17:15	07:41 17:15	16:22 (7) 17:34	16:23 (7) 17:38	16:49 (7) 18:27	06:21 19:55	06:01 20:28	05:59 20:49
30	06:36 20:40	07:10 20:05	07:37 19:24	07:59 17:40	07:29 17:15	07:41 17:15	16:22 (7) 17:35	16:23 (7) 17:39	16:50 (7) 18:28	06:20 19:56	06:01 20:29	05:59 20:49
31	06:37 20:39	07:11 20:03	07:38 19:21	07:59 17:37	07:30 17:15	07:41 17:15	16:22 (7) 17:36	16:23 (7) 18:01	16:51 (7) 18:01	06:19 19:57	06:01 20:29	05:59 20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case					766	884	1055	91				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 8
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** G - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (7)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	19:24 (18) 06:38	19:24 (18) 07:09	07:38	17:42 (19) 07:05	07:30
	22	19:46 (18) 20:38	20:06 (18) 20:06	19:20	18:42 (15) 17:39	17:14
2	06:07	19:24 (18) 06:39	19:24 (18) 07:10	07:39	17:42 (19) 07:06	07:31
	23	19:47 (18) 20:37	20:06 (18) 20:04	19:18	18:43 (15) 17:38	17:14
3	06:08	19:23 (18) 06:40	19:25 (18) 07:11	07:40	17:41 (19) 07:07	07:32
	25	19:48 (18) 20:37	20:05 (18) 20:03	19:17	18:43 (15) 17:36	17:13
4	06:09	19:23 (18) 06:42	19:25 (18) 07:12	07:41	17:41 (19) 07:08	07:32
	26	19:49 (18) 20:36	20:05 (18) 20:02	19:15	18:43 (15) 17:35	17:13
5	06:10	19:23 (18) 06:43	19:26 (18) 07:13	06:42	16:41 (19) 07:09	07:33
	27	19:50 (18) 20:35	20:04 (18) 20:00	18:14	17:43 (15) 17:34	17:13
6	06:10	19:23 (18) 06:44	19:27 (18) 07:14	06:43	16:41 (19) 07:10	07:34
	28	19:51 (18) 20:34	20:03 (18) 19:59	18:12	17:43 (15) 17:33	17:13
7	06:11	19:23 (18) 06:45	19:27 (18) 07:15	06:44	16:41 (19) 07:10	07:34
	29	19:52 (18) 20:33	20:02 (18) 19:57	18:11	17:43 (15) 17:32	17:12
8	06:12	19:23 (18) 06:46	19:29 (18) 07:16	06:44	16:41 (19) 07:11	07:35
	31	19:54 (18) 20:32	20:01 (18) 19:56	18:09	17:42 (15) 17:31	17:12
9	06:13	19:22 (18) 06:47	19:31 (18) 07:17	06:45	16:41 (19) 07:12	07:35
	32	19:54 (18) 20:31	20:01 (18) 19:54	18:08	17:41 (15) 17:30	17:12
10	06:14	19:22 (18) 06:48	19:32 (18) 07:18	06:46	16:42 (19) 07:13	07:36
	33	19:55 (18) 20:30	19:59 (18) 19:53	18:06	17:40 (15) 17:29	17:12
11	06:15	19:22 (18) 06:49	19:34 (18) 07:19	06:47	16:42 (19) 07:14	07:36
	34	19:56 (18) 20:28	19:57 (18) 19:51	18:05	17:39 (15) 17:28	17:12
12	06:16	19:22 (18) 06:51	19:37 (18) 07:20	06:48	16:43 (19) 07:15	07:37
	35	19:57 (18) 20:27	19:54 (18) 19:50	18:03	17:38 (15) 17:27	17:12
13	06:17	19:22 (18) 06:52	19:41 (18) 07:21	06:49	16:44 (19) 07:16	07:37
	35	19:57 (18) 20:26	19:50 (18) 19:48	18:02	17:37 (15) 17:26	17:12
14	06:18	19:21 (18) 06:53	07:22	06:50	16:45 (19) 07:17	07:38
	37	19:58 (18) 20:25	19:47	18:01	17:35 (15) 17:25	17:12
15	06:19	19:21 (18) 06:54	07:22	06:51	16:47 (19) 07:17	07:38
	38	19:59 (18) 20:24	19:45	17:59	17:33 (15) 17:25	17:12
16	06:20	19:21 (18) 06:55	07:23	18:08 (19) 06:52	16:48 (19) 07:18	07:38
	39	20:00 (18) 20:23	19:44	18:23 (19) 17:58	17:29 (15) 17:24	17:12
17	06:21	19:21 (18) 06:56	07:24	18:03 (19) 06:53	16:50 (19) 07:19	07:39
	40	20:01 (18) 20:22	19:42	18:26 (19) 17:56	17:18 (19) 17:23	17:12
18	06:22	19:21 (18) 06:57	07:25	18:00 (19) 06:53	16:52 (19) 07:20	07:39
	40	20:01 (18) 20:20	19:41	18:28 (19) 17:55	17:16 (19) 17:22	17:12
19	06:24	19:21 (18) 06:58	07:26	17:57 (19) 06:54	16:56 (19) 07:21	07:39
	41	20:02 (18) 20:19	19:39	18:30 (19) 17:54	17:12 (19) 17:21	17:12
20	06:25	19:21 (18) 06:59	07:27	17:55 (19) 06:55	07:22	07:39
	41	20:02 (18) 20:18	19:38	18:31 (19) 17:52	17:21	17:12
21	06:26	19:22 (18) 07:00	07:28	17:53 (19) 06:56	07:22	07:40
	42	20:04 (18) 20:17	19:36	18:33 (19) 17:51	17:20	17:12
22	06:27	19:22 (18) 07:01	07:29	17:52 (19) 06:57	07:23	07:40
	42	20:04 (18) 20:15	19:35	18:34 (19) 17:50	17:19	17:13
23	06:28	19:22 (18) 07:03	07:30	17:50 (19) 06:58	07:24	07:40
	43	20:05 (18) 20:14	19:33	18:35 (19) 17:48	17:19	17:13
24	06:29	19:22 (18) 07:04	07:31	17:49 (19) 06:59	07:25	07:40
	43	20:05 (18) 20:13	19:32	18:35 (19) 17:47	17:18	17:13
25	06:30	19:22 (18) 07:05	07:32	17:48 (19) 07:00	07:25	07:40
	43	20:05 (18) 20:11	19:30	18:36 (19) 17:46	17:17	17:13
26	06:31	19:22 (18) 07:06	07:33	17:47 (19) 07:01	07:26	07:40
	44	20:06 (18) 20:10	19:29	18:36 (19) 17:45	17:17	17:14
27	06:32	19:22 (18) 07:07	07:34	17:46 (19) 07:02	07:27	07:41
	44	20:06 (18) 20:09	19:27	18:37 (19) 17:43	17:16	17:14
28	06:34	19:22 (18) 07:08	07:34	17:45 (19) 07:02	07:28	07:41
	44	20:06 (18) 20:07	19:26	18:37 (19) 17:42	17:16	17:14
29	06:35	19:22 (18) 07:09	07:35	17:43 (19) 07:03	07:28	07:41
	44	20:06 (18) 20:06	19:24	18:37 (15) 17:41	17:15	17:15
30	06:36	19:22 (18) 07:10	07:36	17:43 (19) 07:04	07:29	07:41
	44	20:06 (18) 20:05	19:23	18:39 (15) 17:40	17:15	17:15
31	06:37	19:23 (18) 07:11	07:37	17:42 (19) 07:05	07:30	07:41
	43	20:06 (18) 20:04	19:21	18:41 (15) 17:39	17:14	17:14
Potential sun hours	447	378	383	334	314	288
Total, worst case	1132	411	677	979		

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 9
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** G - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (7)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	07:41 17:16	07:25 17:36	06:46 18:02	16:41 (19) 17:38 (15)	06:00 18:28	19:04 (18) 19:38 (18)
2	07:40 17:16	07:24 17:37	06:45 18:03	16:41 (19) 17:39 (15)	05:59 18:29	19:05 (18) 19:38 (18)
3	07:40 17:16	07:23 17:38	06:43 18:04	16:39 (19) 17:39 (15)	05:57 18:29	19:06 (18) 19:38 (18)
4	07:40 17:17	07:22 17:39	06:42 18:05	16:39 (19) 17:40 (15)	06:56 19:30	19:07 (18) 19:38 (18)
5	07:40 17:17	07:21 17:40	06:40 18:06	16:37 (19) 17:39 (15)	06:54 19:31	19:08 (18) 19:37 (18)
6	07:40 17:18	07:20 17:40	06:39 18:06	16:37 (19) 17:39 (15)	06:53 19:32	19:09 (18) 19:37 (18)
7	07:40 17:19	07:19 17:41	06:37 18:07	16:36 (19) 17:38 (15)	06:51 19:33	19:10 (18) 19:37 (18)
8	07:39 17:19	07:18 17:42	06:36 18:08	16:36 (19) 17:38 (15)	06:50 19:34	19:11 (18) 19:37 (18)
9	07:39 17:20	07:16 17:43	06:34 18:09	16:35 (19) 17:37 (15)	06:48 19:35	19:12 (18) 19:37 (18)
10	07:39 17:20	07:15 17:44	06:33 18:10	16:34 (19) 17:35 (15)	06:47 19:36	19:13 (18) 19:36 (18)
11	07:38 17:21	07:14 17:45	06:31 18:11	16:35 (19) 17:35 (15)	06:45 19:37	19:14 (18) 19:36 (18)
12	07:38 17:21	07:13 17:46	06:30 18:11	16:34 (19) 17:33 (15)	06:44 19:38	19:15 (18) 19:36 (18)
13	07:38 17:22	07:12 17:46	06:28 18:12	16:35 (19) 17:31 (15)	06:43 19:39	19:16 (18) 19:36 (18)
14	07:37 17:23	07:11 17:47	06:27 18:13	16:34 (19) 17:29 (15)	06:41 19:40	19:17 (18) 19:36 (18)
15	07:37 17:23	07:09 17:48	06:25 18:14	16:35 (19) 17:27 (19)	06:40 19:41	19:18 (18) 19:36 (18)
16	07:36 17:24	07:08 17:49	06:24 18:15	16:35 (19) 17:26 (19)	06:38 19:42	19:19 (18) 19:36 (18)
17	07:36 17:25	07:07 17:50	06:22 18:16	16:34 (19) 17:24 (19)	06:37 19:42	19:19 (18) 19:36 (18)
18	07:35 17:26	07:06 17:51	06:21 18:16	16:35 (19) 17:24 (19)	06:35 19:43	19:21 (18) 19:36 (18)
19	07:35 17:26	07:04 17:51	06:19 18:17	16:36 (19) 17:22 (19)	06:34 19:44	19:21 (18) 19:36 (18)
20	07:34 17:27	07:03 17:52	06:17 18:18	16:37 (19) 17:22 (19)	06:33 19:45	19:22 (18) 19:37 (18)
21	07:33 17:28	07:02 17:53	06:16 18:19	16:37 (19) 17:20 (19)	06:31 19:46	19:22 (18) 19:37 (18)
22	07:33 17:28	07:00 17:54	06:14 18:20	16:38 (19) 17:18 (19)	06:30 19:47	19:22 (18) 19:37 (18)
23	07:32 17:29	06:59 17:55	06:13 18:21	16:39 (19) 17:17 (19)	06:29 19:48	19:23 (18) 19:38 (18)
24	07:31 17:30	06:58 17:56	06:11 18:22	16:40 (19) 17:14 (19)	06:28 19:49	19:23 (18) 19:38 (18)
25	07:31 17:31	06:56 17:56	06:10 18:22	16:43 (19) 17:12 (19)	06:26 19:50	19:24 (18) 19:39 (18)
26	07:30 17:32	06:55 17:57	06:08 18:23	16:44 (19) 17:09 (19)	06:25 19:51	19:24 (18) 19:40 (18)
27	07:29 17:32	06:54 17:58	06:07 18:24	16:48 (19) 17:06 (19)	06:24 19:53	19:24 (18) 19:41 (18)
28	07:28 17:33	06:52 17:59	06:05 18:25	16:53 (19) 17:00 (19)	06:23 19:54	19:24 (18) 19:42 (18)
29	07:27 17:34	06:51 18:00	06:03 18:26	06:21 19:55	19:09 (18) 19:20 (18)	19:24 (18) 19:42 (18)
30	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:56	19:05 (18) 19:24 (18)	19:24 (18) 19:44 (18)
31	07:26 17:36	06:48 18:01	06:00 18:28	06:19 19:57	19:03 (18) 19:27 (18)	19:24 (18) 19:45 (18)
Potential sun hours	305	331	355	405	424	456
Total, worst case		319	1364	54	1183	652

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 10
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km**Shadow receptor:** H - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (8)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March		April	May	June	July	August	September		October		November	December	
1	06:06	06:38	07:09		07:38	07:05	07:30	07:40	07:24	06:46		06:00		17:12 (52)	06:18	05:57
	20:49	20:38	20:06		19:20	17:39	17:14	17:16	17:37	18:02		18:28	39	17:51 (52)	19:57	20:29
2	06:07	06:39	07:10		07:39	07:06	07:31	07:40	07:23	06:45		06:59		17:13 (52)	06:17	05:56
	20:49	20:37	20:04		19:18	17:38	17:14	17:16	17:37	18:03		18:28	38	17:51 (52)	19:58	20:30
3	06:08	06:41	07:11		07:40	07:07	07:31	07:40	07:22	06:43		06:57		17:13 (52)	06:16	05:56
	20:49	20:36	20:03		19:17	17:37	17:14	17:17	17:38	18:04		18:29	36	17:49 (52)	20:00	20:31
4	06:09	06:42	07:12		07:41	07:07	07:32	07:40	07:21	06:42		06:56		18:14 (52)	06:15	05:56
	20:49	20:35	20:01	2	18:56 (52)	19:15	17:35	17:13	17:17	18:05		19:30	34	18:48 (52)	20:01	20:32
5	06:10	06:43	07:13		07:42	07:08	07:33	07:40	07:20	06:40		06:54		18:15 (52)	06:14	05:56
	20:49	20:34	20:00	16	19:03 (52)	18:14	17:34	17:13	17:18	18:06		19:31	31	18:46 (52)	20:02	20:33
6	06:11	06:44	07:14		07:43	07:09	07:33	07:39	07:19	06:39		06:53		18:17 (52)	06:13	05:56
	20:49	20:33	19:58	22	19:06 (52)	18:12	17:33	17:13	17:18	18:06		19:32	28	18:45 (52)	20:03	20:34
7	06:12	06:45	07:15		07:44	07:10	07:34	07:39	07:18	06:37		06:51		18:18 (52)	06:12	05:56
	20:49	20:32	19:57	26	19:07 (52)	18:11	17:32	17:13	17:19	18:07		19:33	24	18:42 (52)	20:04	20:35
8	06:13	06:46	07:16		07:45	07:11	07:34	07:39	07:17	06:36		06:50		18:21 (52)	06:11	05:56
	20:49	20:31	19:56	30	19:09 (52)	18:09	17:31	17:12	17:19	18:08		19:34	19	18:40 (52)	20:05	20:36
9	06:13	06:47	07:17		07:46	07:12	07:35	07:39	07:16	06:34		06:48		18:24 (52)	06:10	05:56
	20:49	20:30	19:54	32	19:10 (52)	18:08	17:30	17:12	17:20	18:09		19:35	11	18:35 (52)	20:06	20:37
10	06:14	06:48	07:18		07:47	07:13	07:36	07:38	07:15	06:33		06:47			06:09	05:56
	20:49	20:29	19:53	35	19:11 (52)	18:06	17:29	17:12	17:20	18:10		19:36			20:07	20:37
11	06:15	06:50	07:19		07:48	07:14	07:36	07:38	07:14	06:31		06:45			06:08	05:56
	20:49	20:28	19:51	37	19:12 (52)	18:05	17:28	17:12	17:21	18:11		19:37			20:08	20:38
12	06:16	06:51	07:20		07:49	07:14	07:36	07:38	07:13	06:30		17:32 (52)		06:44	06:07	05:56
	20:49	20:27	19:50	39	19:13 (52)	18:03	17:27	17:12	17:22	18:11	13	17:45 (52)		19:37	20:09	20:39
13	06:17	06:52	07:21		07:50	07:15	07:37	07:37	07:12	06:28		17:28 (52)		06:43	06:06	05:57
	20:49	20:26	19:48	40	19:13 (52)	18:02	17:26	17:12	17:22	18:12	20	17:48 (52)		19:38	20:10	20:40
14	06:18	06:53	07:21		07:51	07:16	07:37	07:37	07:10	06:27		17:25 (52)		06:41	06:06	05:57
	20:48	20:25	19:47	41	19:13 (52)	18:01	17:26	17:12	17:23	18:13	25	17:50 (52)		19:39	20:11	20:41
15	06:19	06:54	07:22		07:52	07:17	07:37	07:36	07:09	06:25		17:23 (52)		06:40	06:05	05:57
	20:48	20:24	19:45	43	19:13 (52)	17:59	17:25	17:12	17:24	18:14	29	17:52 (52)		19:40	20:13	20:41
16	06:21	06:55	07:23		07:53	07:18	07:38	07:36	07:08	06:23		17:21 (52)		06:38	06:04	05:57
	20:48	20:22	19:44	43	19:13 (52)	17:58	17:24	17:12	17:24	18:15	32	17:53 (52)		19:41	20:14	20:42
17	06:22	06:56	07:24		07:54	07:19	07:38	07:35	07:07	06:22		17:19 (52)		06:37	06:03	05:58
	20:47	20:21	19:42	44	19:13 (52)	17:56	17:23	17:12	17:25	18:16	35	17:54 (52)		19:42	20:15	20:43
18	06:23	06:57	07:25		07:55	07:20	07:38	07:35	07:05	06:20		17:18 (52)		06:36	06:03	05:58
	20:47	20:20	19:41	43	19:12 (52)	17:55	17:22	17:12	17:26	18:16	37	17:55 (52)		19:43	20:16	20:43
19	06:24	06:58	07:26		07:56	07:20	07:39	07:34	07:04	06:19		17:17 (52)		06:34	06:02	05:58
	20:46	20:19	19:39	43	19:12 (52)	17:54	17:22	17:12	17:26	18:17	38	17:55 (52)		19:44	20:17	20:44
20	06:25	06:59	07:27		07:57	07:21	07:39	07:34	07:03	06:17		17:15 (52)		06:33	06:01	05:59
	20:46	20:18	19:38	43	19:12 (52)	17:52	17:21	17:12	17:27	18:18	40	17:55 (52)		19:45	20:18	20:44
21	06:26	07:00	07:28		07:58	07:22	07:39	07:33	07:01	06:16		17:15 (52)		06:31	06:01	05:59
	20:45	20:16	19:36	42	19:11 (52)	17:51	17:20	17:13	17:28	18:19	41	17:56 (52)		19:46	20:19	20:45
22	06:27	07:01	07:29		07:59	07:23	07:39	07:32	07:00	06:14		17:13 (52)		06:30	06:00	06:00
	20:45	20:15	19:35	41	19:10 (52)	17:50	17:19	17:13	17:29	18:20	43	17:56 (52)		19:47	20:20	20:45
23	06:28	07:03	07:30		08:00	07:24	07:40	07:32	06:59	06:13		17:13 (52)		06:29	06:00	06:00
	20:44	20:14	19:33	41	19:10 (52)	17:49	17:19	17:13	17:29	18:21	43	17:56 (52)		19:48	20:21	20:46
24	06:29	07:04	07:31		08:01	07:24	07:40	07:31	06:57	06:11		17:12 (52)		06:28	05:59	06:01
	20:44	20:12	19:32	39	19:09 (52)	17:47	17:18	17:13	17:30	18:21	44	17:56 (52)		19:49	20:22	20:46
25	06:30	07:05	07:32		08:02	07:25	07:40	07:30	06:56	06:10		17:13 (52)		06:26	05:59	06:01
	20:43	20:11	19:30	38	19:08 (52)	17:46	17:18	17:14	17:31	18:22	43	17:56 (52)		19:50	20:23	20:47
26	06:31	07:06	07:33		08:03	07:26	07:40	07:29	06:55	06:08		17:12 (52)		06:25	05:58	06:02
	20:42	20:10	19:29	35	19:06 (52)	17:45	17:17	17:14	17:32	18:23	43	17:55 (52)		19:51	20:24	20:47
27	06:33	07:07	07:33		08:04	07:01	07:27	07:40	06:53	06:06		17:11 (52)		06:24	05:58	06:03
	20:42	20:08	19:27	33	19:04 (52)	17:43	17:17	17:14	17:32	18:24	43	17:54 (52)		19:52	20:25	20:48
28	06:34	07:08	07:34		08:05	07:02	07:27	07:40	06:52	06:05		17:12 (52)		06:23	05:58	06:03
	20:41	20:07	19:26	30	19:02 (52)	17:42	17:16	17:15	17:33	18:25	42	17:54 (52)		19:53	20:26	20:48
29	06:35		07:35		08:06	07:03	07:28	07:40	06:50	06:03		17:11 (52)		06:21	05:57	06:04
	20:40		19:24	26	19:00 (52)	17:41	17:16	17:15	17:34	18:00	42	17:53 (52)		19:54	20:27	20:48
30	06:36		07:36		08:07	07:04	07:29	07:40	06:49	06:02		17:12 (52)		06:20	05:57	06:05
	20:40		19:23	21	18:57 (52)	17:40	17:15	17:15	17:35	18:01	41	17:53 (52)		19:55	20:28	20:49
31	06:37		07:37		08:08	07:01	07:29		06:48					19:56		06:05
	20:39		19:21	15	18:54 (52)		17:15		17:36	18:01				19:56		20:49
Potential sun hours	447	378	383		334	314	288	305	332	355		404		424	456	
Total, worst case			940							694		260				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 11
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** I - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (9)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:04	20:36
8	06:13	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:36
9	06:13	06:47	07:17	06:46	07:12	07:35	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:55	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:07	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:57
	20:49	20:26	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:59	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:04	07:29	07:41	07:27	06:50	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 12
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** J - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (10)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:36
8	06:12	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:37
9	06:13	06:47	07:17	06:46	07:12	07:35	07:39	07:17	06:35	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:49	18:02	17:26	17:12	17:22	17:47	18:12	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:21	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:36	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:13	17:31	17:57	18:23	19:51	20:24	20:48
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:44	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	448	378	383	334	313	288	304	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 13

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** K - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (11)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:32	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:05	20:36
8	06:12	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:37
9	06:13	06:47	07:17	06:46	07:13	07:36	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:55	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:49	07:18	06:47	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:07	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:37	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:56
	20:49	20:27	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:36	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:40	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:56	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:37	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:45	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:12	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:27	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:29	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:05	07:29	07:41	07:27	06:50	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 14
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** L - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (12)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June
1	06:06	06:38	07:04 (2)	07:09	07:38	07:31
	20:50	20:38	07:46 (2)	20:06	19:20	17:14
2	06:07	06:40	07:04 (2)	07:10	07:39	07:31
	20:50	20:38	07:46 (2)	20:05	19:18	17:14
3	06:08	06:41	07:04 (2)	07:11	07:40	07:32
	20:50	20:37	07:46 (2)	20:03	19:17	17:14
4	06:09	06:42	07:04 (2)	07:12	07:41	07:33
	20:50	20:36	07:46 (2)	20:02	19:15	17:13
5	06:10	06:43	07:05 (2)	07:13	06:42	07:33
	20:50	20:35	07:46 (2)	20:00	18:14	17:13
6	06:11	06:44	07:05 (2)	07:14	06:43	07:34
	20:50	20:34	07:45 (2)	19:59	18:12	17:13
7	06:12	07:15 (2) 06:45	07:06 (2)	07:15	06:44	07:34
	20:50	07:19 (2) 20:33	07:46 (2)	19:57	18:11	17:13
8	06:13	07:12 (2) 06:46	07:07 (2)	07:16	06:45	07:35
	20:50	07:23 (2) 20:32	07:45 (2)	19:56	18:09	17:12
9	06:13	07:11 (2) 06:47	07:08 (2)	07:17	06:46	07:35
	20:50	07:25 (2) 20:31	07:45 (2)	19:54	18:08	17:12
10	06:14	07:10 (2) 06:49	07:09 (2)	07:18	06:46	07:36
	20:50	07:27 (2) 20:30	07:44 (2)	19:53	18:07	17:12
11	06:15	07:09 (2) 06:50	07:10 (2)	07:19	06:47	07:36
	20:50	07:29 (2) 20:29	07:43 (2)	19:52	18:05	17:12
12	06:16	07:08 (2) 06:51	07:11 (2)	07:20	06:48	07:37
	20:49	07:30 (2) 20:28	07:41 (2)	19:50	18:04	17:12
13	06:17	07:07 (2) 06:52	07:12 (2)	07:21	06:49	07:37
	20:49	07:31 (2) 20:26	07:40 (2)	19:49	18:02	17:12
14	06:18	07:06 (2) 06:53	07:14 (2)	07:22	06:50	07:38
	20:49	07:32 (2) 20:25	07:38 (2)	19:47	18:01	17:12
15	06:20	07:06 (2) 06:54	07:16 (2)	07:23	06:51	07:38
	20:49	07:34 (2) 20:24	07:35 (2)	19:46	17:59	17:12
16	06:21	07:06 (2) 06:55	07:20 (2)	07:24	06:52	07:38
	20:48	07:36 (2) 20:23	07:33 (2)	19:44	17:58	17:12
17	06:22	07:06 (2) 06:56		07:25	06:53	07:39
	20:48	07:37 (2) 20:22		19:43	17:57	17:12
18	06:23	07:05 (2) 06:57		07:26	06:54	07:39
	20:48	07:38 (2) 20:20		19:41	17:55	17:12
19	06:24	07:05 (2) 06:58		07:26	06:55	07:39
	20:47	07:39 (2) 20:19		19:39	17:54	17:12
20	06:25	07:04 (2) 07:00		07:27	06:55	07:40
	20:47	07:40 (2) 20:18		19:38	17:53	17:12
21	06:26	07:04 (2) 07:01		07:28	06:56	07:40
	20:46	07:41 (2) 20:17		19:36	17:51	17:13
22	06:27	07:04 (2) 07:02		07:29	06:57	07:40
	20:46	07:41 (2) 20:15		19:35	17:50	17:13
23	06:28	07:03 (2) 07:03		07:30	06:58	07:40
	20:45	07:42 (2) 20:14		19:33	17:49	17:13
24	06:29	07:03 (2) 07:04		07:31	06:59	07:40
	20:44	07:43 (2) 20:13		19:32	17:47	17:13
25	06:30	07:03 (2) 07:05		07:32	07:00	07:41
	20:44	07:43 (2) 20:11		19:30	17:46	17:14
26	06:32	07:03 (2) 07:06		07:33	07:01	07:41
	20:43	07:44 (2) 20:10		19:29	17:45	17:14
27	06:33	07:03 (2) 07:07		07:34	07:02	07:41
	20:42	07:44 (2) 20:09		19:27	17:44	17:14
28	06:34	07:03 (2) 07:08		07:35	07:03	07:41
	20:42	07:45 (2) 20:07		19:26	17:42	17:15
29	06:35	07:03 (2)		07:36	07:04	07:41
	20:41	07:46 (2)		19:24	17:41	17:15
30	06:36	07:03 (2)		07:37	07:04	07:41
	20:40	07:46 (2)		19:23	17:40	17:15
31	06:37	07:04 (2)		07:37		07:30
	20:39	07:46 (2)		19:21		17:15
Potential sun hours	447	378	383	334	314	288
Total, worst case	775	546				

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 15
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** L - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (12)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December
1	07:41 17:16	07:25 17:37	06:47 18:03	06:01 18:28	06:18 19:58	06:38 (2) 05:57 07:13 (2) 20:30
2	07:41 17:16	07:24 17:37	06:45 18:03	05:59 18:29	06:17 19:59	06:37 (2) 05:57 07:14 (2) 20:31
3	07:41 17:17	07:23 17:38	06:44 18:04	05:58 18:30	06:16 20:00	06:36 (2) 05:56 07:15 (2) 20:32
4	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:31	06:15 20:01	06:35 (2) 05:56 07:15 (2) 20:33
5	07:40 17:18	07:21 17:40	06:41 18:06	06:55 19:31	06:14 20:02	06:35 (2) 05:56 07:16 (2) 20:34
6	07:40 17:18	07:20 17:41	06:39 18:07	06:53 19:32	06:13 20:03	06:35 (2) 05:56 07:16 (2) 20:35
7	07:40 17:19	07:19 17:42	06:38 18:08	06:52 19:33	06:12 20:04	06:34 (2) 05:56 07:16 (2) 20:36
8	07:40 17:19	07:18 17:42	06:36 18:08	06:50 19:34	06:11 20:05	06:34 (2) 05:56 07:16 (2) 20:36
9	07:39 17:20	07:17 17:43	06:35 18:09	06:49 19:35	06:10 20:07	06:35 (2) 05:56 07:17 (2) 20:37
10	07:39 17:20	07:16 17:44	06:33 18:10	06:47 19:36	06:09 20:08	06:35 (2) 05:56 07:17 (2) 20:38
11	07:39 17:21	07:14 17:45	06:32 18:11	06:46 19:37	06:08 20:09	06:35 (2) 05:56 07:17 (2) 20:39
12	07:38 17:22	07:13 17:46	06:30 18:12	06:44 19:38	06:07 20:10	06:35 (2) 05:56 07:17 (2) 20:40
13	07:38 17:22	07:12 17:47	06:28 18:13	06:43 19:39	06:06 20:11	06:35 (2) 05:57 07:17 (2) 20:40
14	07:37 17:23	07:11 17:47	06:27 18:13	06:41 19:40	06:06 20:12	06:36 (2) 05:57 07:18 (2) 20:41
15	07:37 17:24	07:10 17:48	06:25 18:14	06:40 19:41	06:05 20:13	06:36 (2) 05:57 07:17 (2) 20:42
16	07:36 17:24	07:08 17:49	06:24 18:15	06:38 19:42	06:04 20:14	06:36 (2) 05:57 07:17 (2) 20:43
17	07:36 17:25	07:07 17:50	06:22 18:16	06:37 19:43	06:03 20:15	06:37 (2) 05:58 07:17 (2) 20:43
18	07:35 17:26	07:06 17:51	06:21 18:17	06:36 19:44	06:03 20:16	06:37 (2) 05:58 07:17 (2) 20:44
19	07:35 17:26	07:05 17:52	06:19 18:18	06:34 19:45	06:02 20:17	06:37 (2) 05:58 07:16 (2) 20:44
20	07:34 17:27	07:03 17:52	06:18 18:18	06:33 19:46	06:01 20:19	06:39 (2) 05:59 07:16 (2) 20:45
21	07:34 17:28	07:02 17:53	06:16 18:19	06:32 19:47	06:01 20:20	06:39 (2) 05:59 07:16 (2) 20:46
22	07:33 17:29	07:01 17:54	06:15 18:20	06:30 19:48	06:00 20:21	06:40 (2) 06:00 07:16 (2) 20:46
23	07:32 17:29	06:59 17:55	06:13 18:21	06:29 19:49	06:00 20:22	06:41 (2) 06:00 07:15 (2) 20:47
24	07:32 17:30	06:58 17:56	06:11 18:22	06:28 19:50	05:59 20:23	06:42 (2) 06:01 07:15 (2) 20:47
25	07:31 17:31	06:57 17:57	06:10 18:23	06:26 19:51	05:59 20:24	06:42 (2) 06:01 07:14 (2) 20:48
26	07:30 17:32	06:55 17:58	06:08 18:24	06:25 19:52	05:58 07:03 (2) 20:25	06:44 (2) 06:02 07:14 (2) 20:48
27	07:29 17:33	06:54 17:58	06:07 18:24	06:24 19:53	05:58 07:06 (2) 20:26	06:45 (2) 06:03 07:14 (2) 20:48
28	07:28 17:33	06:52 17:59	06:05 18:25	06:23 19:54	05:58 07:08 (2) 20:27	06:46 (2) 06:03 07:12 (2) 20:49
29	07:28 17:34	06:51 18:00	06:04 18:26	06:22 19:55	05:57 07:09 (2) 20:28	06:48 (2) 06:04 07:12 (2) 20:49
30	07:27 17:35	06:49 18:01	06:02 18:27	06:20 19:56	05:57 07:11 (2) 20:29	06:49 (2) 06:05 07:11 (2) 20:49
31	07:26 17:36	06:48 18:02		06:19 19:57	06:39 (2) 07:12 (2)	06:05 20:49
Potential sun hours	305	331	355	405	424	456
Total, worst case				150	1110	66

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 16

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** M - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (13)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:45	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:46	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:45	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:47
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:03	07:28	07:41	07:27	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 17

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km **Shadow receptor:** N - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (14)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:25 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:30
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:24 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:31
3	06:08 20:50	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:32 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:58 18:30	06:16 20:00	05:57 20:31
4	06:09 20:50	06:42 20:36	07:12 20:02	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:50	06:43 20:35	07:13 20:00	06:42 18:14	07:09 17:35	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	06:55 19:31	06:14 20:02	05:56 20:33
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 18

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** O - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (15)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 19

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** P - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (16)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:29
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29	06:35 20:41		07:35 19:24	07:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	06:22 19:54	05:58 20:27	06:04 20:48
30	06:36 20:40		07:36 19:23	07:04 17:40	07:29 17:15	07:40 17:16	07:26 17:35	06:49 18:01	06:02 18:27	06:21 19:56	05:57 20:28	06:05 20:49
31	06:37 20:39		07:37 19:21		07:30 17:15		07:25 17:36	06:48 18:02		06:19 19:57		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 20
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** Q - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (17)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:55	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:19	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:32	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:49	06:10	05:56
	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:48	18:13	19:40	20:12	20:41
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:25	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:18	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:53	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:01
	20:44	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:30	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	06:00	06:01
	20:44	20:12	19:32	17:48	17:19	17:14	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:15	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:35	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:04
	20:41	20:07	19:26	17:43	17:16	17:15	17:34	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 21
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** R - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (18)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:39	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:01	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:15	17:16	17:37	18:03	18:28	19:58	20:29
2	06:08	06:40	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:17	17:38	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:58	06:16	05:57
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:57
	20:50	20:35	20:01	19:15	17:36	17:14	17:18	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:55	06:14	05:56
	20:50	20:34	20:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:34	17:13	17:19	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:44	07:10	07:34	07:39	07:18	06:37	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:33	17:13	17:19	17:42	18:08	19:33	20:04	20:35
8	06:13	06:47	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:32	17:13	17:20	17:43	18:08	19:34	20:05	20:36
9	06:14	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:49	06:10	05:56
	20:49	20:30	19:54	18:08	17:31	17:13	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:07	17:30	17:12	17:21	17:44	18:10	19:36	20:07	20:38
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:57
	20:49	20:28	19:51	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:41
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:39	06:04	05:58
	20:48	20:23	19:44	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:25	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:04	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:58	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:23	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:59	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	20:47	20:19	19:39	17:54	17:22	17:13	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	06:55	07:21	07:39	07:34	07:03	06:18	06:33	06:02	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:28	17:53	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	06:00
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:01	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
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	20:44	20:12	19:32	17:48	17:19	17:14	17:30	17:56	18:22	19:49	20:22	20:47
25	06:31	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:27	05:59	06:02
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26	06:32	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:59	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
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29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:58	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:21	05:57	06:05
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31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 22
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** S - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (19)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:00	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:36
8	06:12	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:35	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:24	06:52	07:18	07:38	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:22	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:02	05:58
	20:48	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:45	20:17	20:45
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:00	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:14	06:30	06:00	05:59
	20:46	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:13	17:31	17:57	18:23	19:51	20:24	20:48
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:44	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	448	378	383	334	313	288	304	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 23
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** T - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (20)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January		February		March		April		May		June	
1	06:06		06:38	20:03 (12)	07:09		07:38	08:00 (15)	07:05	07:31		
	20:50		20:38	12	20:15 (12)	20:06		19:20	28	08:28 (15)	17:39	17:14
2	06:07		06:39		20:04 (12)	07:10		07:39		08:00 (15)	07:06	07:31
	20:50		20:38	10	20:14 (12)	20:04		19:18	28	08:28 (15)	17:38	17:14
3	06:08		06:41		20:05 (12)	07:11		07:40		08:00 (15)	07:07	07:32
	20:50		20:37	9	20:14 (12)	20:03		19:17	28	08:28 (15)	17:36	17:13
4	06:09		06:42		20:07 (12)	07:12		07:41		08:00 (15)	07:08	07:32
	20:50		20:36	6	20:13 (12)	20:02		19:15	27	08:27 (15)	17:35	17:13
5	06:10		20:04 (12)	06:43		20:09 (12)	07:13	06:42		08:01 (15)	07:09	07:33
	20:50	4	20:08 (12)	20:35	3	20:12 (12)	20:00	18:14	25	08:26 (15)	17:34	17:13
6	06:11		20:02 (12)	06:44			07:14	06:43		07:02 (15)	07:10	07:34
	20:50	9	20:11 (12)	20:34			19:59	18:12	23	07:25 (15)	17:33	17:13
7	06:11		20:02 (12)	06:45			07:15	06:44		07:03 (15)	07:11	07:34
	20:50	11	20:13 (12)	20:33			19:57	18:11	21	07:24 (15)	17:32	17:12
8	06:12		20:01 (12)	06:46			07:16	06:45		07:04 (15)	07:11	07:35
	20:50	13	20:14 (12)	20:32			19:56	18:09	18	07:22 (15)	17:31	17:12
9	06:13		20:00 (12)	06:47			07:17	06:45		07:05 (15)	07:12	07:35
	20:50	16	20:16 (12)	20:31			19:54	18:08	14	07:19 (15)	17:30	17:12
10	06:14		19:59 (12)	06:48			07:18	06:46		07:08 (15)	07:13	07:36
	20:50	17	20:16 (12)	20:30			19:53	18:06	7	07:15 (15)	17:29	17:12
11	06:15		19:59 (12)	06:50			07:19	06:47			07:14	07:36
	20:50	19	20:18 (12)	20:29			19:51	18:05			17:28	17:12
12	06:16		19:58 (12)	06:51			07:20	06:48			07:15	07:37
	20:49	21	20:19 (12)	20:27			19:50	18:04			17:27	17:12
13	06:17		19:58 (12)	06:52			07:21	06:49			07:16	07:37
	20:49	22	20:20 (12)	20:26			19:48	18:02			17:26	17:12
14	06:18		19:58 (12)	06:53			07:22	06:50			07:17	07:38
	20:49	23	20:21 (12)	20:25			19:47	18:01			17:26	17:12
15	06:19		19:58 (12)	06:54			07:23	06:51			07:18	07:38
	20:49	24	20:22 (12)	20:24			19:45	17:59			17:25	17:12
16	06:20		19:57 (12)	06:55			07:24	06:52			07:18	07:38
	20:48	26	20:23 (12)	20:23			19:44	17:58			17:24	17:12
17	06:21		19:57 (12)	06:56			07:24	06:53			07:19	07:39
	20:48	26	20:23 (12)	20:22			19:42	17:57			17:23	17:12
18	06:23		19:57 (12)	06:57			07:25	06:54			07:20	07:39
	20:47	26	20:23 (12)	20:20			19:41	17:55			17:22	17:12
19	06:24		19:57 (12)	06:58			07:26	06:54			07:21	07:39
	20:47	26	20:23 (12)	20:19			19:39	17:54			17:22	17:12
20	06:25		19:58 (12)	06:59			07:27	06:55			07:22	07:40
	20:47	25	20:23 (12)	20:18			19:38	17:52			17:21	17:12
21	06:26		19:58 (12)	07:00			07:28	06:56			07:22	07:40
	20:46	24	20:22 (12)	20:17			19:36	17:51			17:20	17:12
22	06:27		19:58 (12)	07:02			07:29	06:57			07:23	07:40
	20:45	24	20:22 (12)	20:15			19:35	17:50			17:19	17:13
23	06:28		19:58 (12)	07:03			07:30	08:16 (15)	06:58		07:24	07:40
	20:45	23	20:21 (12)	20:14			19:33	3	08:19 (15)	17:49	17:19	17:13
24	06:29		19:58 (12)	07:04			07:31	08:11 (15)	06:59		07:25	07:40
	20:44	23	20:21 (12)	20:13			19:32	13	08:24 (15)	17:47	17:18	17:13
25	06:30		19:58 (12)	07:05			07:32	08:08 (15)	07:00		07:26	07:40
	20:44	22	20:20 (12)	20:11			19:30	18	08:26 (15)	17:46	17:18	17:13
26	06:31		19:58 (12)	07:06			07:33	08:06 (15)	07:01		07:26	07:41
	20:43	21	20:19 (12)	20:10			19:29	21	08:27 (15)	17:45	17:17	17:14
27	06:33		19:59 (12)	07:07			07:34	08:05 (15)	07:02		07:27	07:41
	20:42	20	20:19 (12)	20:09			19:27	23	08:28 (15)	17:44	17:16	17:14
28	06:34		19:59 (12)	07:08			07:35	08:04 (15)	07:03		07:28	07:41
	20:42	19	20:18 (12)	20:07			19:26	25	08:29 (15)	17:42	17:16	17:14
29	06:35		20:00 (12)				07:35	08:03 (15)	07:03		07:28	07:41
	20:41	17	20:17 (12)				19:24	26	08:29 (15)	17:41	17:15	17:15
30	06:36		20:00 (12)				07:36	08:01 (15)	07:04		07:29	07:41
	20:40	16	20:16 (12)				19:23	28	08:29 (15)	17:40	17:15	17:15
31	06:37		20:02 (12)				07:37	08:01 (15)			07:30	
	20:39	14	20:16 (12)				19:21	28	08:29 (15)		17:15	
Potential sun hours	447		378				383		334		314	
Total, worst case	531		40				185		219			288

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 24
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** T - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (20)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	July	August	September	October	November	December	
1	07:41	07:25	06:46	06:00	06:18	05:57	19:41 (12)
	17:16	17:36	18:02	18:28	19:58	20:30	20:01 (12)
2	07:41	07:24	06:45	07:07 (15)	05:59	06:17	05:56
	17:16	17:37	18:03	7	07:14 (15)	18:29	19:59 (12)
3	07:40	07:23	06:44	07:03 (15)	05:57	06:16	05:56
	17:17	17:38	18:04	14	07:17 (15)	18:30	20:00
4	07:40	07:22	06:42	07:01 (15)	06:56	06:15	20:32
	17:17	17:39	18:05	18	07:19 (15)	19:30	20:01
5	07:40	07:21	06:41	06:59 (15)	06:54	06:14	05:56
	17:18	17:40	18:06	21	07:20 (15)	19:31	20:02
6	07:40	07:20	06:39	06:58 (15)	06:53	06:13	19:39 (12)
	17:18	17:41	18:07	23	07:21 (15)	19:32	20:03
7	07:40	07:19	06:38	06:56 (15)	06:51	06:12	3
	17:19	17:41	18:07	25	07:21 (15)	19:33	20:04
8	07:40	07:18	06:36	06:55 (15)	06:50	06:11	6
	17:19	17:42	18:08	27	07:22 (15)	19:34	20:05
9	07:39	07:17	06:34	06:54 (15)	06:48	06:10	9
	17:20	17:43	18:09	28	07:22 (15)	19:35	20:06
10	07:39	07:15	06:33	06:53 (15)	06:47	06:09	11
	17:20	17:44	18:10	28	07:21 (15)	19:36	20:08
11	07:39	07:14	06:31	06:53 (15)	06:45	06:08	13
	17:21	17:45	18:11	28	07:21 (15)	19:37	20:09
12	07:38	07:13	06:30	06:52 (15)	06:44	06:07	14
	17:22	17:46	18:12	28	07:20 (15)	19:38	20:10
13	07:38	07:12	06:28	06:53 (15)	06:43	06:06	16
	17:22	17:46	18:12	27	07:20 (15)	19:39	20:11
14	07:37	07:11	06:27	06:52 (15)	06:41	06:05	17
	17:23	17:47	18:13	27	07:19 (15)	19:40	20:12
15	07:37	07:10	06:25	06:53 (15)	06:40	06:05	19
	17:24	17:48	18:14	26	07:19 (15)	19:41	20:13
16	07:36	07:08	06:24	06:53 (15)	06:38	06:04	20
	17:24	17:49	18:15	24	07:17 (15)	19:42	20:14
17	07:36	07:07	06:22	06:54 (15)	06:37	06:03	21
	17:25	17:50	18:16	21	07:15 (15)	19:43	20:15
18	07:35	07:06	06:21	06:55 (15)	06:36	06:03	22
	17:26	17:51	18:17	19	07:14 (15)	19:44	20:16
19	07:35	07:04	06:19	06:57 (15)	06:34	06:02	23
	17:26	17:51	18:17	14	07:11 (15)	19:45	20:17
20	07:34	07:03	06:17	07:00 (15)	06:33	06:01	23
	17:27	17:52	18:18	8	07:08 (15)	19:46	20:18
21	07:34	07:02	06:16		06:32	06:01	24
	17:28	17:53	18:19		19:46	20:19	24
22	07:33	07:00	06:14		06:30	06:00	24
	17:29	17:54	18:20		19:48	20:21	25
23	07:32	06:59	06:13		06:29	06:00	25
	17:29	17:55	18:21		19:49	20:22	25
24	07:31	06:58	06:11		06:28	05:59	25
	17:30	17:56	18:22		19:50	20:23	26
25	07:31	06:56	06:10		06:26	05:59	26
	17:31	17:57	18:23		19:51	20:24	26
26	07:30	06:55	06:08		06:25	05:58	26
	17:32	17:57	18:23		19:52	20:25	26
27	07:29	06:54	06:07		06:24	05:58	26
	17:32	17:58	18:24		19:53	20:26	25
28	07:28	06:52	06:05		06:23	05:57	25
	17:33	17:59	18:25		19:54	20:27	23
29	07:27	06:51	06:04		06:21	05:57	23
	17:34	18:00	18:26		19:55	20:28	22
30	07:27	06:49	06:02		06:20	05:57	22
	17:35	18:01	18:27		19:56	20:29	21
31	07:26	06:48			06:19		
	17:36	18:02			19:57		
Potential sun hours	305	331	355	405	424	456	91
Total, worst case			413		484		

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** U - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (21)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** V - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (22)**Assumptions for shadow calculations**

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Project:

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Description:

Vic wind farm in Lal Lal near Ballarat

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22	06:27 20:45	07:02 20:15	07:29 19:35	06:57 17:50	07:23 17:20	07:40 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:01 20:20	06:00 20:46
23	06:28 20:44	07:03 20:14	07:30 19:33	06:58 17:49	07:24 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:01 20:46
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:57		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 28

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** X - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (24)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:29
2	06:08 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:17	07:23 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:58 18:29	06:16 20:00	05:57 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:22 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:57 20:32
5	06:10 20:50	06:43 20:34	07:13 20:00	06:42 18:14	07:09 17:35	07:33 17:13	07:40 17:18	07:21 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 29

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km **Shadow receptor:** Y - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (25)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:03	06:01 18:28	06:18 19:58	05:57 20:29
2	06:08 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:17	07:23 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:23 17:38	06:43 18:04	05:58 18:29	06:16 20:00	05:57 20:31
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 30
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** Z - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (26)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
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	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:17	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:46	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:22	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:47	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:34	07:02	06:16	06:31	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:51	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 31
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AA - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (27)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December	
1	06:07	06:27 (25)	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	25	06:52 (25)	06:38	07:06	19:20	17:39	17:15	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:28 (25)	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	24	06:52 (25)	06:37	07:04	19:18	17:38	17:14	17:16	17:38	18:03	18:29	19:59	20:30
3	06:08	06:29 (25)	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:57
	24	06:53 (25)	06:36	07:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:30 (25)	06:42	07:12	07:41	07:08	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	23	06:53 (25)	06:35	07:01	19:15	17:36	17:14	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:30 (25)	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	23	06:53 (25)	06:34	07:00	18:14	17:35	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:31 (25)	06:44	07:14	06:43	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	22	06:53 (25)	06:33	07:13	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:32 (25)	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	21	06:53 (25)	06:32	07:15	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:33 (25)	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20	06:53 (25)	06:31	07:16	18:09	17:31	17:13	17:20	17:42	18:08	19:34	20:05	20:36
9	06:14	06:34 (25)	06:48	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	19	06:53 (25)	06:30	07:18	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:35 (25)	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	18	06:53 (25)	06:29	07:19	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:16	06:36 (25)	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:46	06:08	05:56
	17	06:53 (25)	06:28	07:20	18:05	17:29	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:37 (25)	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	15	06:52 (25)	06:27	07:21	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:09	20:39
13	06:18	06:38 (25)	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:07	05:57
	14	06:52 (25)	06:26	07:22	18:02	17:27	17:12	17:23	17:47	18:12	19:39	20:10	20:40
14	06:19	06:39 (25)	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	12	06:51 (25)	06:25	07:23	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:41
15	06:20	06:40 (25)	06:54	07:23	06:51	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	10	06:50 (25)	06:24	07:24	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:41 (25)	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	7	06:48 (25)	06:23	07:24	17:58	17:24	17:12	17:25	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20	06:57	07:25	07:25	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	07:25	06:53	07:20	07:38	07:35	07:05	06:21	06:36	06:03	05:58
	19	06:58	07:26	07:26	17:54	17:22	17:12	17:26	17:51	18:17	19:43	20:16	20:43
19	06:24	06:58	07:26	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:59
	18	06:59	07:27	07:27	17:55	17:23	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	07:00	07:27	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:02	05:59
	17	06:59	07:28	07:28	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:01	07:28	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	16	06:59	07:29	07:29	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	15	07:03	07:30	07:30	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	14	07:04	07:31	07:31	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	13	07:05	07:32	07:32	17:47	17:18	17:14	17:30	17:56	18:22	19:49	20:22	20:46
25	06:31	07:05	07:32	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:02
	12	07:06	07:33	07:33	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:59	06:02
	11	07:07	07:34	07:34	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	10	07:08	07:35	07:35	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	9	07:09	07:35	07:35	17:43	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35	07:09	07:35	07:35	07:03	07:28	07:40	07:27	06:51	06:04	06:22	05:57	06:04
	8	07:10	07:36	07:36	17:42	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36	07:10	07:36	07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	7	07:11	07:37	07:37	17:41	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37	07:11	07:37	07:37	07:05	07:29	07:40	07:25	06:48	06:03	06:21	05:58	06:06
	6	07:12	07:38	07:38	17:40	17:14	17:15	17:36	18:02	18:28	19:56	20:29	20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456	765
Total, worst case	294										56		

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 32
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AB - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (28)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:39 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:58	05:57 20:29
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:38	06:45 18:03	05:59 18:29	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:57 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:42 18:14	07:08 17:35	07:33 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:59	07:43 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:07	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	07:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:49	06:46 20:31	07:16 19:56	07:44 18:09	07:11 17:31	07:34 17:13	07:39 17:20	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:49	06:48 20:30	07:17 19:54	07:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:15 20:49	06:49 20:29	07:18 19:53	07:46 18:06	07:13 17:29	07:35 17:12	07:38 17:21	07:15 17:44	06:33 18:10	06:47 19:36	06:09 20:07	05:56 20:37
11	06:16 20:49	06:50 20:28	07:19 19:51	07:47 18:05	07:14 17:29	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:46 19:37	06:08 20:08	05:56 20:38
12	06:17 20:49	06:51 20:27	07:20 19:50	07:48 18:04	07:15 17:28	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:12	06:44 19:38	06:07 20:09	05:57 20:39
13	06:18 20:49	06:52 20:26	07:21 19:48	07:49 18:02	07:15 17:27	07:37 17:12	07:37 17:23	07:12 17:47	06:28 18:12	06:43 19:39	06:07 20:10	05:57 20:40
14	06:19 20:48	06:53 20:25	07:22 19:47	07:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	06:41 19:39	06:06 20:11	05:57 20:41
15	06:20 20:48	06:54 20:24	07:23 19:45	07:51 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:13	05:57 20:41
16	06:21 20:48	06:55 20:23	07:23 19:44	07:51 17:58	07:18 17:24	07:38 17:12	07:36 17:25	07:08 17:49	06:24 18:15	06:38 19:41	06:04 20:14	05:58 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	07:52 17:57	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	07:53 17:55	07:20 17:23	07:38 17:12	07:35 17:26	07:05 17:51	06:21 18:17	06:36 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	07:54 17:54	07:20 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:59 20:44
20	06:25 20:46	07:00 20:18	07:27 19:38	07:55 17:53	07:21 17:21	07:39 17:13	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:02 20:18	05:59 20:44
21	06:26 20:46	07:01 20:16	07:28 19:36	07:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:02 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	07:57 17:50	07:23 17:20	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:46
23	06:28 20:44	07:03 20:14	07:30 19:33	07:58 17:49	07:24 17:19	07:40 17:13	07:32 17:30	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:00 20:46
24	06:29 20:44	07:04 20:12	07:31 19:32	07:59 17:47	07:24 17:18	07:40 17:14	07:31 17:30	06:58 17:56	06:11 18:22	06:28 19:49	05:59 20:22	06:01 20:46
25	06:31 20:43	07:05 20:11	07:32 19:30	07:00 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	06:26 19:50	05:59 20:23	06:02 20:47
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27	06:33 20:42	07:07 20:08	07:34 19:27	07:01 17:44	07:27 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:07 18:24	06:24 19:52	05:58 20:25	06:03 20:48
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29	06:35 20:40		07:35 19:24	07:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:51 18:00	06:04 18:26	06:22 19:54	05:57 20:27	06:04 20:48
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:56		06:06 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 33
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AC - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (29)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
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	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
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	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
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	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
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26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
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	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
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29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 34
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AD - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (30)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
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11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
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	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
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18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
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	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
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28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 35

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AE - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (31)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:42	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 36
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AF - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (32)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:43	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:57
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
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	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 37
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AG - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (33)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
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	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
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	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
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	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
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	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 38
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AH - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (34)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
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	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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10	06:14	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
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	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 39

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AI - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (35)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
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	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:12	20:41
15	06:20	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
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	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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14/04/2015 12:26 PM / 40

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km **Shadow receptor:** AJ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (36)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:15	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:40 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:38	06:45 18:03	05:59 18:28	06:17 19:59	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:57 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:08 17:36	07:32 17:14	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:42 18:14	07:08 17:35	07:33 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
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Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

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Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AK - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (37)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
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4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
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30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 42

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AL - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (38)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 43
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AM - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (39)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
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	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
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16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
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	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
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	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 44
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AN - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (40)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:28	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:40	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:43	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
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	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
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	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 45
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AO - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (41)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
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26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
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	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 46
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AP - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (42)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
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	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:46	18:11	19:38	20:10	20:39
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	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:40	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
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29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 47

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AQ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (43)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:33
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:44	07:10	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
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10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:13	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 48
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AR - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (44)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:19	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
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	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:38
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12	06:16	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:38	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:10	20:40
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
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27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 49
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AS - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (45)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:40	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:36	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:13	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:15	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:16	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:17	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:57
	20:49	20:27	19:50	18:04	17:28	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:18	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:38	20:10	20:40
14	06:19	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:51	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:53	17:21	17:13	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:32	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:30	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:31	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:22	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:16	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:06
	20:39		19:21		17:15		17:36	18:02		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 50

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** AT - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (46)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:41	07:25	06:46	06:00	06:18	05:56
	20:49	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:36	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:41	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:12	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:40	07:19	06:37	06:51	06:11	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:39
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:21	06:50	07:17	07:37	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:04	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:40	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:20	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:39	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:20	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:46
24	06:29	07:03	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:51	20:25	20:48
27	06:32	07:07	07:34	07:01	07:27	07:41	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:22	05:57	06:03
	20:41	20:07	19:26	17:42	17:16	17:14	17:33	17:59	18:25	19:54	20:27	20:48
29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:26	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 51
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AU - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (47)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
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11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
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	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
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	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
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	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 52
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AV - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (48)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
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10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:41
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
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23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
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24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
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25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
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26	06:31	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
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	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 53
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AW - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (49)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
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12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
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	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 54
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AX - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (50)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 55
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AY - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (51)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
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	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
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16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
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	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 56
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** AZ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (52)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:14	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:21	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:20	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:21	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:27	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:03	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 57
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BA - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (53)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:06	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	06:42 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:58	06:42 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:06	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	06:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:49	06:46 20:31	07:16 19:56	06:44 18:09	07:11 17:31	07:34 17:12	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:49	06:47 20:30	07:17 19:54	06:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
10	06:15 20:49	06:49 20:29	07:18 19:53	06:46 18:06	07:13 17:29	07:35 17:12	07:38 17:21	07:15 17:44	06:33 18:10	06:47 19:36	06:09 20:07	05:56 20:37
11	06:15 20:49	06:50 20:28	07:19 19:51	06:47 18:05	07:14 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:45 19:37	06:08 20:08	05:56 20:38
12	06:16 20:49	06:51 20:27	07:20 19:50	06:48 18:03	07:14 17:27	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:11	06:44 19:37	06:07 20:09	05:56 20:39
13	06:17 20:49	06:52 20:26	07:21 19:48	06:49 18:02	07:15 17:27	07:37 17:12	07:37 17:22	07:12 17:47	06:28 18:12	06:43 19:38	06:06 20:10	05:57 20:40
14	06:19 20:48	06:53 20:25	07:21 19:47	06:50 18:01	07:16 17:26	07:37 17:12	07:37 17:23	07:10 17:47	06:27 18:13	06:41 19:39	06:06 20:11	05:57 20:40
15	06:20 20:48	06:54 20:24	07:22 19:45	06:50 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:12	05:57 20:41
16	06:21 20:48	06:55 20:22	07:23 19:44	06:51 17:58	07:18 17:24	07:38 17:12	07:36 17:24	07:08 17:49	06:23 18:15	06:38 19:41	06:04 20:14	05:57 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	06:52 17:57	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	06:53 17:55	07:19 17:22	07:38 17:12	07:35 17:26	07:05 17:51	06:20 18:16	06:36 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	06:54 17:54	07:20 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:17	07:27 19:38	06:55 17:52	07:21 17:21	07:39 17:12	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:01 20:18	05:59 20:44
21	06:26 20:45	07:00 20:16	07:28 19:36	06:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:01 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	06:57 17:50	07:23 17:20	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:45
23	06:28 20:44	07:03 20:14	07:30 19:33	06:58 17:49	07:23 17:19	07:40 17:13	07:32 17:29	06:59 17:55	06:13 18:21	06:29 19:48	06:00 20:21	06:00 20:46
24	06:29 20:44	07:04 20:12	07:31 19:32	06:59 17:47	07:24 17:18	07:40 17:13	07:31 17:30	06:57 17:56	06:11 18:21	06:28 19:49	06:01 20:22	06:01 20:46
25	06:30 20:43	07:05 20:11	07:32 19:30	06:59 17:46	07:25 17:18	07:40 17:14	07:30 17:31	06:56 17:57	06:10 18:22	06:26 19:50	06:01 20:23	06:01 20:47
26	06:32 20:42	07:06 20:10	07:33 19:29	07:00 17:45	07:26 17:17	07:40 17:14	07:29 17:32	06:55 17:57	06:08 18:23	06:25 19:51	06:02 20:24	06:02 20:47
27	06:33 20:42	07:07 20:08	07:33 19:27	07:01 17:44	07:26 17:17	07:40 17:14	07:29 17:33	06:53 17:58	06:06 18:24	06:24 19:52	06:03 20:25	06:03 20:48
28	06:34 20:41	07:08 20:07	07:34 19:26	07:02 17:42	07:27 17:16	07:40 17:15	07:28 17:33	06:52 17:59	06:05 18:25	06:23 19:53	06:04 20:26	06:04 20:48
29	06:35 20:40		07:35 19:24	07:03 17:41	07:28 17:16	07:40 17:15	07:27 17:34	06:50 18:00	06:03 18:26	06:21 19:54	06:05 20:27	06:05 20:48
30	06:36 20:40		07:36 19:23	07:04 17:40	07:29 17:15	07:40 17:15	07:26 17:35	06:49 18:01	06:02 18:27	06:20 19:55	06:05 20:28	06:05 20:48
31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:02		06:19 19:56		06:05 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 58

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BB - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (54)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:07 20:49	06:38 20:38	07:09 20:05	07:38 19:20	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:37	06:46 18:02	06:00 18:28	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:57 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:17	07:07 17:37	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 20:00	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	06:42 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:58	06:42 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:06	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	06:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:42	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:13 20:49	06:46 20:31	07:16 19:56	06:44 18:09	07:11 17:31	07:34 17:12	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:14 20:49	06:47 20:30	07:17 19:54	06:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
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13	06:17 20:49	06:52 20:26	07:21 19:48	06:49 18:02	07:15 17:27	07:37 17:12	07:37 17:22	07:11 17:47	06:28 18:12	06:43 19:38	06:06 20:10	05:57 20:40
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15	06:20 20:48	06:54 20:24	07:22 19:45	06:50 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:12	05:57 20:41
16	06:21 20:48	06:55 20:22	07:23 19:44	06:51 17:58	07:18 17:24	07:38 17:12	07:36 17:24	07:08 17:49	06:23 18:15	06:38 19:41	06:04 20:14	05:57 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	06:52 17:56	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:16	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	06:53 17:55	07:19 17:22	07:38 17:12	07:35 17:26	07:05 17:51	06:20 18:16	06:36 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	06:54 17:54	07:20 17:22	07:39 17:12	07:34 17:27	07:04 17:52	06:19 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:17	07:27 19:38	06:55 17:52	07:21 17:21	07:39 17:12	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:01 20:18	05:59 20:44
21	06:26 20:45	07:00 20:16	07:28 19:36	06:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:01 17:53	06:16 18:19	06:32 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:02 20:15	07:29 19:35	06:57 17:50	07:23 17:20	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:45
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:01		06:19 19:56		06:05 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 59
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BC - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (55)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
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	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
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	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
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24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:27	05:59	06:01
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26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
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	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 60
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BD - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (56)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
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	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 61
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BE - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (57)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	19:59	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:10	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:26	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:27	05:59	06:01
	20:44	20:12	19:31	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:47		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 62
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BF - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (58)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
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	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:49	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:10	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:21	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
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29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 63
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BG - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (59)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:08	07:33	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:11	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
13	06:17	06:52	07:20	06:49	07:15	07:37	07:37	07:11	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:57
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:27	07:40	07:29	06:53	06:06	06:24	05:58	06:02
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 64
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BH - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (60)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:49	20:32	19:57	18:11	17:32	17:13	17:19	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:49	20:31	19:55	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
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	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:36	20:08	20:38
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	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:38	20:10	20:40
14	06:18	06:53	07:21	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:05	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:11	20:40
15	06:19	06:54	07:22	06:50	07:17	07:37	07:36	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
16	06:20	06:55	07:23	06:51	07:18	07:38	07:36	07:08	06:23	06:38	06:04	05:57
	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:25	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 65

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BI - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (61)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06 20:49	06:38 20:38	07:09 20:05	07:38 19:19	07:05 17:39	07:30 17:14	07:40 17:16	07:24 17:36	06:46 18:02	06:00 18:27	06:18 19:57	05:57 20:29
2	06:07 20:49	06:39 20:37	07:10 20:04	07:39 19:18	07:06 17:38	07:31 17:14	07:40 17:16	07:23 17:37	06:45 18:03	05:59 18:28	06:17 19:58	05:56 20:30
3	06:08 20:49	06:41 20:36	07:11 20:03	07:40 19:16	07:07 17:36	07:31 17:14	07:40 17:17	07:22 17:38	06:43 18:04	05:57 18:29	06:16 19:59	05:56 20:31
4	06:09 20:49	06:42 20:35	07:12 20:01	07:41 19:15	07:07 17:35	07:32 17:13	07:40 17:17	07:21 17:39	06:42 18:05	06:56 19:30	06:15 20:01	05:56 20:32
5	06:10 20:49	06:43 20:34	07:13 20:00	07:41 18:14	07:08 17:34	07:32 17:13	07:40 17:18	07:20 17:40	06:40 18:06	06:54 19:31	06:14 20:02	05:56 20:33
6	06:11 20:49	06:44 20:33	07:14 19:58	07:42 18:12	07:09 17:33	07:33 17:13	07:39 17:18	07:19 17:41	06:39 18:06	06:53 19:32	06:13 20:03	05:56 20:34
7	06:12 20:49	06:45 20:32	07:15 19:57	07:43 18:11	07:10 17:32	07:34 17:13	07:39 17:19	07:18 17:41	06:37 18:07	06:51 19:33	06:12 20:04	05:56 20:35
8	06:12 20:49	06:46 20:31	07:16 19:55	07:44 18:09	07:11 17:31	07:34 17:12	07:39 17:19	07:17 17:42	06:36 18:08	06:50 19:34	06:11 20:05	05:56 20:36
9	06:13 20:49	06:47 20:30	07:17 19:54	07:45 18:08	07:12 17:30	07:35 17:12	07:39 17:20	07:16 17:43	06:34 18:09	06:48 19:35	06:10 20:06	05:56 20:37
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11	06:15 20:49	06:50 20:28	07:19 19:51	07:47 18:05	07:14 17:28	07:36 17:12	07:38 17:21	07:14 17:45	06:31 18:11	06:45 19:36	06:08 20:08	05:56 20:38
12	06:16 20:49	06:51 20:27	07:19 19:50	07:48 18:03	07:14 17:27	07:36 17:12	07:38 17:22	07:13 17:46	06:30 18:11	06:44 19:37	06:07 20:09	05:56 20:39
13	06:17 20:49	06:52 20:26	07:20 19:48	07:49 18:02	07:15 17:26	07:37 17:12	07:37 17:22	07:11 17:46	06:28 18:12	06:42 19:38	06:06 20:10	05:56 20:40
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15	06:19 20:48	06:54 20:24	07:22 19:45	07:51 17:59	07:17 17:25	07:37 17:12	07:36 17:24	07:09 17:48	06:25 18:14	06:40 19:40	06:05 20:12	05:57 20:41
16	06:20 20:48	06:55 20:22	07:23 19:44	07:52 17:58	07:18 17:24	07:38 17:12	07:36 17:24	07:08 17:49	06:23 18:15	06:38 19:41	06:04 20:14	05:57 20:42
17	06:22 20:47	06:56 20:21	07:24 19:42	07:53 17:56	07:19 17:23	07:38 17:12	07:35 17:25	07:07 17:50	06:22 18:15	06:37 19:42	06:03 20:15	05:58 20:43
18	06:23 20:47	06:57 20:20	07:25 19:41	07:54 17:55	07:19 17:22	07:38 17:12	07:35 17:26	07:05 17:51	06:20 18:16	06:35 19:43	06:03 20:16	05:58 20:43
19	06:24 20:46	06:58 20:19	07:26 19:39	07:55 17:54	07:20 17:22	07:39 17:12	07:34 17:26	07:04 17:51	06:19 18:17	06:34 19:44	06:02 20:17	05:58 20:44
20	06:25 20:46	06:59 20:17	07:27 19:38	07:56 17:52	07:21 17:21	07:39 17:12	07:34 17:27	07:03 17:52	06:17 18:18	06:33 19:45	06:01 20:18	05:59 20:44
21	06:26 20:45	07:00 20:16	07:28 19:36	07:56 17:51	07:22 17:20	07:39 17:13	07:33 17:28	07:01 17:53	06:16 18:19	06:31 19:46	06:01 20:19	05:59 20:45
22	06:27 20:45	07:01 20:15	07:29 19:35	07:57 17:50	07:23 17:19	07:39 17:13	07:32 17:29	07:00 17:54	06:14 18:20	06:30 19:47	06:00 20:20	06:00 20:45
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31	06:37 20:39		07:37 19:21		07:29 17:15		07:25 17:36	06:48 18:01		06:19 19:56		06:05 20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 66
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BJ - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (62)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	19:59	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:41	07:08	07:32	07:40	07:20	06:40	06:54	06:14	05:56
	20:49	20:34	20:00	18:13	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:42	07:09	07:33	07:39	07:19	06:39	06:53	06:13	05:56
	20:49	20:33	19:58	18:12	17:33	17:13	17:18	17:41	18:06	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
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8	06:12	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
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10	06:14	06:48	07:18	06:46	07:13	07:35	07:38	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:37
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	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:10	19:36	20:08	20:38
12	06:16	06:51	07:19	06:48	07:14	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:22	17:46	18:11	19:37	20:09	20:39
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
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	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:42
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
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26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:03
	20:42	20:08	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:52	20:25	20:48
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30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 67
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BK - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (63)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:05	19:19	17:39	17:14	17:16	17:36	18:02	18:27	19:57	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:23	06:45	05:59	06:17	05:56
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:28	19:58	20:30
3	06:08	06:40	07:11	07:40	07:07	07:31	07:40	07:22	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:16	17:36	17:14	17:17	17:38	18:04	18:29	19:59	20:31
4	06:09	06:42	07:12	07:41	07:07	07:32	07:40	07:21	06:42	06:56	06:15	05:56
	20:49	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
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	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:12	20:41
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	20:48	20:22	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:35	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:56	17:23	17:12	17:25	17:50	18:15	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:19	07:38	07:35	07:05	06:20	06:35	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:20	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:46	20:19	19:39	17:54	17:22	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:17	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:44
21	06:26	07:00	07:28	06:56	07:22	07:39	07:33	07:01	06:16	06:31	06:01	05:59
	20:45	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:01	07:29	06:57	07:23	07:39	07:32	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:19	17:13	17:29	17:54	18:20	19:47	20:20	20:45
23	06:28	07:02	07:30	06:58	07:23	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:44	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:58	07:24	07:40	07:31	06:57	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:21	19:49	20:22	20:46
25	06:30	07:05	07:32	06:59	07:25	07:40	07:30	06:56	06:09	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:13	17:31	17:56	18:22	19:50	20:23	20:47
26	06:31	07:06	07:32	07:00	07:26	07:40	07:29	06:55	06:08	06:25	05:58	06:02
	20:42	20:10	19:28	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:33	07:01	07:26	07:40	07:29	06:53	06:06	06:24	05:58	06:02
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28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:57	06:03
	20:41	20:07	19:25	17:42	17:16	17:14	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:50	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:39		19:22	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:48
31	06:37		07:37		07:29		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:01		19:56		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 68

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BL - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (64)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:00	06:18	05:56
	20:50	20:38	20:06	19:20	17:39	17:14	17:15	17:36	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:37	20:04	19:18	17:37	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:40	07:11	07:40	07:07	07:32	07:40	07:23	06:43	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:36	17:13	17:16	17:38	18:04	18:29	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:09	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:17	17:40	18:06	19:31	20:02	20:34
6	06:10	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:40	18:06	19:32	20:03	20:35
7	06:11	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:37	06:51	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:12	17:18	17:41	18:07	19:33	20:04	20:35
8	06:12	06:46	07:16	06:44	07:11	07:35	07:39	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:50	20:31	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:48	07:18	06:46	07:13	07:36	07:39	07:15	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:49	07:19	06:47	07:14	07:36	07:39	07:14	06:31	06:45	06:08	05:56
	20:50	20:29	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:03	17:27	17:12	17:21	17:45	18:11	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:28	06:42	06:06	05:56
	20:49	20:26	19:48	18:02	17:26	17:12	17:22	17:46	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:17	07:38	07:37	07:11	06:27	06:41	06:05	05:56
	20:49	20:25	19:47	18:01	17:25	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:49	20:24	19:45	17:59	17:25	17:12	17:23	17:48	18:14	19:41	20:13	20:42
16	06:20	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:21	06:56	07:24	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:57
	20:48	20:22	19:42	17:56	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:22	06:57	07:25	06:53	07:20	07:39	07:35	07:06	06:21	06:35	06:02	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:25	17:51	18:16	19:43	20:16	20:44
19	06:23	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:21	17:12	17:26	17:51	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:22	07:40	07:34	07:03	06:17	06:33	06:01	05:58
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:00	07:28	06:56	07:22	07:40	07:33	07:02	06:16	06:31	06:00	05:59
	20:46	20:17	19:36	17:51	17:20	17:12	17:28	17:53	18:19	19:46	20:19	20:46
22	06:27	07:01	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	05:59
	20:45	20:15	19:35	17:50	17:19	17:12	17:28	17:54	18:20	19:47	20:21	20:46
23	06:28	07:02	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	05:59	06:00
	20:45	20:14	19:33	17:48	17:19	17:13	17:29	17:55	18:21	19:48	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:40	07:31	06:58	06:11	06:27	05:59	06:00
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:40	07:31	06:56	06:10	06:26	05:58	06:01
	20:44	20:11	19:30	17:46	17:17	17:13	17:31	17:56	18:22	19:50	20:24	20:47
26	06:31	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:31	17:57	18:23	19:52	20:25	20:48
27	06:32	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:02
	20:42	20:09	19:27	17:43	17:16	17:14	17:32	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:34	07:02	07:28	07:41	07:28	06:52	06:05	06:23	05:57	06:03
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29	06:35		07:35	07:03	07:28	07:41	07:27	06:51	06:03	06:21	05:57	06:04
	20:41		19:24	17:41	17:15	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:04
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:14		17:35	18:01		19:57		20:49
Potential sun hours	447	378	383	334	313	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 69
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BM - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (65)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:46	06:01	06:18	05:57
	20:50	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:30
2	06:07	06:39	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:40	07:23	06:44	05:57	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:54	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
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	20:49	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:42
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:25	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:54	07:21	07:39	07:35	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:45	20:17	20:44
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:18	20:45
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	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
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30	06:36		07:36	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:	Description:	Printed/Page
32671_LalLal_20150316	Vic wind farm in Lal Lal near Ballarat	14/04/2015 12:26 PM / 70
		Licensed user:
		GHD Services Pty Ltd Attn.: Software Licencing & Compliance
		145 Ann Street
		BRISBANE QLD 4000
		61 7 4720 0463
		Chris Davies / Christopher.Davies@ghd.com
		Calculated:
		14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar

Calculation: Scenario 2 - fixed distance 1km **Shadow receptor:** BN - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (66)

Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:57
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:32	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:04	20:36
8	06:13	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:36
9	06:13	06:48	07:17	06:46	07:13	07:35	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:55	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:49	07:18	06:47	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:07	17:29	17:12	17:21	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:28	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:57
	20:49	20:27	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:20	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:39	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:36	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:59	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:27	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:56	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:53	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:37	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:27	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:04	07:29	07:41	07:27	06:50	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:50
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 71

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BO - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (68)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:31	07:41	07:25	06:47	06:01	06:18	05:57
	20:50	20:39	20:06	19:20	17:39	17:14	17:16	17:37	18:03	18:28	19:58	20:30
2	06:07	06:40	07:10	07:39	07:06	07:31	07:41	07:24	06:45	05:59	06:17	05:56
	20:50	20:38	20:05	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:31
3	06:08	06:41	07:11	07:40	07:07	07:32	07:41	07:23	06:44	05:58	06:16	05:56
	20:50	20:37	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:30	20:00	20:32
4	06:09	06:42	07:12	07:41	07:08	07:33	07:41	07:22	06:42	06:56	06:15	05:56
	20:50	20:36	20:02	19:15	17:36	17:13	17:17	17:39	18:05	19:31	20:01	20:33
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:41	06:55	06:14	05:56
	20:50	20:35	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:34
6	06:11	06:44	07:14	06:43	07:10	07:34	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:34	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:35
7	06:12	06:45	07:15	06:44	07:11	07:34	07:40	07:19	06:38	06:52	06:12	05:56
	20:50	20:33	19:57	18:11	17:32	17:13	17:19	17:42	18:08	19:33	20:04	20:36
8	06:12	06:46	07:16	06:45	07:12	07:35	07:40	07:18	06:36	06:50	06:11	05:56
	20:50	20:32	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:06	20:36
9	06:13	06:47	07:17	06:46	07:12	07:35	07:39	07:17	06:35	06:49	06:10	05:56
	20:50	20:31	19:55	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:07	20:37
10	06:14	06:49	07:18	06:46	07:13	07:36	07:39	07:16	06:33	06:47	06:09	05:56
	20:50	20:30	19:53	18:07	17:29	17:12	17:20	17:44	18:10	19:36	20:08	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:39	07:14	06:32	06:46	06:08	05:56
	20:50	20:29	19:52	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:09	20:39
12	06:16	06:51	07:20	06:48	07:15	07:37	07:38	07:13	06:30	06:44	06:07	05:56
	20:50	20:28	19:50	18:04	17:27	17:12	17:22	17:46	18:12	19:38	20:10	20:40
13	06:17	06:52	07:21	06:49	07:16	07:37	07:38	07:12	06:29	06:43	06:06	05:56
	20:49	20:26	19:49	18:02	17:27	17:12	17:22	17:47	18:13	19:39	20:11	20:41
14	06:18	06:53	07:22	06:50	07:17	07:38	07:38	07:11	06:27	06:41	06:06	05:57
	20:49	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:40	20:12	20:41
15	06:19	06:54	07:23	06:51	07:18	07:38	07:37	07:10	06:25	06:40	06:05	05:57
	20:49	20:24	19:46	17:59	17:25	17:12	17:24	17:48	18:14	19:41	20:13	20:42
16	06:21	06:55	07:24	06:52	07:19	07:39	07:37	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:42	20:14	20:43
17	06:22	06:56	07:25	06:53	07:19	07:39	07:36	07:07	06:22	06:37	06:03	05:58
	20:48	20:22	19:43	17:57	17:23	17:12	17:25	17:50	18:16	19:43	20:15	20:43
18	06:23	06:57	07:26	06:54	07:20	07:39	07:35	07:06	06:21	06:36	06:03	05:58
	20:48	20:21	19:41	17:55	17:22	17:12	17:26	17:51	18:17	19:44	20:16	20:44
19	06:24	06:58	07:26	06:55	07:21	07:39	07:35	07:05	06:19	06:34	06:02	05:58
	20:47	20:19	19:40	17:54	17:22	17:12	17:26	17:52	18:18	19:45	20:18	20:45
20	06:25	07:00	07:27	06:55	07:22	07:40	07:34	07:03	06:18	06:33	06:01	05:59
	20:47	20:18	19:38	17:53	17:21	17:12	17:27	17:52	18:18	19:46	20:19	20:45
21	06:26	07:01	07:28	06:56	07:23	07:40	07:34	07:02	06:16	06:32	06:01	05:59
	20:46	20:17	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:47	20:20	20:46
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:01	06:15	06:30	06:00	06:00
	20:46	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:48	20:21	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:49	20:22	20:47
24	06:29	07:04	07:31	06:59	07:25	07:41	07:32	06:58	06:11	06:28	05:59	06:01
	20:44	20:13	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:50	20:23	20:47
25	06:30	07:05	07:32	07:00	07:26	07:41	07:31	06:57	06:10	06:26	05:59	06:01
	20:44	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:23	19:51	20:24	20:48
26	06:32	07:06	07:33	07:01	07:26	07:41	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:58	18:24	19:52	20:25	20:48
27	06:33	07:07	07:34	07:02	07:27	07:41	07:29	06:54	06:07	06:24	05:58	06:03
	20:42	20:09	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:53	20:26	20:48
28	06:34	07:08	07:35	07:03	07:28	07:41	07:28	06:52	06:05	06:23	05:58	06:03
	20:42	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:54	20:27	20:49
29	06:35		07:36	07:04	07:29	07:41	07:28	06:51	06:04	06:22	05:57	06:04
	20:41		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:55	20:28	20:49
30	06:36		07:37	07:04	07:29	07:41	07:27	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:56	20:29	20:49
31	06:37		07:37		07:30		07:26	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	331	355	405	424	456
Total, worst case												

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

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

Project:

32671_LalLal_20150316

Description:

Vic wind farm in Lal Lal near Ballarat

Printed/Page

14/04/2015 12:26 PM / 72

Licensed user:

GHD Services Pty Ltd Attn.: Software Licencing & Compliance

145 Ann Street

BRISBANE QLD 4000

61 7 4720 0463

Chris Davies / Christopher.Davies@ghd.com

Calculated:

14/04/2015 12:22 PM/2.9.285

SHADOW - Calendar**Calculation:** Scenario 2 - fixed distance 1km**Shadow receptor:** BP - Shadow Receptor: 2.0 × 1.5 Azimuth: 0.0° Slope: 0.0° (69)**Assumptions for shadow calculations**

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	06:06	06:38	07:09	07:38	07:05	07:30	07:40	07:24	06:46	06:00	06:18	05:57
	20:49	20:38	20:06	19:20	17:39	17:14	17:16	17:37	18:02	18:28	19:58	20:29
2	06:07	06:39	07:10	07:39	07:06	07:31	07:40	07:24	06:45	05:59	06:17	05:57
	20:49	20:37	20:04	19:18	17:38	17:14	17:16	17:37	18:03	18:29	19:59	20:30
3	06:08	06:41	07:11	07:40	07:07	07:31	07:40	07:23	06:43	05:57	06:16	05:56
	20:49	20:36	20:03	19:17	17:37	17:14	17:17	17:38	18:04	18:29	20:00	20:31
4	06:09	06:42	07:12	07:41	07:08	07:32	07:40	07:22	06:42	06:56	06:15	05:56
	20:50	20:35	20:01	19:15	17:35	17:13	17:17	17:39	18:05	19:30	20:01	20:32
5	06:10	06:43	07:13	06:42	07:09	07:33	07:40	07:21	06:40	06:54	06:14	05:56
	20:50	20:34	20:00	18:14	17:34	17:13	17:18	17:40	18:06	19:31	20:02	20:33
6	06:11	06:44	07:14	06:43	07:09	07:33	07:40	07:20	06:39	06:53	06:13	05:56
	20:50	20:33	19:59	18:12	17:33	17:13	17:18	17:41	18:07	19:32	20:03	20:34
7	06:12	06:45	07:15	06:43	07:10	07:34	07:39	07:18	06:37	06:51	06:12	05:56
	20:50	20:32	19:57	18:11	17:32	17:13	17:19	17:42	18:07	19:33	20:04	20:35
8	06:13	06:46	07:16	06:44	07:11	07:34	07:39	07:17	06:36	06:50	06:11	05:56
	20:50	20:31	19:56	18:09	17:31	17:12	17:19	17:42	18:08	19:34	20:05	20:36
9	06:13	06:47	07:17	06:45	07:12	07:35	07:39	07:16	06:34	06:48	06:10	05:56
	20:49	20:30	19:54	18:08	17:30	17:12	17:20	17:43	18:09	19:35	20:06	20:37
10	06:14	06:49	07:18	06:46	07:13	07:35	07:39	07:15	06:33	06:47	06:09	05:56
	20:49	20:29	19:53	18:06	17:29	17:12	17:20	17:44	18:10	19:36	20:07	20:38
11	06:15	06:50	07:19	06:47	07:14	07:36	07:38	07:14	06:31	06:45	06:08	05:56
	20:49	20:28	19:51	18:05	17:28	17:12	17:21	17:45	18:11	19:37	20:08	20:38
12	06:16	06:51	07:20	06:48	07:15	07:36	07:38	07:13	06:30	06:44	06:07	05:56
	20:49	20:27	19:50	18:04	17:27	17:12	17:22	17:46	18:11	19:38	20:09	20:39
13	06:17	06:52	07:21	06:49	07:15	07:37	07:37	07:12	06:28	06:43	06:06	05:57
	20:49	20:26	19:48	18:02	17:27	17:12	17:22	17:47	18:12	19:39	20:11	20:40
14	06:18	06:53	07:22	06:50	07:16	07:37	07:37	07:10	06:27	06:41	06:06	05:57
	20:48	20:25	19:47	18:01	17:26	17:12	17:23	17:47	18:13	19:39	20:12	20:41
15	06:20	06:54	07:22	06:51	07:17	07:38	07:37	07:09	06:25	06:40	06:05	05:57
	20:48	20:24	19:45	17:59	17:25	17:12	17:24	17:48	18:14	19:40	20:13	20:41
16	06:21	06:55	07:23	06:52	07:18	07:38	07:36	07:08	06:24	06:38	06:04	05:57
	20:48	20:23	19:44	17:58	17:24	17:12	17:24	17:49	18:15	19:41	20:14	20:42
17	06:22	06:56	07:24	06:52	07:19	07:38	07:36	07:07	06:22	06:37	06:03	05:58
	20:47	20:21	19:42	17:57	17:23	17:12	17:25	17:50	18:16	19:42	20:15	20:43
18	06:23	06:57	07:25	06:53	07:20	07:39	07:35	07:05	06:20	06:36	06:03	05:58
	20:47	20:20	19:41	17:55	17:22	17:12	17:26	17:51	18:16	19:43	20:16	20:43
19	06:24	06:58	07:26	06:54	07:21	07:39	07:34	07:04	06:19	06:34	06:02	05:58
	20:47	20:19	19:39	17:54	17:22	17:12	17:26	17:52	18:17	19:44	20:17	20:44
20	06:25	06:59	07:27	06:55	07:21	07:39	07:34	07:03	06:17	06:33	06:01	05:59
	20:46	20:18	19:38	17:52	17:21	17:12	17:27	17:52	18:18	19:45	20:18	20:45
21	06:26	07:01	07:28	06:56	07:22	07:39	07:33	07:02	06:16	06:32	06:01	05:59
	20:46	20:16	19:36	17:51	17:20	17:13	17:28	17:53	18:19	19:46	20:19	20:45
22	06:27	07:02	07:29	06:57	07:23	07:40	07:33	07:00	06:14	06:30	06:00	06:00
	20:45	20:15	19:35	17:50	17:20	17:13	17:29	17:54	18:20	19:47	20:20	20:46
23	06:28	07:03	07:30	06:58	07:24	07:40	07:32	06:59	06:13	06:29	06:00	06:00
	20:45	20:14	19:33	17:49	17:19	17:13	17:29	17:55	18:21	19:48	20:21	20:46
24	06:29	07:04	07:31	06:59	07:24	07:40	07:31	06:58	06:11	06:28	05:59	06:01
	20:44	20:12	19:32	17:47	17:18	17:13	17:30	17:56	18:22	19:49	20:22	20:47
25	06:30	07:05	07:32	07:00	07:25	07:40	07:30	06:56	06:10	06:26	05:59	06:01
	20:43	20:11	19:30	17:46	17:18	17:14	17:31	17:57	18:22	19:50	20:23	20:47
26	06:32	07:06	07:33	07:00	07:26	07:40	07:30	06:55	06:08	06:25	05:58	06:02
	20:43	20:10	19:29	17:45	17:17	17:14	17:32	17:57	18:23	19:51	20:24	20:47
27	06:33	07:07	07:34	07:01	07:27	07:40	07:29	06:53	06:07	06:24	05:58	06:03
	20:42	20:08	19:27	17:44	17:17	17:14	17:33	17:58	18:24	19:52	20:25	20:48
28	06:34	07:08	07:34	07:02	07:27	07:40	07:28	06:52	06:05	06:23	05:58	06:03
	20:41	20:07	19:26	17:42	17:16	17:15	17:33	17:59	18:25	19:53	20:26	20:48
29	06:35		07:35	07:03	07:28	07:40	07:27	06:51	06:03	06:21	05:57	06:04
	20:40		19:24	17:41	17:16	17:15	17:34	18:00	18:26	19:54	20:27	20:48
30	06:36		07:36	07:04	07:29	07:40	07:26	06:49	06:02	06:20	05:57	06:05
	20:40		19:23	17:40	17:15	17:15	17:35	18:01	18:27	19:55	20:28	20:49
31	06:37		07:37		07:30		07:25	06:48		06:19		06:05
	20:39		19:21		17:15		17:36	18:02		19:57		20:49
Potential sun hours	447	378	383	334	314	288	305	332	355	404	424	456
Total, worst case												

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

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

Green light for green energy

At Vestas, the future is green. We believe sustainable energy sources – wind power in particular – will dominate the energy market in place of fossil fuels. This means increasing the public acceptance of turbines, a task best achieved by winning the hearts and minds of communities.

Shadow flicker – the effect caused by the sun shining through the rotating blades of a turbine – is one of the drawbacks of locating a wind farm near houses. In fact, shadow flicker can sometimes dictate whether planning permission is granted or not.

By equipping our turbines with Vestas Shadow Detection System, we can open up more areas for wind farm investment. And that means more opportunities for investors to profit from harvesting wind energy.

Farewell to the flicker

In response to this, we've developed our Vestas Shadow Detection System (VSDS) to overcome shadow flicker.

A reliable and economic solution

To provide the diagnostics and performance required by our customers, the VSDS system is engineered for complete technological reliability. Its direct connection to the turbine means it can operate even if the SCADA systems fail.

VSDS has a good track record with more than fifty installations already in operation. For flawless compatibility, the control box and interfaces is designed with Vestas in control of overall specifications.

Your benefits at a glance:

- Higher chance of planning permission
- Greater community acceptance of wind farms
- Economical to install and maintain
- Reliable, proven technology
- Suitable for a range of turbines and environments

Product Availability:

VSDS is available across a range of turbines and is a reliable and effective option for Vestas turbines with:

- Free IO signals
 - VMP global software platform
-

How does it work?

The VSDS system is integrated with the control system of the turbine. If the unit registers shadow flicker beyond a certain threshold, it pauses the blades to avoid the strobing effect on nearby properties.

The equipment comprises two sensors, fitted to the east and west aspects of the turbine. A shadow controller unit measures the difference in intensity between those two readings and calculates how pronounced a shadow is at any given moment.

The sensors are:

- Heated to prevent freezing in conditions as low as -38°C.
- Resistant to ground reflection for consistent results
- Magnetised for cost-effective installation

Shadow controllers are uniquely configured for each turbine. They are programmed with the locations of neighbouring properties, as well as timetables indicating when shadow flicker must be avoided.

Don't be in the dark about shadows

The intensity of shadow casting is primarily dependent on four factors:

- The angle and position of the sun in relation to the turbine and the property affected
- The distance from the turbine to the property
- The size of the rotor
- The hub height

Based on these values, WindPro software is used to calculate values for each turbine. These are a 'theoretical' worst-case shadow scenario, and an 'actual' shadow scenario. The latter takes into account live factors such as the weather conditions and whether or not the turbine is running

These two values are important because in many markets they can be critical for planning permission. In Germany, for example, wind farms are limited to 30 hours of 'theoretical' shadow casting per year, but only eight hours per year of 'actual' shadow casting.



The sensors are magnetised for cost-effective installation.